DP Country Alignment Studies: Alignment of the Japanese High School Curriculum (JHSC)

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Ecctis

Acronyms

AA	mathematics: analysis and approaches
AHL	additional higher level
AI	mathematics: applications and interpretation
CAS	Creativity, activity, service
CP	Career-related Programme
DP	Diploma Programme
GSP	General Subjects Pathway
HL	higher level
IB	International Baccalaureate
IBO	International Baccalaureate Organisation
JHSC	Japanese High School Curriculum
MEXT	Ministry of Education, Culture, Sports, Science and Technology
MYP	Middle Years Programme
PYP	Primary Years Programme
RQ	Research Question
SL	standard level
SMC	Science and Mathematics Course
SSP	Specialised Subjects Pathway
TOK	theory of knowledge
WIAIBE	What is an IB education?

Contents

1. Executive Summary

Project Aims and Context

The International Baccalaureate (IB) Organization is a not-for-profit educational foundation offering four programmes across the world. One of them – the Diploma Programme (DP) – is a two-year upper secondary programme, primarily intended to prepare students for university matriculation and higher education.

Following previous studies focused on the education systems of Australia, Canada, the US, Singapore, South Korea, Finland, France, Spain, Brazil, and Mexico, Ecctis was commissioned by the IB to deliver another critical and in-depth study that assessed the level of alignment between the DP and comparison points within Japan's upper secondary education system.[1] More specifically, the study aimed to identify areas of similarity and difference between the DP and the Japanese High School Curriculum (JHSC) by comparing philosophical underpinnings, structure, requirements, assessment methods, and learning pathways. Additionally, it sought to determine how the DP compared to the selected benchmarks in terms of intended student learning outcomes at the subject level. The study focused on mathematics, sciences, literature, language acquisition, and history subjects.

Ultimately, this series of comparative studies aims to inform the IB's development of tools and resources for IB teachers, helping them navigate between the IB and the local curriculum in the target countries where needed. In doing so, it also contributes to further supporting fair recognition of the DP by institutions, employers, and other key stakeholders, supporting progression and mobility for DP graduates.

Research Questions and Methods

All comparative studies in this series have been framed by responses to Research Questions (RQs), both at programme and subject levels. For this study, these RQs were the following:

RQ1: To what degree does the DP curriculum align with Japan's upper secondary curriculum? In what way are the curricula similar and in what way are they different in demand and difficulty? To what degree are the curricula compatible?

RQ2: To what degree do the curricula align with regards to their:

2.1: Philosophical underpinnings

- Objectives
- Principles
- Values.

2.2: Structure

- Learning areas
- Subject offerings
- Degree of specialization
- Time allocation.

2.3: Requirements

[1] The summaries and reports for the DP Country Alignment Studies can be accessed here: www.ibo.org/research/curriculum-research/dp-studies/dp-country-alignment-studies-2023/

- Programme entry requirements
- Time requirements (i.e. programme duration, teaching hours, study hours)
- Certificate requirements (i.e. credits, passing and failing conditions, compensation options).

2.4: Assessment

- Nature of assessment (i.e. number, type, duration, question types, availability of marks)
- Assessment model (i.e. relative weighting of assessments to overall grades).

2.5: Student learning pathways

- Degree of specialization
- Options in subject (area) choice (i.e. compulsory subjects, electives).

RQ3: To what degree do the subjects align with regards to:

3.1: Content

- Topics (i.e. scope of content area, breadth, depth)
- Learning activities (i.e. difficulty, demand).

3.2: Expected learning outcomes

- Knowledge
- Competences (i.e. subject-specific, 21st century competences).

To answer the above RQs, Ecctis developed and applied a bespoke methodology.

At programme-level, this involved the comparative analysis of the key components of the DP and JHSC, including philosophical underpinnings, structure, requirements, associated outcomes, student learning pathways, and assessment methods (where possible). At subject-level, it involved the comparative analysis of the key components of the DP and the JHSC subjects, including learning outcomes, content, and demand.

Where appropriate, Ecctis complemented its standard comparative methodology with a comprehensive mapping method, extracting themes from the DP to evaluate their presence in the comparison point(s). Additionally, to assess demand at subject level, Ecctis designed and deployed an expert panel approach, scoring each individual subject against a common set of demand criteria.[2]

Key Findings

Programme-level

The most significant similarity between the DP and JHSC lies in their philosophical underpinnings. However, in most other aspects, they differ somewhat. Key differences include the availability of industry-focused subjects in the JHSC, the subject-based vs credit-based requirements, the level of optionality, the degree of specialisation offered in certain subjects, subject size, the prescriptiveness of entry requirements, and the extent of assessment centralisation. Nevertheless, the flexibility of the JHSC allows students to follow pathways similar to those in the DP, balancing specialisation with breadth across different subject areas.

- **Philosophical underpinnings**: The DP and JHSC share very similar philosophical underpinnings. Indeed, themes of independence and self-management, critical inquiry and reasoning, principled and community-oriented, and communicative and collaborative

[2] Each individual subject was scored for: cognitive skills evidenced in the learning outcomes (based on the Revised Bloom's Taxonomy), depth of knowledge (adapted from Webb's Depth of Knowledge levels), volume of work (a tri-factor score considering breadth, depth and allocated timeframe), and outstanding areas of subject demand (stretch areas).

competency are evident in both curricula, though the themes of conceptual thought and understanding and being grounded in real-world contexts are emphasised more in the DP. Nonetheless, students or teachers moving between the two programmes would find a high level of consistency between their philosophical underpinnings.

- **Programme structure**: The DP and JHSC differ in duration, with the DP spanning two years and the JHSC three. Both follow a baccalaureate-style structure, covering a broad range of subject areas, though the JHSC organises some of these differently and includes additional areas. A key distinction is the JHSC's inclusion of both general and specialised subjects, with industry-focused options that are more vocational than those in the DP. Structurally, the DP follows a subject-based approach with SL and HL options, whereas the JHSC is credit-based, combining compulsory and elective subjects. Additionally, subject offerings and teaching hours differ between the two curricula. While some subject areas in the JHSC have a greater number of individual subjects compared to their DP equivalents, subjects typically have a narrower scope and are allocated fewer teaching hours than those in the DP.

- **Entry requirements**: The DP and JHSC differ with respect to entry requirements. Indeed, the IB encourages students and teachers to consult subject guides around expected prior learning but does not provide fixed entry requirements. In contrast, entry to high school in Japan is dependent on the successful completion of entrance examinations.

- **Student learning pathways**: The JHSC and DP both offer a broad curriculum with significant optionality, though their structural differences lead to different pathways being available. While JHSC students study a wide range of subjects, not all are necessarily pursued throughout high school as in the DP. Generally, JHSC electives allow for more flexibility and control over the breadth and depth of study. For example, several elective subjects can be studied within one single area, whereas the DP requires students to take one subject from each of six distinct areas. Another key difference is the level of specialisation available. In the DP this is consistent across all subjects, whereas in the JHSC, some subjects, such as maths, have more specialisation available, while others, such as geography, have less. However, the flexibility in the JHSC allows students to choose pathways similar to those in the DP, balancing specialisation with breadth across different subject areas.

- **Assessment methods:** Assessment for the High School Diploma in Japan is decentralised, with schools determining how student learning is assessed. In contrast, the DP follows a standardised approach with centrally defined objectives, methods, and weightings. While the DP primarily relies on external exams, with some internal assessment, High School Diploma grades are informed by school-based assessments, though students may still take external exams like the Common Test for University Admissions. Unlike the DP, continuous assessment can contribute to High School Diploma grades. Despite these differences, some school-based assessments, such as written tests and projects, resemble DP assessments, and there are similarities in subject-specific assessment objectives between the two curricula.

Subject-level

In this study, Ecctis carried out subject-level comparative analysis between the DP and JHSC for mathematics, physics, chemistry, biology, literature, language acquisition, and history. The analysis focused on the following DP and JHSC subjects:

Table: Subjects for comparison of the DP and JHSC.

DP subjects	JHSC (General subjects)	JHSC (Specialised subjects)
MATHEMATICS		
mathematics: analysis and approaches (AA) SL & HL mathematics: applications and interpretation (AI) SL & HL	• Mathematics I • Mathematics II • Mathematics III • Mathematics A • Mathematics B • Mathematics C • Basic Inquiry-Based Study of Science and Mathematics • Inquiry-Based Study of Science and Mathematics	• Mathematics I for the Science and Mathematics Course (SMC) • Mathematics II for the Science and Mathematics Course (SMC) • Advanced Mathematics for the Science and Mathematics Course (SMC)
SCIENCES		
physics SL & HL	• Basic Physics • Advanced Physics	Physics for the Science and Mathematics Course (SMC)
chemistry SL & HL	• Basic Chemistry • Advanced Chemistry	Chemistry for the Science and Mathematics Course (SMC)
biology SL & HL	• Basic Biology • Advanced Biology	Biology for the Science and Mathematics Course (SMC)
LITERATURE		
language A: literature SL & HL	• Japanese Literature • Advanced Classics	
LANGUAGE ACQUISITION		
language B SL & HL	• English Communication I • English Communication II • English Communication III • Logic and Expression I • Logic and Expression II • Logic and Expression III	• Comprehensive English I • Comprehensive English II • Comprehensive English III • Debate and Discussion I • Debate and Discussion II • Essay Writing I • Essay Writing II
HISTORY		
history SL & HL	• Modern and Contemporary History • Advanced Japanese History • Advanced World History	

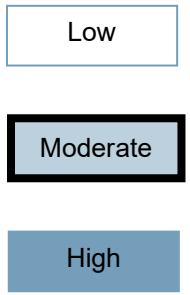
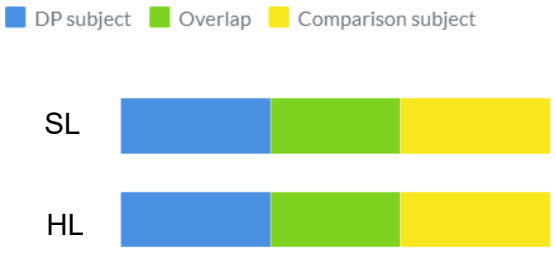
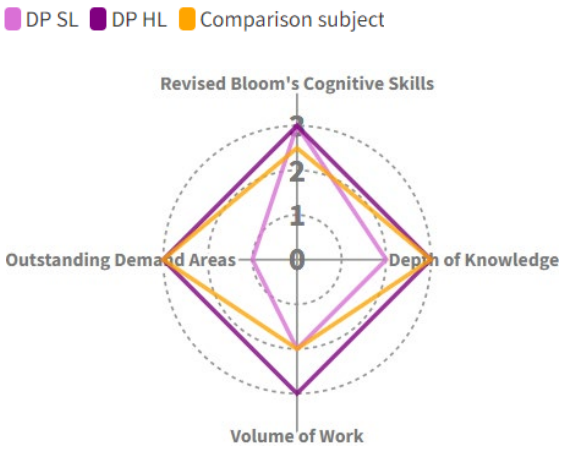
DP subjects were considered at both standard level (SL) and higher level (HL).

Visual and written summaries of the subject-level analysis between the DP and respective comparison points in the JHSC are provided in this section. The summaries include key findings on learning outcomes alignment, content alignment and demand alignment.

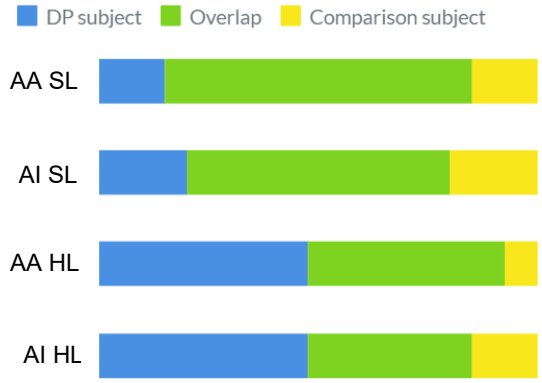
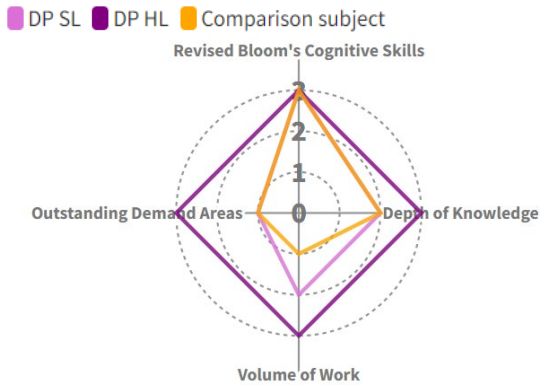
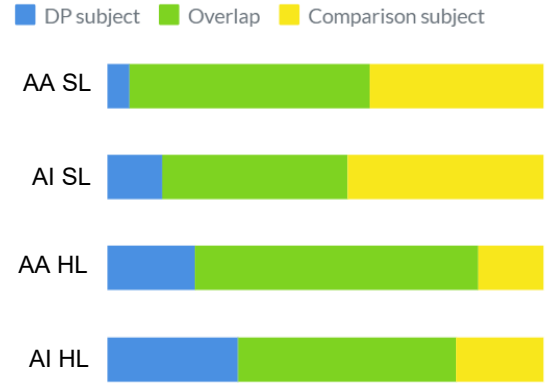
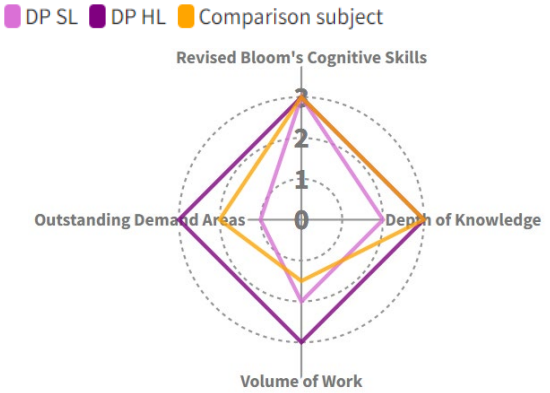
The findings from the subject-level analysis are summarised in the following tables.

Figures: Visual representation of alignment between DP subjects and JHSC comparison subjects.

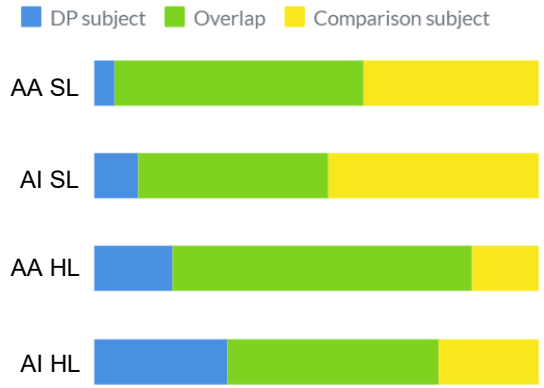
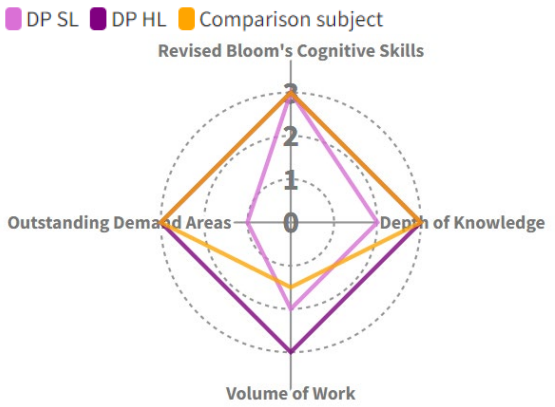
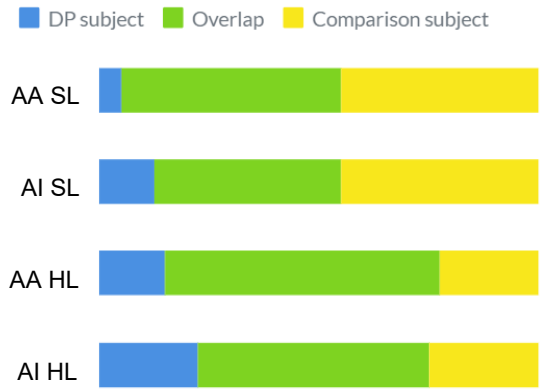
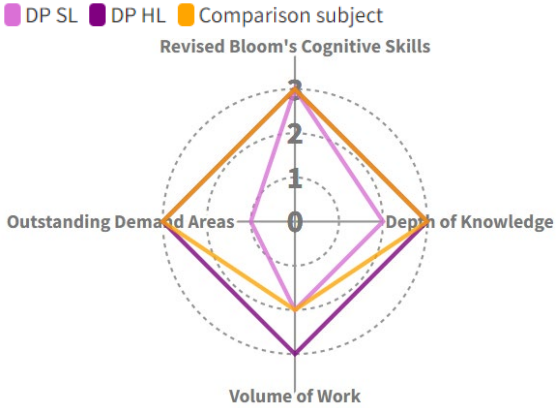
Key:

Comparison subject	Learning outcomes alignment	Content alignment	Demand alignment
Displays the name of the comparison subject	 This represents the learning outcome alignment between the DP subject and the comparison subject. A black border is placed around the selected judgement – 'Moderate' in this example.	 These bars represent the content alignment between the DP subject and the comparison subject. There is one bar showing alignment with SL content and another for HL content (inclusive of SL content). The **green** section of the bar represents the overlap of content between the subjects. The **blue** section represents content which was in the DP subject only. The **yellow** section represents content which was in the comparison subject only. Therefore, if, say, the blue section was larger than the yellow, this can be interpreted as DP subject having more content unique to itself than the comparison subject. A large green bar would indicate that a substantial proportion of content is shared between the DP and comparison subject.	 This radar diagram displays the demand judgement scores for the comparison subject and the DP subject – both at SL and HL.

The subject level alignment between DP mathematics (AA and AI, SL and HL) and the JHSC mathematics pathways is represented below:

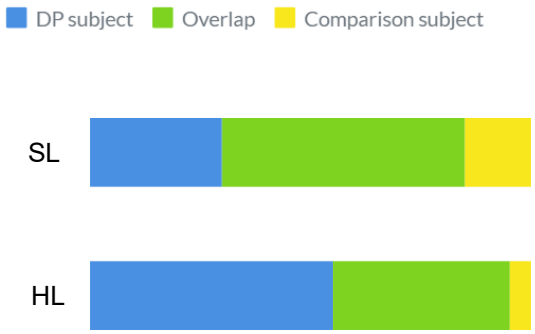
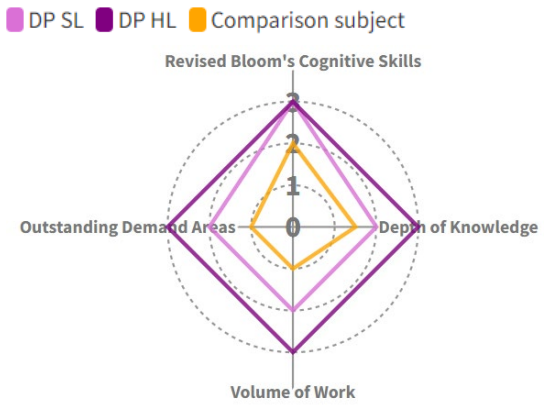
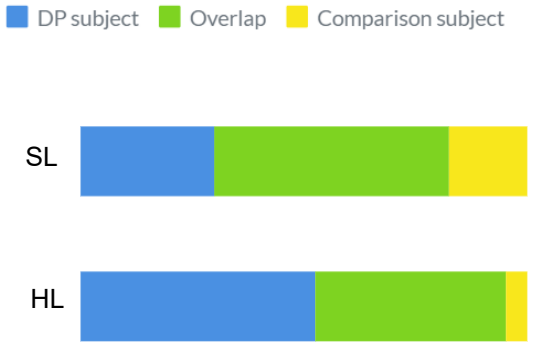
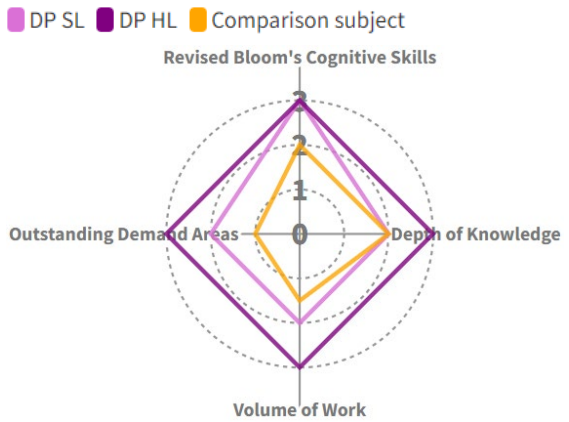
Comparison subject/pathway	Learning outcomes alignment	Content alignment	Demand alignment*
JHSC General Subjects Pathway I	Low Moderate **High**		
JHSC General Subjects Pathway II	Low Moderate **High**		

General Subjects Pathway I: Mathematics I and II, Mathematics A and B, and Basic Inquiry.
General Subjects Pathway II: Mathematics I, II, and III, Mathematics A, B and C, and Basic Inquiry and Inquiry.
*DP mathematics: analysis and approaches (AA) and mathematics: applications and interpretation (AI) score the same as each other for SL and the same as each other for HL.

Comparison subject/pathway	Learning outcomes alignment	Content alignment	Demand alignment*
JHSC Specialised Subjects Pathway I	Low Moderate **High**		
JHSC Specialised Subjects Pathway II	Low Moderate **High**		

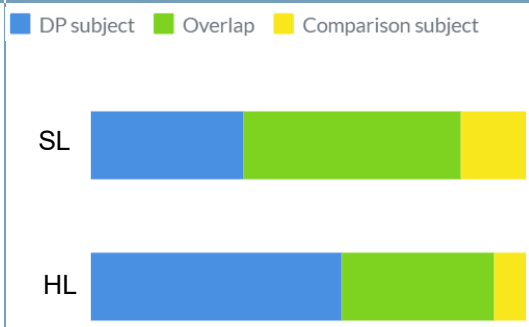
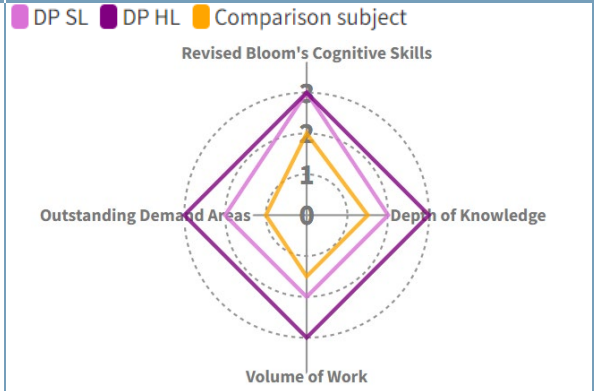
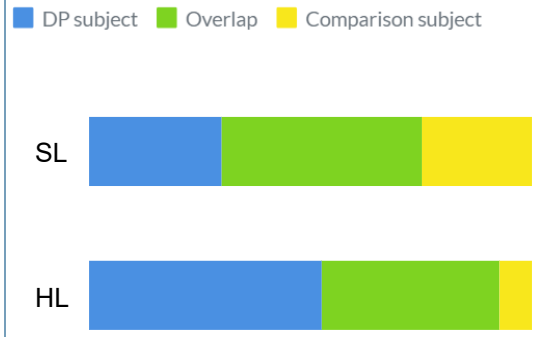
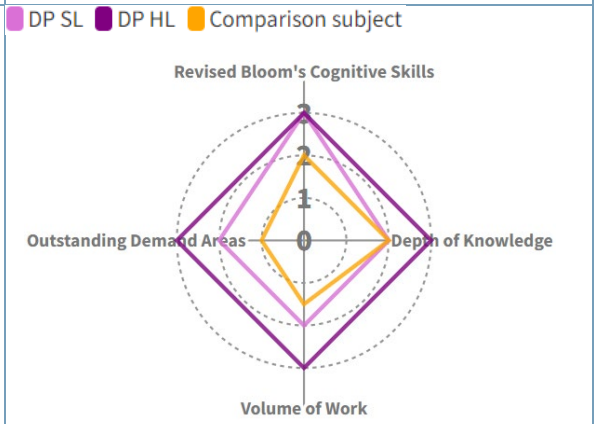
Specialised Subjects Pathway I: Mathematics I and II (SMC) and Inquiry subjects.
Specialised Subjects Pathway II: Mathematics I and II (SMC), Advanced Mathematics (SMC), and Inquiry subjects.
*DP mathematics: analysis and approaches (AA) and mathematics: applications and interpretation (AI) score the same as each other for SL and the same as each other for HL.

The subject level alignment between DP physics (SL and HL) and JHSC physics subjects is represented below:

Comparison subject	Learning outcomes alignment	Content alignment	Demand alignment
JHSC Advanced Physics	Low **Moderate** High		
JHSC Physics for the Science and Mathematics Course (SMC)*	Low **Moderate** High		

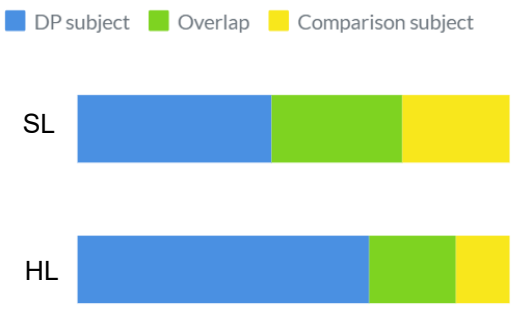
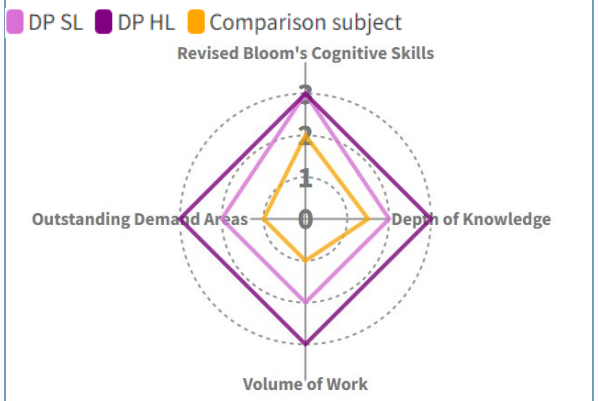
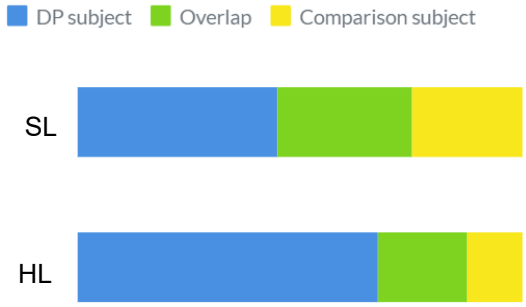
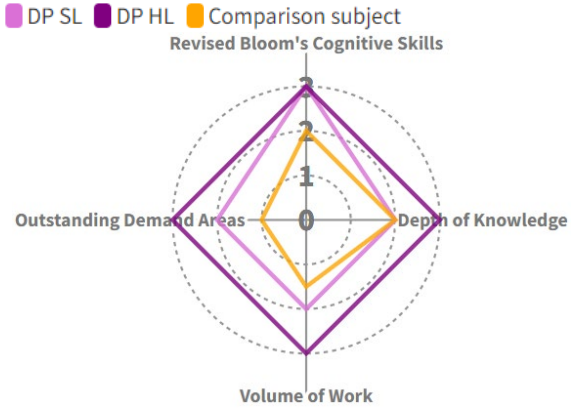
*The JHSC states that content may be expanded as appropriate in specialised science subjects, such as Physics (SMC). Therefore, in practice, the subject content and demand may differ slightly to what is represented here.

The subject level alignment between DP chemistry (SL and HL) and JHSC chemistry subjects is represented below:

Comparison subject	Learning outcomes alignment	Content alignment	Demand alignment
JHSC Advanced Chemistry	Low **Moderate** High		
JHSC Chemistry for the Science and Mathematics Course (SMC)*	Low **Moderate** High		

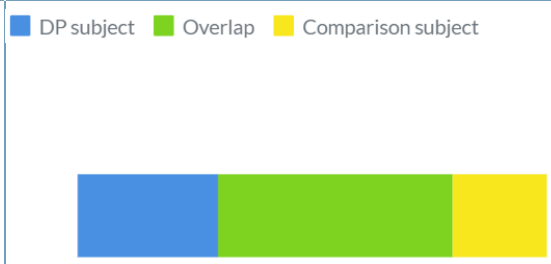
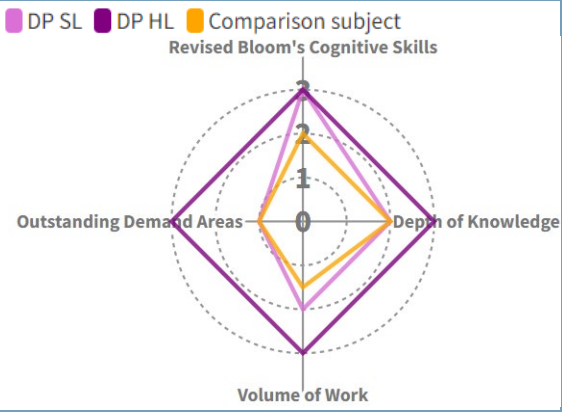
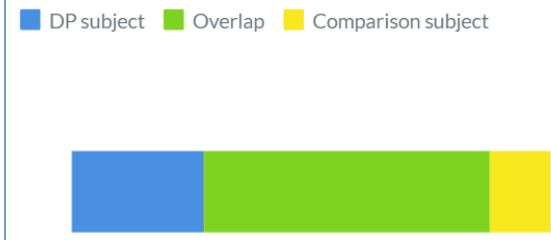
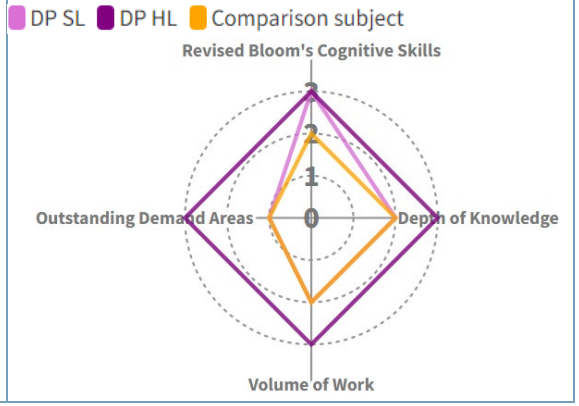
*The JHSC states that content may be expanded as appropriate in specialised science subjects, such as Chemistry (SMC). Therefore, in practice, the subject content and demand may differ slightly to what is represented here.

The subject level alignment between DP biology (SL and HL) and JHSC biology subjects is represented below:

Comparison subject	Learning outcomes alignment	Content alignment*	Demand alignment
JHSC Advanced Biology	Low **Moderate** High		
JHSC Biology for the Science and Mathematics Course (SMC)*	Low **Moderate** High		

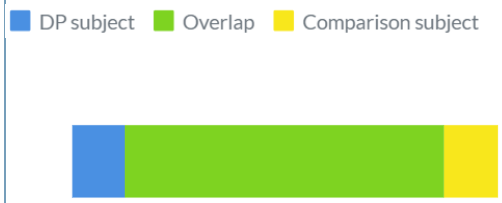
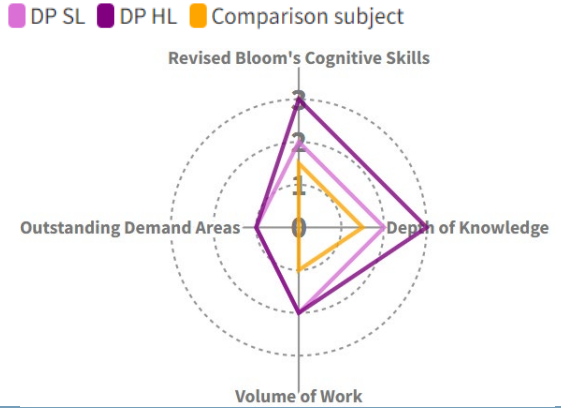
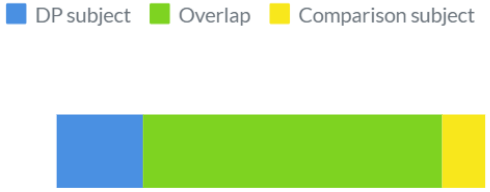
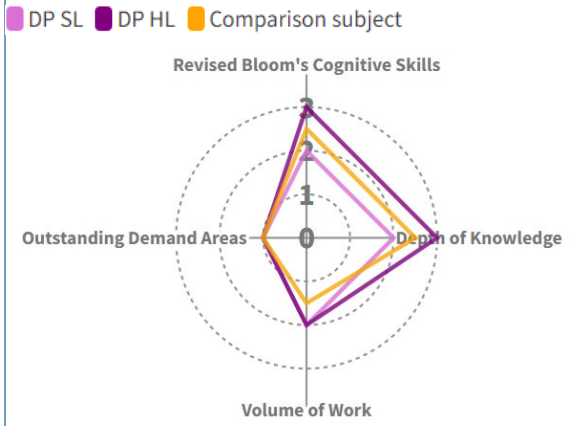
*The JHSC states that content may be expanded as appropriate in specialised science subjects such as Biology (SMC). Therefore, in practice, the subject content and demand may differ slightly to what is represented here.

The subject level alignment between DP language A: literature (SL and HL) and JHSC literature subjects is represented below:

Comparison subject	Learning outcomes alignment	Content alignment*	Demand alignment
JHSC Japanese Literature	Low **Moderate** High		
JHSC Advanced Classics	Low **Moderate** High		

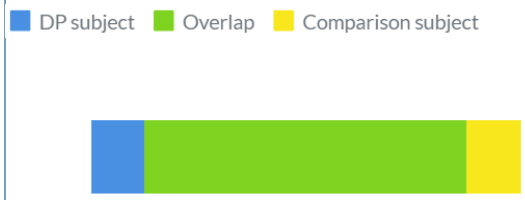
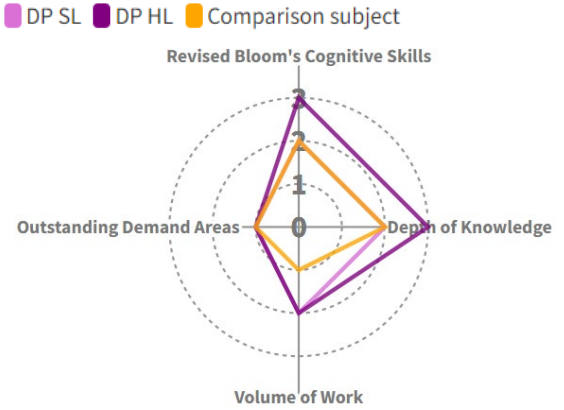
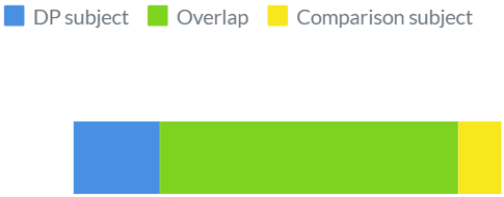
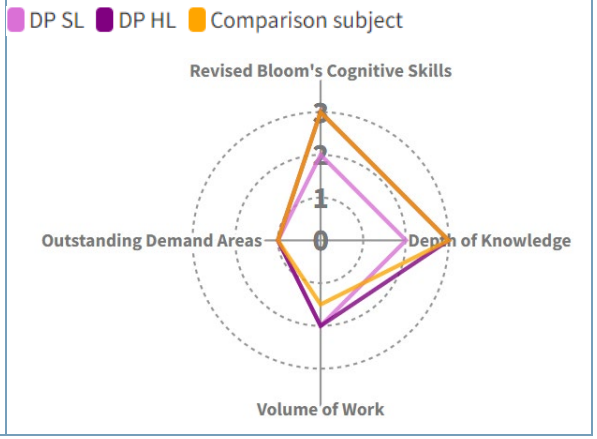
*Each bar represents the areas and conceptual questions that may be considered, rather than the number of texts studied, as this is not specified in JHSC literature subjects. As the areas of exploration and conceptual questions are the same for language A: literature SL and HL, only one bar is presented.

The subject level alignment between DP language B (SL and HL) and JHSC Foreign Language/English subject pathways is represented below.

Comparison subject/pathway	Learning outcomes alignment	Content alignment*	Demand alignment
JHSC General Subjects Pathway I	Low Moderate **High**	 The pathway aligns with **SL** receptive, productive, and interactive skills.	
JHSC General Subjects Pathway II	Low Moderate **High**	 The pathway aligns with **HL** receptive, productive, and interactive skills.	

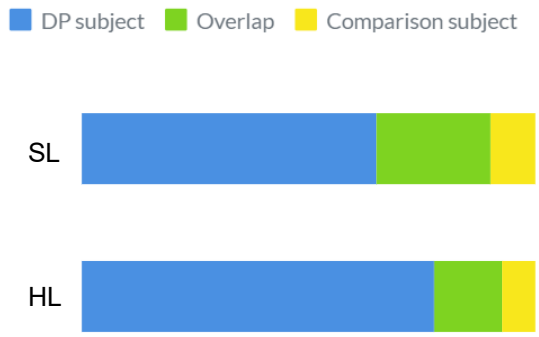
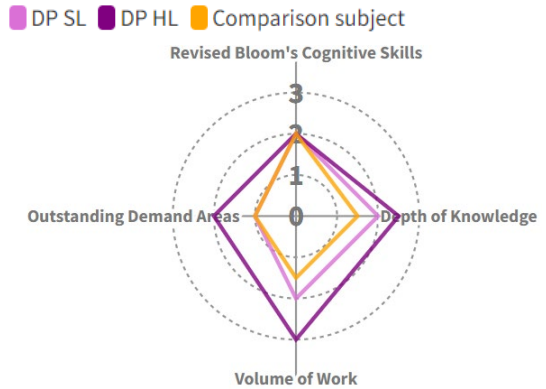
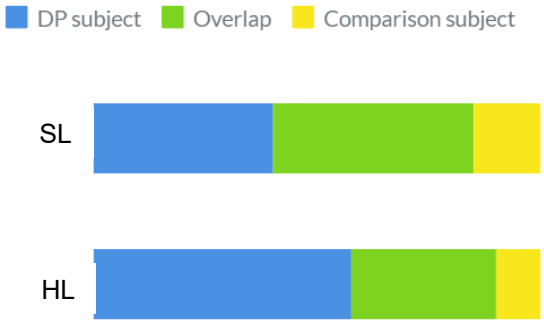
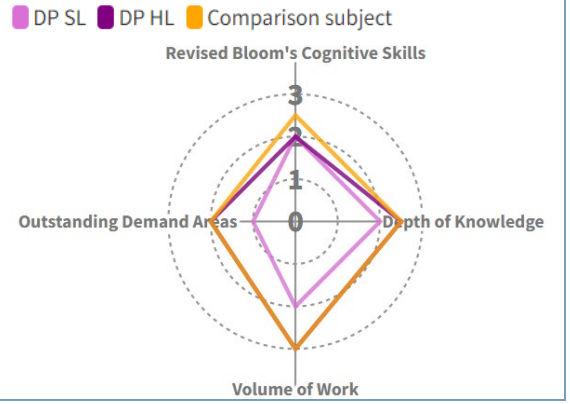
- **General Subjects Pathway I**: English Communication I and II and Logic and Expression I and II.
- **General Subjects Pathway II**: English Communication I, II, and III and Logic and Expression I, II, and III.

*Each bar represents the extent to which the JHSC pathway overlaps with the components of the DP language B syllabus, including its prescribed themes, text types, concepts, and principles of course design. Additionally, a statement below each bar specifies whether the JHSC pathway aligns with SL or HL based on communication competencies.

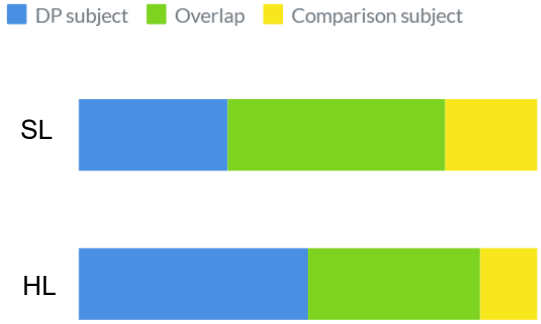
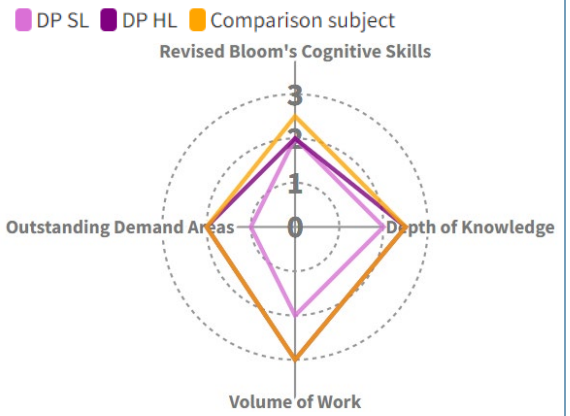
Comparison subject/pathway	Learning outcomes alignment	Content alignment	Demand alignment
JHSC Specialised Subjects Pathway I	Low Moderate **High**	 The pathway aligns with **SL** receptive, productive, and interactive skills.	
JHSC Specialised Subjects Pathway II	Low Moderate **High**	 The pathway aligns with **HL** receptive, productive, and interactive skills.	

- **Specialised Subjects Pathway I**: Comprehensive English I and II, Debate and Discussion I, and Essay Writing I.
- **Specialised Subjects Pathway II**: Comprehensive English I, II, and III, Debate and Discussion I and II, and Essay Writing I and II.

The subject level alignment between DP history (SL and HL) and JHSC history subjects is represented below:

Comparison subject	Learning outcomes alignment	Content alignment*	Demand alignment
JHSC Modern and Contemporary History	Low Moderate **High**		
JHSC Advanced Japanese History	Low Moderate **High**		

*Each bar represents the content overlap between the JHSC subject and all DP history topics available at SL or HL. In practice, DP students only study a selection of these topics.

Comparison subject	Learning outcomes alignment	Content alignment*	Demand alignment
JHSC Advanced World History	Low Moderate High		

*Each bar represents the content overlap between the JHSC subject and all DP history topics available at SL or HL. In practice, DP students only study a selection of these topics.

Key highlights of the subject-level analysis are summarised below.

Mathematics

- **Learning outcomes alignment**: There is a high level of alignment between the mathematics learning outcomes of the DP and JHSC. Both have a strong emphasis on understanding and application, communicating mathematically, developing learning skills, using critical thinking, and making links and generalisations. Other DP themes – engaging with wider contexts and inquiry approaches – are more present in some JHSC subjects than others and there's an overall lesser focus on technology in the JHSC objectives.

- **Content alignment**: General Subjects Pathway I aligns strongly with SL content and has similar breadth and depth. The other pathways include a good amount of AHL and other content, thus align well with HL and have similar breadth and depth. As the largest, Specialised Subjects Pathway II contains the greatest amount of DP content. For all pathways, alignment tends to be stronger with AA, rather than AI, content.

- **Demand alignment**: General Subjects Pathway I strongly aligns with the demand scores given to DP mathematics subjects at SL. The other pathways align well with the demand scores given to DP mathematics subjects at HL, with Specialised Subjects Pathway II having the strongest alignment.

Physics, chemistry, and biology

The DP science subjects – physics, chemistry, and biology – have been individually analysed and compared against the corresponding subjects in the JHSC. However, due to DP sciences sharing learning outcomes and JHSC articulating objectives applicable to all sciences – the findings for all subjects were somewhat similar and are, thus, collectively presented below.

- **Learning outcomes alignment**: There is a moderate level of alignment between DP and JHSC science learning outcomes. While both strongly align in their emphasis on developing scientific investigations skills, other DP learning outcome themes are less present in the JHSC objectives. Conceptual understanding and awareness of issues and impacts are somewhat present; however, technology and communication and collaboration have a limited presence in the JHSC.

- **Content alignment**: JHSC physics and chemistry subjects have moderate alignment with SL content, with similar breadth but less depth in some topics. Alignment with AHL content is limited, though the specialised subjects indicate a higher presence of this. JHSC biology subjects have limited content alignment with DP biology. The JHSC subjects cover less breadth and, in most topics, have less depth than SL, though the occasional AHL subtopic is covered. The specialised science subjects cover the same content as the general subjects while allowing opportunity for expansion. Therefore, there is scope for the specialised subjects to offer greater breadth and depth in practice.

- **Demand alignment:** JHSC science subjects have moderate alignment with the demand scores of the corresponding DP science subjects at SL and limited alignment with the demand scores of DP science subjects at HL. However, the specialised subjects allow for expansion, hence there is scope for their demand to be greater in practice.

Literature

- **Learning outcomes alignment**: The DP and JHSC literature learning outcomes show moderate alignment, both emphasising literary interpretation, formulating and expressing ideas, intertextuality, and exploring identity through studying language and literature. Some DP themes are partially reflected in JHSC outcomes, such as the relationship between context and text, which is more present in Advanced Classics than Japanese Literature. While both address understanding the writer's craft, the DP places greater emphasis on evaluation. The JHSC instead emphasises vocabulary expansion, developing imagination, and writing literary compositions.

- **Content alignment**: There is moderate content alignment between DP language A: literature and JHSC literature subjects. The JHSC literature subjects align to varying degrees with all three areas of exploration in DP language A: literature. Notably, Advanced Classics has stronger alignment with these areas than Japanese Literature, though not with regards to the types of literary works studied. JHSC subjects are less prescriptive regarding the number and type of texts studied, making direct comparisons with DP language A: literature SL and HL challenging. However, the teaching hours allocated to the JHSC subjects imply that the breadth and depth of study would be more comparable to DP language A: literature at SL than HL.

- **Demand alignment**: JHSC literature subjects generally align with the demand scores given to DP language A: literature at SL, with Advanced Classics having slightly greater alignment than Japanese Literature. Neither subject aligns strongly with the demand of HL.

Language acquisition

- **Learning outcomes alignment**: There is a high level of alignment between the DP and JHSC language acquisition learning outcomes. Indeed, all DP language B learning outcome themes are at least partially present in JHSC Foreign Language/English objectives, with nearly all being well-evidenced.

- **Content alignment**: The content alignment between the JHSC language acquisition pathways and DP language B is moderate to high. All JHSC pathways have strong alignment with the prescribed themes, texts, conceptual understandings, and principles of course design of DP language B. In terms of communication skills, the content of General Subjects Pathway I and Specialised Subjects Pathway I closely align with DP language B at SL. Meanwhile, General Subjects Pathway II and Specialised Subjects Pathway II strongly align more with the communication skills required for DP language B at HL.

- **Demand alignment**: General Subjects Pathway I aligns moderately with the demand scores given to DP language B at SL, as it scores less in all categories. Specialised Subjects pathway I aligns more strongly with DP language B at SL, scoring the same in most categories. Generalised Subjects Pathway II and Specialised Subjects Pathway II align well with the demand scores for DP language B at HL, with the specialised pathway having slightly stronger alignment.

History

- **Learning outcomes alignment**: There is a high level of alignment between DP and JHSC history learning outcomes. Both emphasise understanding historical contexts, studying diverse sources, engaging with multiple perspectives and opinions, and using history to understand the self and present day. Both require the formulation of arguments, though the DP more explicitly emphasises that analysis, evaluation and synthesis should be used. While the DP includes reflection on the nature of history, the JHSC focuses more on problem-solving.

- **Content alignment**: Modern and Contemporary History, as a smaller subject, has low content alignment with DP history, whereas the elective subjects – Advanced Japanese and Advanced World History – have moderate content alignment. Content alignment is not strong for any subject, as the JHSC subjects do not offer optional topics. In practice, Modern Contemporary History has similar breadth, but less depth than DP history at SL. The elective subjects have greater breadth than DP history at SL or HL with regards to the time periods covered, but Advanced Japanese History has less breadth with regards to the regions covered. The elective subjects align with some prescribed subjects and world history topics, as well as having partial alignment with some HL depth studies; thus their depth somewhat surpasses that of SL.

- **Demand alignment**: Modern and Contemporary History scores similarly to DP history at SL, though slightly less in certain categories. The scores for Advanced Japanese History and Advanced World History align with DP history at HL.

Summary

At the programme level, the DP and JHSC show moderate alignment. Both programmes share similar philosophical underpinnings, though they differ in key areas such as structure, student learning pathways, entry requirements, and assessment methods. However, the flexibility within the JHSC allows students to pursue pathways comparable to those offered in the DP.

At the subject level, the degree of alignment between the DP and JHSC varies. The strongest alignment is observed for mathematics and language acquisition, where the JHSC offers more opportunities for specialisation in comparison to its other subjects. However, the extent of this alignment depends on the number and combination of subjects studied in these subject areas. In terms of intended learning outcomes, alignment is high for mathematics, language acquisition, and history, and moderate for sciences and literature. Content alignment is strongest for mathematics and language acquisition, moderate for other subjects, and lowest for biology. Regarding demand, JHSC subjects and pathways generally align well with the corresponding DP subject at SL. However, only certain JHSC subject pathways in mathematics and language acquisition demonstrate alignment with DP subjects at HL.

2. Introduction

2.1 Context and Scope

The International Baccalaureate (IB) Organization is a not-for-profit educational foundation offering four programmes across the world, including the Primary Years Programme (PYP), Middle Years Programme (MYP), Diploma Programme (DP) and the Career-related Programme (CP). The DP – the IB's two-year upper secondary Diploma Programme – is conceived as a preparatory programme for university matriculation and higher education, aimed at developing students with "excellent breadth and depth of knowledge" who "flourish physically, intellectually, emotionally and ethically".[3]

Following previous studies focused on the education systems of Australia, Canada, the US, Singapore, South Korea, Finland, France, Spain, Brazil, and Mexico, Ecctis has been commissioned by the IB to deliver another critical and in-depth study to assess the level of alignment between the DP and comparison points within the upper secondary education system of Japan.[4] More specifically, the study aims to identify areas of similarity and difference between the DP and the Japanese High School Curriculum (JHSC) by comparing philosophical underpinnings, structure, requirements, assessment methods, learning pathways, and to determine how the DP compares to the selected benchmarks in terms of intended student learning outcomes at the subject level. The study focuses on mathematics, sciences, literature, language acquisition, and history subjects.

Ultimately, this series of comparative studies aims to inform the IB's development of tools and resources for IB teachers, helping them navigate between the IB and the local curriculum in the target countries where needed. In doing so, it also contributes to further supporting fair recognition of the DP by institutions, employers, and other key stakeholders, supporting progression and mobility for DP graduates.

This report constitutes one of the project's deliverables and aims to specifically answer the research questions pertaining to how the DP aligns with the Japanese High School Curriculum (JHSC).

2.2 Research Questions

All comparative studies in this series have been framed by responses to Research Questions (RQs), both at programme level and subject level. For this study specifically, the RQs are as follows:

[3] International Baccalaureate. (2022). *Diploma Programme*. Available from: https://www.ibo.org/programmes/diploma-programme/

[4] Other DP County Alignment Studies are available from: DP country alignment studies (2023) - International Baccalaureate®

Table 1: Japan research questions.

RQ1: To what degree does the DP curriculum align with Japan's upper secondary curriculum? In what way are the curricula similar and in what way are they different in demand and difficulty? To what degree are the curricula compatible?

RQ2: To what degree do the curricula align with regards to their:

2.1: Philosophical underpinnings
- Objectives
- Principles
- Values.

2.2: Structure
- Learning areas
- Subject offerings
- Degree of specialization
- Time allocation.

2.3: Requirements
- Programme entry requirements
- Time requirements (i.e. programme duration, teaching hours, study hours)
- Certificate requirements (i.e. credits, passing and failing conditions, compensation options).

2.4: Assessment
- Nature of assessment (i.e. number, type, duration, question types, availability of marks)
- Assessment model (i.e. relative weighting of assessments to overall grades).

2.5: Student learning pathways
- Degree of specialization
- Options in subject (area) choice (i.e. compulsory subjects, electives).

RQ3: To what degree do the subjects[5] align with regards to:

3.1: Content
- Topics (i.e. scope of content area, breadth, depth)
- Learning activities (i.e. difficulty, demand).

3.2: Expected learning outcomes
- Knowledge
- Competences (i.e. subject-specific, 21st century competences).

With regards to subjects to be compared in the subject-level comparative analysis, the following table indicates the agreed scope:

[5] With regards to subjects within scope, see Table 2.

Table 2: Subjects for comparison between the DP and JHSC.

DP subjects	JHSC (General subjects)	JHSC (Specialised subjects)
MATHEMATICS		
mathematics: analysis and approaches (AA) SL & HL mathematics: applications and interpretation (AI) SL & HL	• Mathematics I • Mathematics II • Mathematics III • Mathematics A • Mathematics B • Mathematics C • Basic Inquiry-Based Study of Science and Mathematics • Inquiry-Based Study of Science and Mathematics	• Mathematics I for the Science and Mathematics Course (SMC) • Mathematics II for the Science and Mathematics Course (SMC) • Advanced Mathematics for the Science and Mathematics Course (SMC)
SCIENCES		
physics SL & HL	• Basic Physics • Advanced Physics	Physics for the Science and Mathematics Course (SMC)
chemistry SL & HL	• Basic Chemistry • Advanced Chemistry	Chemistry for the Science and Mathematics Course (SMC)
biology SL & HL	• Basic Biology • Advanced Biology	Biology for the Science and Mathematics Course (SMC)
LITERATURE		
language A: literature SL & HL	• Japanese Literature • Advanced Classics	
LANGUAGE ACQUISITION		
language B SL & HL	• English Communication I • English Communication II • English Communication III • Logic and Expression I • Logic and Expression II • Logic and Expression III	• Comprehensive English I • Comprehensive English II • Comprehensive English III • Debate and Discussion I • Debate and Discussion II • Essay Writing I • Essay Writing II
HISTORY		
history SL & HL	• Modern and Contemporary History • Advanced Japanese History • Advanced World History	

All DP subjects have been considered at both standard level (SL) and higher level (HL).

2.3 Report Structure

In responding to the above RQs, this report included the following sections:

- 3. Methodology: this section provides a brief overview of the methodology applied in this study. This includes details of how the document selection and identification of comparison points for the study took place; a definition of 'alignment'; an outline of the methodology used for comparisons at both programme and subject levels; and an outline of the methodology used to assess demand.

- 4. Programme-Level Alignment: this section presents the synthesised analysis from the programme-level comparisons between the DP and the JHSC. In doing so, it includes brief programme overviews for both, followed by the comparative analysis on their philosophical underpinnings, structure, requirements and associated outcomes, student learning pathways and the general nature of assessment practices.

- 5. Subject-Level Alignment: this section presents the synthesised analysis from the subject-level comparisons between DP and JHSC subjects. For each comparison subject, this includes the comparative analysis of their learning outcomes, content, and demand.

- 6. Key Findings: this section outlines the key findings from both the programme- and subject-level comparisons undertaken in this study. In doing so, it provides a top-level conclusion on alignment at both programme and subject levels, and a succinct summary of key similarities and key differences.

- 7. Bibliography: this section references all sources cited in the study, including the documents used for both programme- and subject-level curriculum analyses.

3. Methodology

3.1 Document Selection and Identification of Comparison Points

To undertake these comparative analyses, the following core documentation was reviewed (supplemented by additional documentation – detailed in the Bibliography – where relevant and available):

DP Documentation

- What is an IB education? (WIAIBE)
- WIAIBE Teacher Support Material
- DP: From Principles into Practice
- Programme Standards and Practices
- DP subject guides:
    - mathematics: analysis and approaches
    - mathematics: applications and interpretation
    - physics
    - chemistry
    - biology
    - language A: literature
    - language B
    - history

JHSC Documentation

- High School Course of Study (Announced in 2018)
- Commentary on the High School Curriculum Guidelines - Mathematics
- Commentary on the High School Curriculum Guidelines - Science
- Commentary on the High School Curriculum Guidelines - Japanese Language
- Commentary on the High School Curriculum Guidelines - Foreign Language/English
- Commentary on the High School Curriculum Guidelines - Geography and History
- Commentary on the High School Curriculum Guidelines - Science and Mathematics

Philosophical Underpinnings Comparison

For the programme-level comparisons between the philosophical underpinnings of each programme, Ecctis used the following elements of the curriculum documentation:

Table 3: Philosophical underpinnings for comparison of the DP and the JHSC.

Documentation containing philosophical underpinnings	
DP	**JHSC**
'What is an IB Education', particularly the following sections: • IB learner profile • International-mindedness	School Education Act（Act No. 26 of 1947).[7] • Art. 50 regarding the purpose of high school • Art. 51 regarding the objectives of education in high school

[7] School Education Act (1947). *Article 51.* Available from: https://www.japaneselawtranslation.go.jp/en/laws/view/4573/en#je_ch7at1

Documentation containing philosophical underpinnings	
DP	**JHSC**
• Approaches to teaching and approaches to learning.[6]	Basic Act on Education（Act No. 120 of 2006).[8] • Art. 2 regarding objectives of education High School Course of Study (Announced in 2018).[9] • Fundamentals of High School Education and the Role of the Curriculum.

The document 'What is an IB Education?' provides detailed information about the IB's educational philosophy. For the JHSC, the philosophical underpinnings can be determined from legislation and curriculum documentation. Indeed, the purpose and objectives of high school described in the Articles 50 and 51 of the School Education Act (Act No. 26 of 1947), the objectives of education described in Article 2 of the Basic Act on Education (Act No. 120 of 2006), and the fundamentals of high school education and the role of the curriculum described in Chapter 1 of the High School Course of Study, provided sufficient detail for meaningful comparison between the DP and JHSC in terms of philosophical underpinnings and were used as such.

For more information on the mapping process, see the Measuring Alignment section.

Learning Outcomes Comparison

For the Learning Outcomes comparisons, as neither of the two qualifications explicitly defines 'learning outcomes' in their curriculum documentation, Ecctis used the following categories of the curriculum documentation for comparison:

Table 4: Learning outcomes for comparison of the DP and the JHSC.

DP subjects	Categories utilised as learning outcomes
MATHEMATICS	
mathematics: analysis and approaches	DP mathematics subject group – aims and assessment objectives
mathematics: applications and interpretation	
SCIENCES	
physics	DP sciences subject group – aims and assessment objectives
chemistry	
biology	
LITERATURE	
language A: literature	DP studies in language and literature subject group – aims and assessment objectives
LANGUAGE ACQUISITION	
language B	DP language acquisition subject group – aims and assessment objectives
HISTORY	
history	DP individuals and societies subject group – aims DP history – aims and assessment objectives

[6] International Baccalaureate. (2017). *What is an IB Education?*

[8] Basic Act on Education (2006). Available from: https://www.japaneselawtranslation.go.jp/en/laws/view/2442

[9] MEXT. (2018). *High School Course of Study. Fundamentals of high school education and the role of the curriculum.* p. 19. Available from: 高等学校学習指導要領（平成 30 年告示）

JHSC subjects	Documentation and sections
MATHEMATICS	
• Mathematics I • Mathematics II • Mathematics III • Mathematics A • Mathematics B • Mathematics C	High School Course of Study - General Subjects - Mathematics - subject area objectives and individual subject objectives
• Basic Inquiry-Based Study of Science and Mathematics • Inquiry-Based Study of Science and Mathematics	High School Course of Study - General Subjects - Science and Mathematics - subject area objectives and individual subject objectives
• Mathematics I (SMC) • Mathematics II (SMC) • Advanced Mathematics (SMC)	High School Course of Study - Specialised Subjects - Science and Mathematics - subject area objectives and individual subject objectives
SCIENCE	
• Basic physics • Advanced physics • Basic chemistry • Advanced chemistry • Basic biology • Advanced biology	High School Course of Study - General Subjects - Science - subject area objectives and individual subject objectives
• Physics (SMC) • Chemistry (SMC) • Biology (SMC)	High School Course of Study - Specialised Subjects - Science and Mathematics - subject area objectives and individual subject objectives
JAPANESE LANGUAGE	
• Japanese Literature • Advanced Classics	High School Course of Study - General Subjects - Japanese Language - subject area objectives and individual subject objectives
FOREIGN LANGUAGE/ENGLISH	
• English Communication I • English Communication II • English Communication III • Logic and Expression I • Logic and Expression II • Logic and Expression III	High School Course of Study - General Subjects - Foreign Language - subject area objectives and individual subject objectives
• Comprehensive English I • Comprehensive English II • Comprehensive English III • Debate and Discussion I • Debate and Discussion II • Essay Writing I • Essay Writing II	High School Course of Study - Specialised Subjects - English - subject area objectives and individual subject objectives
HISTORY	
• Modern and Contemporary History • Advanced Japanese History • Advanced World History	High School Course of Study - General Subjects - Geography and History - subject area objectives and individual subject objectives

Although not labelled as learning outcomes per se, the above categories were chosen as they were deemed to provide the most complete picture of the skills and knowledge that students should obtain upon completion of each subject.

For more information on the mapping process, see the Measuring Alignment section below.

3.2 Measuring Alignment (Similarities and Differences)

Alignment is a key concept for this series of studies. The aim of this study is to ascertain the level of alignment between the DP and the JHSC. Although Ecctis has sought to represent the alignment findings as straightforwardly as possible in this report, alignment is not a simple concept, so it is important to establish Ecctis' approach in this regard.

Alignment, as a term, is often used in education circles to refer to *internal* coherence between learning outcomes, assessment methods, teaching practices and other features of teaching and learning. This report does not consider *internal* alignment, but what might appropriately be labelled *external* alignment. Alignment of this type looks at the extent to which a programme (in this case, the DP) aligns with other educational programmes (in this case, the JHSC). This form of external alignment is particularly key to understand for an organisation like the IB which operates in so many international contexts, often alongside national curricula, where teachers and students may seek to move back and forth between IB and national pathways of education.

Within this narrower definition of *external* alignment, the idea is still broad and could be viewed from any number of perspectives. In this series of studies, the IB has specifically asked Ecctis to consider alignment from the specific perspectives outlined by the RQs. The RQs thereby define the limits of the type of alignment that will be considered within the reports. Namely:

- At the programme level:
    - Alignment of philosophical underpinnings
    - Alignment of structure
    - Alignment of requirements and associated outcomes
    - Alignment of student learning pathways
    - Alignment of approaches to assessment.

- At the subject level (in selected subjects):
    - Alignment of learning outcomes
    - Alignment of content
    - Alignment of demand.

To form a comprehensive picture of alignment, Ecctis' approach has used multiple repeating steps within each report. For Japan, it sought to:

- Analyse to what extent the JHSC has similarities with the DP.
- Analyse to what extent the JHSC lacks features contained within the DP.
- Analyse to what extent the DP lacks features contained within the JHSC.

In this respect, **alignment is a measure of the extent to which there are similarities and differences between key selected criteria of two educational programmes**. High alignment indicates significant similarities, with few differences in key areas, whereas low alignment results from many differences in important aspects, with perhaps only few or non-impactful similarities. Alignment judgements in this study took a holistic view of similarities and differences and the likely impact these will have on what skills and knowledge students possess upon completion of a programme of study. As such, the study did not use fixed

quantitative criteria to differentiate high from low alignment, but rather utilised the expert panels to produce informed, holistic judgements drawing on an outcomes-focused perspective.

Mapping

To accurately measure the alignment of the DP to the JHSC, it is necessary to map the similarities and differences across the selected alignment criteria. This necessitates identification of the same structural features in the DP and in the JHSC (the comparison programme) so that a mapping process can be undertaken.

Mapping, in this case, refers to detailed analysis of a feature of an education programme (generally as represented within that programme's documentation). Specifically, mapping applies the same analytical method to two separate sets of data (for example, the learning outcomes of two different curricula), enabling similarities and differences between those two data sets to be understood through the different results of applying the same mapping method to both. Another important feature of mapping is that there is a paper trail of the analysis, as the approach is methodical, testable, and repeatable.

For more information on how mapping has been applied in this study, see sections 3.2.1 and 3.2.2.

3.2.1 Method: Programme-Level Comparison

Each aspect of the programme-level comparison is achieved through slightly different approaches to mapping and assessing alignment, the results of which inform the overall alignment evaluation. Each method is described in the appropriate subsection below.

Philosophical Underpinnings

In the DP, the IB learner profile, approaches to teaching, approaches to learning, and framework of international-mindedness were used to represent the philosophical underpinnings. For the JHSC, the *School Education Act (Act No. 26 of 1947)* was used, with a focus on the following sections:

- Article 50: The purpose of high school
- Article 51: Objectives of education in high school

Additionally, for the JHSC, the *Basic Act on Education (Act No. 120 of 2006)* was used, with a focus on *Article 2: Objectives of Education*. Furthermore, the *High School Course of Study (2018)* was used, with a focus on the *Fundamentals of High School Education and the Role of the Curriculum.*

In order to carry out the comparative analysis, six themes were extracted from the DP's philosophical underpinnings:

Table 5: Philosophical underpinning themes.

Philosophical underpinning themes
• International outlook, diversity, and intercultural understanding • Grounded in real world contexts • Principled and community-oriented • Independence/self-management, critical inquiry, and reasoning • Communicative and collaborative competence • Conceptual thought and understanding.

This list of themes was mapped against both the DP's philosophical underpinnings and the philosophical underpinnings of the JHSC to identify what aspects of the DP's philosophical underpinnings are shared with the JHSC and what aspects are unique to either the JHSC's philosophical underpinnings or the DP's. The detail of this mapping was carried out in the mapping spreadsheets, while a visual summary and written explication of the findings can be found in the Philosophical Underpinnings section below (see section 4.2).

Structure

Comparing the structures of the DP and a national programme does not require a mapping process. Instead, subject offerings, how duration interacts with subjects/progression, and the general structure of the qualification (including exit points) have been represented with visuals for each programme. These curriculum structure diagrams use block colours and simple box and arrow graphics to demonstrate structure and progression.

Curriculum structure diagrams have been placed next to each other in this report to show the similarities and differences at a glance. The visual presentation is followed by a short write-up of the key similarities and differences, to maintain analytical focus on the alignment of the two programmes.

Requirements and Associated Outcomes

The requirements and associated outcomes of each programme are, like the structure, also simple, core features which do not require a mapping process in order to be compared. Comparisons and contrasts are drawn between the different requirements (e.g. entry requirements, pass/fail requirements) linked to both programmes and the associated outcomes of both.

Student Learning Pathways

By 'student learning pathways', we refer to the learning route that each student can take through a programme – with focus on scope for subject-specific specialisation. As with the comparative analysis of structure, diagrams resembling flow charts have been used to visually demonstrate the core and optional subject choices, providing an example to indicate how students follow different potential learning pathways in both programmes. A short textual write-up has been included after the diagrams to highlight and discuss the key similarities and differences – maintaining analytical focus on the issue of alignment.

Assessment Methods

Although detailed comparative analysis of assessment is not a main component of the analysis of alignment, Ecctis has briefly considered the high-level assessment features within the programmes being compared.

A simple table has been used, followed by a short textual description of the key similarities and differences. The types/numbers of assessment used in the programme are a source of comparison, and the subjects analysed in the subject-level alignment analysis in each report have been used as examples to consider assessment in more detail (i.e. question types and marking approaches, where this information is available).

3.2.2 Method: Subject-Level Comparison

As previously described, a number of subjects has been selected by the IB for a closer look at alignment at the subject level. This includes a closer look at the learning outcomes for each subject, the subject content, and the demand level. Each approach is outlined below.

Learning Outcomes

To analyse the alignment of learning outcomes at the subject level, the process began by extracting six to eight themes from the DP's subject-level learning outcomes for each subject being analysed, encompassing both skills and knowledge areas. This thematic code was then mapped onto the learning outcomes of the DP subject(s) and the comparison subject(s) from the JHSC.

The top-level results of the mapping process are represented with a table per subject area. Following the tables, a written commentary is provided regarding the presence of DP knowledge areas and skills (represented by themes) in the JHSC and any knowledge areas and skills found in the JHSC but not in the DP.

Content

To compare the content of the DP subject(s) and the comparison JHSC subject(s), their content is first presented next to each other in the document in a simple tabular format. Additionally, content mapping took place through a simple process of establishing whether each content subtopic covered by the DP subject in question has 'clear alignment' with any content in the JHSC comparison subject. The mapping spreadsheets demonstrate the full logic of all judgements.

A commentary is provided on DP subject content not found to have alignment points in the JHSC subject and on JHSC subject content topics not found to have alignment points in the DP subject.

Demand

Comparing the demand of subject curricula is perhaps the most complex mapping and alignment analysis within this report. Ecctis' approach views demand from multiple perspectives to capture its relationship to skills as well as to the detail and scope of content.

To allow for a comprehensive assessment of the level of demand of the DP selected subjects against the respective comparison points, Ecctis has created a Demand Profile for each subject in the study. Each Demand Profile comprises four criteria designed to judge complexity, depth, breadth, workload levels and potential for intellectual stretch. These criteria have been applied uniformly across all subjects in the study, using an expert panel-approach (as outlined below).

Demand Profile – Subject-level Judgement

The Demand Profile is comprised of four scores (each between zero and three) based on specific criteria. Each score within each category has a specific definition which is listed in Appendix A. A panel of subject, teaching, and curriculum design experts analysed each subject curriculum and arrived at a consensus on which score descriptor in each category best matched with the curriculum in question. The categories which comprise the Demand Profile are as follows:

- **Revised Bloom's Cognitive Skills** score (0-3): this is an overall score of course demand, based entirely on a review of learning outcomes. Levels have been defined based on increasing emphasis of higher order cognitive skills taken from Bloom's Revised Taxonomy.[10]

- **Depth of Knowledge** (adapted from Webb's) score (0-3): this is an overall score evaluating the depth of knowledge or complexity of knowledge and skills required by curriculum standards and expectations. The score is focused on subject content and learning outcomes, complemented by assessment where relevant/possible. Levels have been defined based on the level of detail studied per topic, as well as the levels of thinking described in Webb's depth of knowledge framework.[11]

- **Volume of Work** score (0-3): this is a trifactor score, considering:
  a. breadth of content – i.e. how many topics and subtopics are covered
  b. depth of content – i.e. the extent to which the topics and subtopics are focused upon, amplified and explored.[12]
  c. specified timeframe – i.e. the time allocated for studying the subject.

  The three factors – breadth, depth, and time – were all considered in defining the levels.

- **Outstanding Areas of Subject Demand** score (0-3): this score reflects the number of content areas viewed as more challenging and/or conducive to intellectual stretching of students. Levels have been defined on a scale of increasing number of 'stretch areas'.

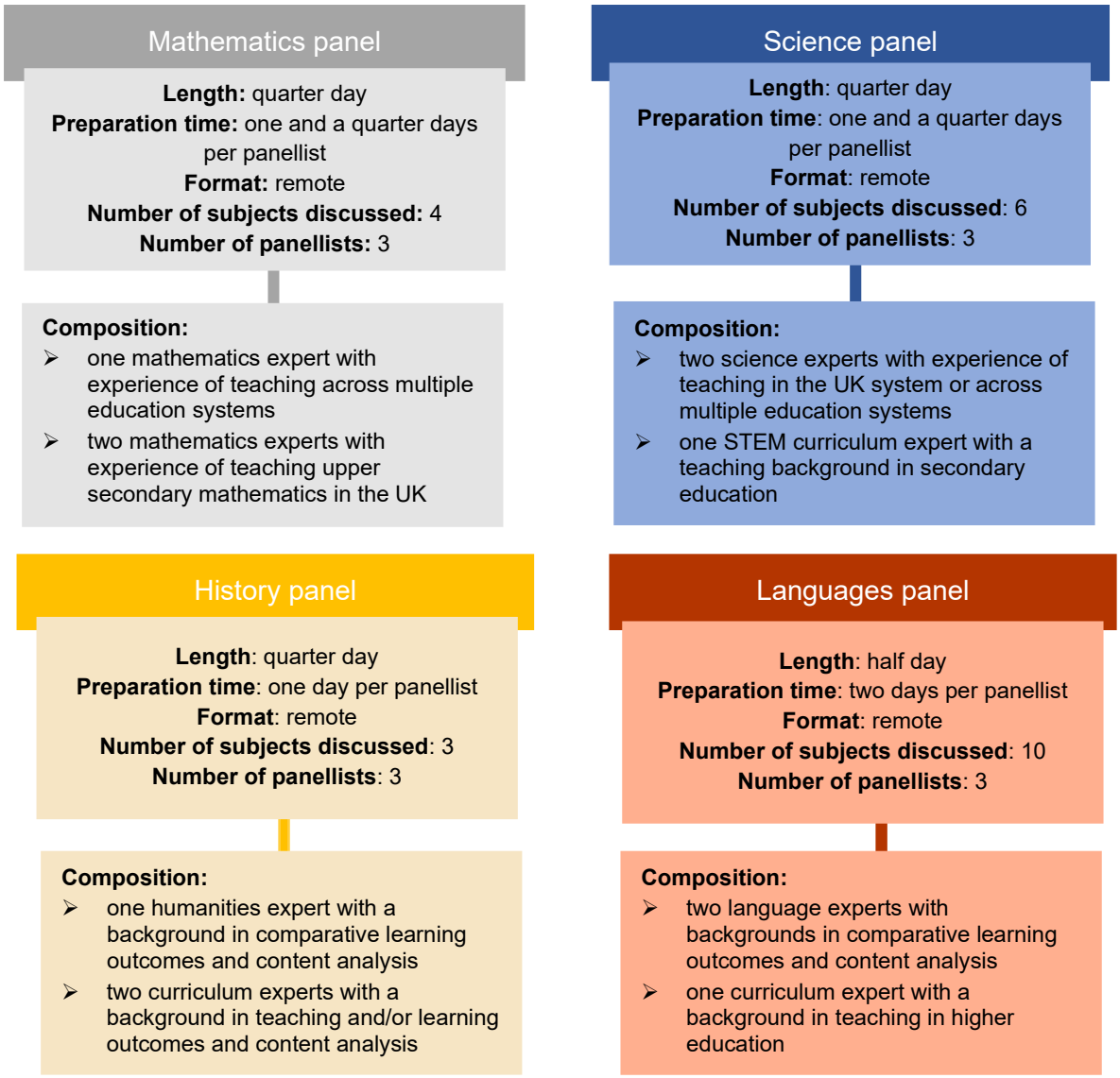
[10] Krathwohl, D. (2002). *A Revision of Bloom's taxonomy: An Overview. Theory Into Practice*, Vol 41(4). Available from: www.tandfonline.com/doi/abs/10.1207/s15430421tip4104_2?journalCode=htip20
[11] Webb, N. L. (2002). *Depth-of-knowledge levels for four content areas*. Available from: Microsoft Word - Webb DOK all content.doc (pbworks.com)
[12] Note: 'depth of content' primarily describes what is on the curriculum (i.e. the level of detail comprised in each topic), whereas 'depth of knowledge' describes what the students need to be able to do (i.e. how complex and extensive the thinking processes involved are).

Demand Panel: Expert Judgement Procedure

Demand analysis and judgements against the above criteria rested with a panel of experts comprised of both curriculum and teaching experts – i.e. international education researchers experienced in comparative secondary curriculum evaluation – and subject experts – i.e. researchers and consultants with a subject specialism in the relevant subject areas. For both expert types, teaching experience, understanding of appropriate national/international teaching contexts, and experience of curriculum and learning outcomes comparisons were prioritised.[13]

For the panels discussing the demand level of the DP subjects and respective comparison subjects in the JHSC, the composition of each panel was as follows:

Figure 1: Demand panels detail.



[13] To minimise potential biases and subjectivity, Ecctis' recruitment procedure excluded candidates with experience of teaching any of the comparison qualifications in this study.

All panellists were provided with the relevant extracts from the appropriate qualifications' specifications,[14] including (where available):

- Learning outcomes and aims of the qualification
- Assessment structure
- Information about guided learning hours or curriculum time
- Assessment objectives
- Content.

The experts were also provided with a document containing:

- An introduction to the comparative analysis task
- Descriptions of the demand taxonomies
- The demands instrument (used to record findings).

Panellists conducted around one to two days of panel preparation, reviewing the appropriate curriculum documentation in detail and scoring each subject against the demand criteria provided (the template utilised for this has been included in Appendix C). Following this preparation, participants then took part in their respective panels, which were all hosted remotely on Microsoft Teams. Panel durations ranged between a couple of hours to half a day.

All judgements resulted in scores from 0-3 for each demand criterion mentioned above, with each score for each criterion being pulled into each course's demand profile. The panel approach was used to debate the findings and scores reached by each member of the panel and arrive at an evidence-based consensus on every demand score for every subject.[15]

Visually, each demand profile is represented by radar diagrams to facilitate demand comparison between subjects.

NB: all demand scores produced should be interpreted as approximate judgements given the varying degrees of documentation and detail available for each curriculum, as well as likely variation on how the curricula are implemented in practice.

[14] The documents were shared both in their original languages and in English.
[15] Note: each score was debated by the panel until a unanimous agreement was reached.

4. Programme-Level Alignment

This section focuses on answering RQ2 and the sub-questions associated with it, namely:

Table 6: Research question 2.

RQ2: To what degree do the curricula align with regards to their: 2.1: Philosophical underpinnings • Objectives • Principles • Values? 2.2: Structure • Learning areas • Subject offerings • Degree of specialization • Time allocation? 2.3: Requirements • Programme entry requirements • Time requirements (i.e. programme duration, teaching hours, study hours) • Certificate requirements (i.e. credits, passing and failing conditions, compensation options)? 2.4: Assessment • Nature of assessment (i.e. number, type, duration, question types, availability of marks) • Assessment model (i.e. relative weighting of assessments to overall grades)? 2.5: Student learning pathways • Degree of specialization • Options in subject (area) choice (i.e. compulsory subjects, electives)?

It starts by offering top-level overviews of both the DP and the JHSC, followed by presenting the results from the programme-level comparative analysis for each core aspect outlined above.

4.1 Programme Overviews

4.1.1 The International Baccalaureate Diploma Programme

The Diploma Programme (DP) was established in 1968 as a two-year pre-university programme for 16–19-year-old students.[16]

Students who aim to achieve the Diploma award must generally select one subject from each of the six subject groups:

- Studies in language and literature
- Language acquisition
- Individuals and societies
- Sciences
- Mathematics
- Arts.[17]

[16] International Baccalaureate. (2015). *Diploma Programme: From principles into practice.* p. 5.
[17] International Baccalaureate. (2024). *DP curriculum*. Available from: https://ibo.org/programmes/diploma-programme/curriculum/

Students who do not wish to take a subject from the Arts subject group may opt to study an additional Sciences, Individuals and societies, or languages course instead.

All subjects are studied concurrently over the two-year duration of the programme and most subjects can be taken at either HL or SL. In terms of teaching hours, the DP's documentation recommends 150 teaching hours for individual subjects at SL and 240 teaching hours are at HL.[18]

In addition to the six subjects taken from these groups, DP students will also need to complete three further curriculum components. Theory of knowledge (TOK) allows students to reflect on the nature of knowledge by considering their subjects from a broader perspective.[19] The extended essay is a self-directed piece of research which results in a 4000-word essay.[20] Creativity, activity, service (CAS) is not formally assessed but requires that students undertake a creative endeavour, take part in something physically active, and participate in a voluntary or unpaid activity.[21] Together, these three components comprise the DP 'core'.

To achieve the IB Diploma a student must take at least three HL subjects.[22] The maximum number of subjects that can be taken at higher level is four. HL subjects are intended to prepare learners for the discipline specialisation of higher education, whilst the SL subjects balance this by broadening the range of subjects studied.[23]

The DP curriculum framework is based on a concentric circle model (see below), whereby the learner profile is positioned at the centre to represent its relevance to all aspects of the programme. The next circle comprises the core requirements of TOK, The extended essay, and CAS. The six subject groups are then encircled by international-mindedness and the programme title – indicating that everything students' study is unified by the underpinning philosophy of encouraging thinking from a perspective that embraces points of view outside one's own frame of reference.

[18] Ibid.
[19] International Baccalaureate. (2021). *Theory of knowledge*. Available from: https://www.ibo.org/programmes/diploma-programme/curriculum/theory-of-knowledge/
[20] International Baccalaureate. (2023). *Extended Essay*. Available from: https://www.ibo.org/programmes/diploma-programme/curriculum/dp-core/extended-essay/
[21] International Baccalaureate. (2022). *CAS projects*. Available from: https://www.ibo.org/es/programmes/diploma-programme/curriculum/dp-core/creativity-activity-and-service/cas-projects/
[22] International Baccalaureate. (2024). *DP curriculum*.
[23] International Baccalaureate. (2015). *Diploma Programme: From principles into practice*. p. 6.

Figure 2: IB Diploma Programme curriculum model.[24]

Both internal and external assessment methods are used in the DP. In most subjects, students take written examinations at the end of the programme that are marked by external IB examiners. Internally assessed tasks normally comprise between 20-30% of the total mark in each subject.[25]

Question types used in DP assessment vary from subject to subject. Essays, structured problems, short-response questions, data-response questions, case-study questions, and multiple-choice questions are some of the external assessment question types deployed.[26] Coursework forms part of the assessment for areas of the DP such as the extended essay and TOK.[27] This is normally carried out over an extended period under teacher supervision. Where students complete internally assessed tasks, these are marked by teachers and moderated by the IB.[28] Some of the internal assessment methods used include oral work in languages, fieldwork in geography, laboratory work in the sciences, and artistic performances in the arts.[29]

Each DP subject, whether taken at SL or HL, is graded from 1-7 (with 7 representing the highest achievement level).[30] If a student has taken enough subjects at the correct level to be in contention for the Diploma award, a minimum of 24 points is needed to achieve the

[24] International Baccalaureate. (2015). *Diploma Programme: From principles into practice*. p. 5.
[25] International Baccalaureate. (2021). *Understanding DP assessment*. Available from: https://www.ibo.org/programmes/diploma-programme/assessment-and-exams/understanding-ib-assessment/
[26] International Baccalaureate. (2021). *Assessment and Exams*. Available from: https://www.ibo.org./programmes/diploma-programme/assessment-and-exams/
[27] International Baccalaureate. (2021). *Understanding DP assessment*.
[28] Ibid.
[29] International Baccalaureate. (2021). *Assessment and Exams*.
[30] International Baccalaureate. (2021). *Understanding DP assessment*.

qualification. A minimum grade of 3 is also needed in at least four subjects to achieve the qualification.[31]

Additionally, 42 total points are available from the combination of the grades for six subjects and a further three points are available to students for successful completion of the core elements of TOK and The extended essay. The TOK and extended essay components of the DP are each marked on an A-E scale, where an A grade is the highest award, and an E grade the lowest.[32] Their combined results can contribute up to three additional numerical points to the overall DP score (see
Table below). CAS does not constitute a graded part of the DP, although its completion is mandatory to be awarded the Diploma.

HL and SL subjects are assessed against the same grade descriptors;[33] however, HL candidates are expected to demonstrate the various elements of the grade descriptors across a greater range of knowledge, skills, and understanding.

A bilingual Diploma is awarded to students who achieve:

- Grade 3 or higher in two language subjects from the Studies in language and literature group; or,
- Grade 3 or higher in a language subject from the Studies in language and literature group and a grade 3 or higher in a subject from the Individuals and societies group or Sciences group taken in a different language.

Certificates are awarded to students that have taken individual subjects but not enrolled on the full Diploma, or DP candidates who do not achieve the full DP.[34] Prospective candidates can enrol in as many individual subjects as permitted by their school; these are graded with the same 1-7 system used in the full DP.

Table 7: Letter-Grade: numerical score conversion matrix.[35]

		Theory of knowledge (TOK)				
	Grade awarded	A	B	C	D	E
The extended essay	A	3	3	2	2	Failing condition
	B	3	2	2	1	
	C	2	2	1	0	
	D	2	1	0	0	
	E	Failing condition				

No formal entrance requirements are stipulated as the IB envisages numerous educational pathways leading to the DP.[36] However, the IB recommends consulting the subject guides prior to enrolment to ensure an adequate understanding of programme expectations.[37]

[31] International Baccalaureate. (2024). *DP passing criteria.* Available from: DP passing criteria - International Baccalaureate®
[32] Ibid.
[33] International Baccalaureate. (2021). *Understanding DP assessment*.
[34] International Baccalaureate. (2024). *DP passing criteria.*
[35] International Baccalaureate. (2018). *Assessment principles and practices-Quality assessments in a digital age*. p. 220.
[36] International Baccalaureate. (2015). *Diploma Programme: From principles into practice*. p. 22.
[37] Ibid.

4.1.2 Japanese High School Curriculum

In accordance with the *Basic Act on Education* (revised in 2006), the national government in Japan is responsible for implementing measures to maintain and increase educational standards throughout the country (Article 16, paragraph 2).[38] The Ministry of Education, Culture, Sports, Science and Technology (often referred to as MEXT) regulates the education system from kindergarten to upper secondary school and develops curriculum standards known as the *National Course of Study*.[39] The *Course of Study* is revised approximately once every 10 years; the most recent revision took place in 2018 and was implemented from 2020 to 2022.[40]

Table 8: Outline of the primary and secondary stages of the Japanese education system.

Education Stage	School		Grades	Age	Years
Elementary	Elementary schools (小学校 shogakko)	Compulsory Education Schools (義務教育学校 *gimu-kyoiku-gakko*)	1-6	6-12	6
Lower secondary	Junior high schools (中学校 *chugakko*)		7-9	12-15	3
Upper secondary	High schools (高等学校 *kotogakko*)		10-12	15-18	3

As presented in the table above, the Japanese education system includes six years of elementary school followed by six years of secondary school, which is divided into three years of lower secondary (grades 7-9) and three years of upper secondary (grades 10-12).[41] Compulsory education spans nine years, including primary and lower secondary education,[42] and is free in schools established by government entities.[43] Although upper secondary education is not mandatory, most students continue to this stage, with only 2% of the relevant age group not enrolled in 2022.[44]

Upper secondary education is typically provided in high schools (高等学校 *kotogakko*).[45] Since 1998, it has also been possible for students to attend secondary schools (中等教育学校 *chuto-kyoiku-gakko*), which provide both lower and upper secondary education over the course of six years.[46] In addition to full-time courses, upper secondary education institutions may offer part-time courses (定時制 *teiji-sei*), such as evening classes, or correspondence courses (通信制 *tsushin-sei*), which involve distance learning. Furthermore, higher vocational

[38] Basic Act on Education (2006). *Article 16, paragraph 2.* Available from: https://www.japaneselawtranslation.go.jp/en/laws/view/2442
[39] MEXT. (2018). *High School Course of Study. Chapter VI Institutions of Higher Learning.* p. 5-6. Available from: 高等学校学習指導要領（平成 30 年告示）
[40] MEXT. (2018). *High School Course of Study. Supplementary Provisions (Ministry of Education, Culture, Sports, Science and Technology Decree No. 13 on March 30, 2006).* p. 11.
[41] National Information Centre for Academic Recognition Japan (NIC-Japan). (n.d.). *Overview of the Japanese Education System*. Available from: https://www.nicjp.niad.ac.jp/en/japanese-system/about.html
[42] National Information Centre for Academic Recognition Japan (NIC-Japan). (n.d.). *Overview of the Japanese Education System.* Available from: https://www.nicjp.niad.ac.jp/en/japanese-system/about.html
[43] No tuition fees shall be charged for compulsory education in schools established by the national or local government entities. (p. 3)
[44] OECD. (2024). *Education at a Glance 2024: OECD Indicators*, OECD Publishing, Paris. p. 23. Available from https://doi.org/10.1787/c00cad36-en. p. 23
[45] National Information Centre for Academic Recognition Japan (NIC-Japan). (n.d.). *Overview of the Japanese Education System*. Available from: https://www.nicjp.niad.ac.jp/en/japanese-system/about.html
[46] MEXT. (n.d.). *Principles Guide Japan's Educational System.* Available from: https://www.mext.go.jp/en/policy/education/overview/index.htm

schools (高等専修学校 *koto-senshu-gakko*) offer specialised training/vocational courses (専修学校高等課程 *senshu-gakko-koto-katei*).[47,48]

Structure and credit requirements

The courses offered in high schools are classified as general, specialised, or integrated. General courses, and their associated subjects, are suitable for those wishing to progress to higher education or employment, but who do not intend to pursue a specific vocational area. In contrast, specialised courses provide vocational or specialist education for those who intend to pursue a particular vocational area or career. There are two types of subjects offered in specialised courses: industry and non-industry. Integrated courses, introduced in 1994, offer a variety of subjects that draw from both general and specialised courses.[49]

Each high school determines its own curriculum offering, within certain parameters.[50] Japan operates on a credit-based system and each school determines the duration and number of credits for each subject, as well as the number of class hours for extracurricular activities. This is done in consideration of the standard number of credits allocated by the curriculum guidelines for each subject listed in table 9 (below). Moreover, schools are also to ensure that subjects are taught in the order intended by the curriculum guidelines.

Classes are held for 35 weeks per year, with 30 hours as the standard number of class hours per week. However, this can be extended if deemed appropriate according to the conditions of the school. Likewise, 35 hours per year (one hour a week) should be dedicated to homeroom activities.[51] Outside of this, the standard is that 35 class hours (with each class lasting 50 minutes) constitutes one credit.[52]

A minimum of 74 credits is required to graduate high school[53] and the following subjects must be studied by all students:

- **Japanese Language:** 'Contemporary Japanese Language' and 'Language Culture'
- **Geography and History:** 'Geography' and 'Modern and Contemporary History'
- **Civics:** 'Public Affairs'
- **Mathematics:** 'Mathematics I'
- **Science:** two subjects from among 'Science and Human Life', 'Basic Physics', 'Basic Chemistry', 'Basic Biology' and 'Basic Earth Science' (one of which will be 'Science and Human Life'), or three subjects from among 'Basic Physics', 'Basic Chemistry', 'Basic Biology' and 'Basic Earth Science'
- **Health and Physical Education:** 'Physical Education' and 'Health'
- **Arts:** one subject from among 'Music I', 'Art I', 'Crafts I' and 'Calligraphy I'
- **Foreign Language:** 'English Communication I' (if a foreign language other than English is taken, it shall be one subject established by the school, and the standard credit number is 3 credits)

[47] National Information Centre for Academic Recognition Japan (NIC-Japan). (n.d.). *Overview of the Japanese Education System*.
[48] MEXT. (2018). *High School Course of Study. Section 2: Organization of the curriculum*. p. 20-29.
[49] MEXT. (n.d.). *Principles Guide Japan's Educational System.*
[50] MEXT. (2018). *High School Course of Study. Section 2: Organisation of the curriculum*. p. 20-29.
[51] Ibid.
[52] Ibid.
[53] MEXT. (2018). *High School Course of Study. Chapter VI Institutions of Higher Learning*. p.5-6.

- **Home Economics:** 'Basic Home Economics' or 'Home Economics'
- **Information:** 'Informatics I'.

All students are also required to study the **Comprehensive Inquiry.** However, if completing an inquiry-based Science and Mathematics subject is expected to produce similar results, it may be substituted for all, or part, of the Comprehensive Inquiry. In addition to the compulsory subjects outlined above, students will choose elective subjects. The following table presents all the general subjects (both compulsory and elective) and their standard credit allocations:

Table 9: JHSC general subjects and their standard credit allocations.

Subject Area	Subject	Standard Credits	Subject Area	Subject	Standard Credits
Japanese Language	Contemporary Japanese Language	2	Health and Physical Education	Physical Education	7-8
	Language Culture	2		Health	2
	Japanese Language (Logic)	4	Art	Music I	2
	Japanese Language (Literature)	4		Music II	2
	Japanese Language (Expression)	4		Music III	2
	Advanced Classics	4		Art and Design I	2
Geography and History	Geography	2		Art and Design II	2
	Advanced Geography	3		Art and Design III	2
	Modern and Contemporary History	2		Crafts Production I	2
	Advanced Japanese History	3		Crafts Production II	2
	Advanced World History	3		Crafts Production III	2
Civics	Public Affairs	2		Calligraphy I	2
	Ethics	2		Calligraphy II	2
	Politics and economy	2		Calligraphy III	2
Mathematics	Mathematics I	3	Foreign Languages	English Communication I	3
	Mathematics II	4		English Communication II	4
	Mathematics III	3		English Communication III	4
	Mathematics A	2		Logic and Expression I	2
	Mathematics B	2		Logic and Expression II	2
	Mathematics C	2		Logic and Expression III	2
Science	Science and Human Life	2	Home Economics	Basic Home Economics	2
	Basic Physics	2		Home Economics	4
	Basic Chemistry	2	Informatics	Informatics I	2
	Basic Biology	2		Informatics II	2
	Basic Earth Science	2	Science and Mathematics	Basic Inquiry-Based Study of Science and Mathematics	1
	Advanced Physics	4			
	Advanced Chemistry	4		Inquiry-Based Study of Science and Mathematics	2-5
	Advanced Biology	4			
	Advanced Earth Science	4			
Comprehensive Inquiry					3-6
Tokkatsu (Student-Led Activities)					-

Students studying in specialised departments can choose from a wide range of industry and non-industry specialised subjects. Students studying vocational courses must have a minimum of 25 credits from specialised subjects and schools are to determine the credits for

each subject. Industry specialised subjects have the following subject areas: Agriculture, Industry, Business, Fisheries, Home Economics, Nursing, Informatics, and Welfare.[54] A full list of industry subjects can be found in Appendix D. Non-industry specialised subjects are presented in the table below.

Table 10: Non-industry specialised subjects of the JHSC.[55]

Subject Area	Subject	
Science and Mathematics	Mathematics I for the Science and Mathematics Course	Physics for the Science and Mathematics Course
	Mathematics II for the Science and Mathematics Course	Chemistry for the Science and Mathematics Course
	Advanced Mathematics for the Science and Mathematics Course	Biology for the Science and Mathematics Course
		Earth Science for the Science and Mathematics Course
Physical Education	Theory of Physical Education	Sport IV
	Sport I	Sport V
	Sport II	Sport VI
	Sport III	Comprehensive Seminar of Sport
Music	Music Theory	Vocal Music
	History of Music	Instrumental Music
	Music Performance Research	Composition
	Solfége	Music Appreciation Research
Art and Design	Introduction to Art	Sculpture
	History of Art	Visual Design
	Art Appreciation Research	Craft Design
	Drawing	Information and Media Design
	Composition in Art	Video Expression
	Painting	Environmental Art and Design
	Print	
English	Comprehensive English I	Debate and Discussion I
	Comprehensive English II	Debate and Discussion II
	Comprehensive English III	Essay Writing I
		Essay Writing II

Lastly, to contribute to the development of distinctive educational curricula, schools may also establish subjects other than those listed in the curriculum guidelines, referred to as 'school-established subjects'. Students may take no more than 36 credits of school-established subjects.[56]

Assessment

High school assessment evaluates the extent to which students have met the objectives outlined in the *High School Course of Study* and supports the enhancement of teaching and learning. Schools are generally able to determine the methods they use to assess students.[57]

Subject grades are usually determined by class participation, homework and assignments, midterm exams and final exams. The grading scales and methods used by schools can vary, however the numerical scale of 5 (highest) to 1 (lowest) is commonly used.[58] To receive the high school diploma, students must have completed the required credits and final exams.

[54] MEXT. (n.d.). *Principles Guide Japan's Educational System.*
[55] MEXT. (n.d.). *Non-industry Specialised Subjects*. Available from: https://www.mext.go.jp/content/20201117-mxt_kyoiku02-100014466-02.pdf
[56] MEXT. (2018). *High School Course of Study. Chapter VI Institutions of Higher Learning*. p. 5-6.
[57] OECD. (2018). *Education Policy in Japan: Building Bridges towards 2030. Reviews of National Policies for Education*. p. 82. OECD Publishing, Paris. Available from: https://doi.org/10.1787/9789264302402-en
[58] National Information Center for Academic Recognition Japan. (n.d.). *Upper Secondary Education*. Available from: https://www.nicjp.niad.ac.jp/en/japanese-system/assessment.html

Common Test for University Admissions

The Common Test for University Admissions, introduced in 2021, is for high school graduates who are applying to university. It replaced the National Centre Test, which was administered from 1990 to 2020.[59] The Common Test for University Admissions is a standardised examination conducted in accordance with the *Guidelines for University Entrance Examinations* set by MEXT, which are reviewed annually.[60] The exam is held simultaneously each year in mid-January and is administered by national, public, and private universities that use the test, in collaboration with the National Centre for University Entrance Examinations.[61] The exam consists of written tests for subjects across different areas, such as Japanese Language, Geography and History, Mathematics, Science, and Foreign Languages. Each university specifies the subjects included in the examination and how the scores will be used for admission (i.e. whether it is a requirement or supplementary).

National Assessment of Academic Ability

MEXT delivers the National Assessment of Academic Ability to students in Grades 6 and 9 (the end of primary and lower-secondary education). This assessment has been delivered to whole cohorts since 2007, except for the years 2011-2013, where sampling methods were used instead. The assessments measure students' achievement in mathematics and Japanese language every year and in science every three years. The purpose of the assessment is to maintain and improve the consistency and standards of the level of education, rather than to evaluate individual schools' achievement.[62]

Curriculum Design Principles

The *Basic Act on Education (Article 2)* states that the objectives of education in Japan are to:

- "Ensure students acquire wide-ranging knowledge and culture, foster the value of seeking the truth, and cultivate a rich sensibility and sense of morality, as well as building the health of the body;
- Develop individuals' abilities, cultivate creativity, and foster a spirit of autonomy and independence by respecting the value of the individual, while also emphasising the relationship between one's career and one's everyday life and fostering the value of respect for hard work;
- Foster the values of respect for justice, responsibility, and equality between men and women, mutual respect and cooperation, as well as the value of active participation in building our society and contributing to its development, in the public spirit;
- Foster the values of respect for life, care for nature, and desire to contribute to the preservation of the environment; and
- Foster the value of respect for tradition, culture and love of the country and its regions, as well as the value of respect for other countries and the desire to contribute to world peace and the development of the international community".[63]

[59] National Information Center for Academic Recognition Japan. (n.d.). *Admission to Higher Education Institution.* Available from: https://www.nicjp.niad.ac.jp/en/japanese-system/admission.html
[60] MEXT. (n.d.). *Notice regarding the "Implementation Guidelines for the Common University Entrance Examination for FY2026 University Admissions Selection".* Available from: https://www.mext.go.jp/a_menu/koutou/senbatsu/1346785.htm
[61] National Centre for University Entrance Examinations. (n.d.). *Structure and operation of the Common Test for University Entrance Examinations.* Available from: https://www.dnc.ac.jp/kyotsu/shiken_gaiyou/shikumi_unei.html
[62] MEXT. (n.d.). *Improvement of Academic Abilities*. Available from: https://www.mext.go.jp/en/policy/education/elsec/title02/detail02/1373859.htm; OECD. (2018). *Education Policy in Japan: Building Bridges towards 2030. Reviews of National Policies for Education.* p. 82. OECD Publishing, Paris.
[63] Basic Act on Education (2006).

High schools are expected to provide general and specialised education which is based on the foundations of education offered in junior high schools, and which is in accordance with students' physical and mental development, as well as their career paths.[64] For this, according to the *School Education Act*, high school education should aim to achieve the following goals:

- "Further develop and expand the outcomes of compulsory education, fostering rich humanity, creativity, and a healthy development;
- Enable students to decide their future careers based on their individuality, enhancing their general and professional knowledge, techniques and skills, based on an awareness of their role in wider society;
- Encourage students to develop their own individuality, while also cultivating a broad and deep critical understanding of society, and a willingness to contribute to its improvement". [65]

Additionally, the *High School Course of Study* outlines that "schools shall aim to develop students' life skills by implementing distinctive educational activities utilizing creativity and ingenuity through improvements to lessons aimed at the realisation of independent, interactive, and deep learning".[66] More specifically, the *Fundamentals of High School and the Role of the Curriculum* specifies the following:

(1) "Ensure that students acquire basic and fundamental knowledge and skills, and develop the necessary thinking, judgment, and expression skills to be able to use knowledge to solve problems, while cultivating an attitude of proactively engaging in learning and encouraging collaboration with a variety of people. In doing so, the school shall take into consideration the students' developmental stage and shall endeavour to enhance activities that build the foundations of learning, such as language activities, and to establish students' study habits while working in cooperation with their families.

(2) Education that aims to cultivate rich hearts and creativity through moral education, experience-based activities, and a variety of expression and appreciation activities Moral education in schools should be enriched by providing education on how to be and live as a human being throughout all educational activities at school, and appropriate instruction should be given according to the characteristics of each subject belonging to each subject (hereinafter referred to as "each subject/course"), comprehensive research time, and special activities (hereinafter referred to as "each subject/course, etc."). Moral education, based on the fundamental spirit of education set out in the Fundamental Act of Education and the School Education Act, should aim to cultivate the morality that will serve as the foundation for students to think about how to be and live as a human being, act with independent judgment, and live better with others as independent individuals, taking into consideration that students are at a stage of development in which they strive for self-exploration and self-actualization and can act with an awareness as members of the nation and society. In promoting moral education, particular attention should be given to ensuring that it contributes to the development of Japanese people who will apply the spirit of respect for persons and reverence for life in the home, school and other parts of society, who are rich in spirit, respect traditions and culture, love the country and hometown that nurtured

[64] School Education Act (1947). *Article 50.*
[65] School Education Act (1947). *Article 51.*
[66] MEXT. (2018). *High School Course of Study. Fundamentals of High School Education and the Role of the Curriculum.* p. 19.

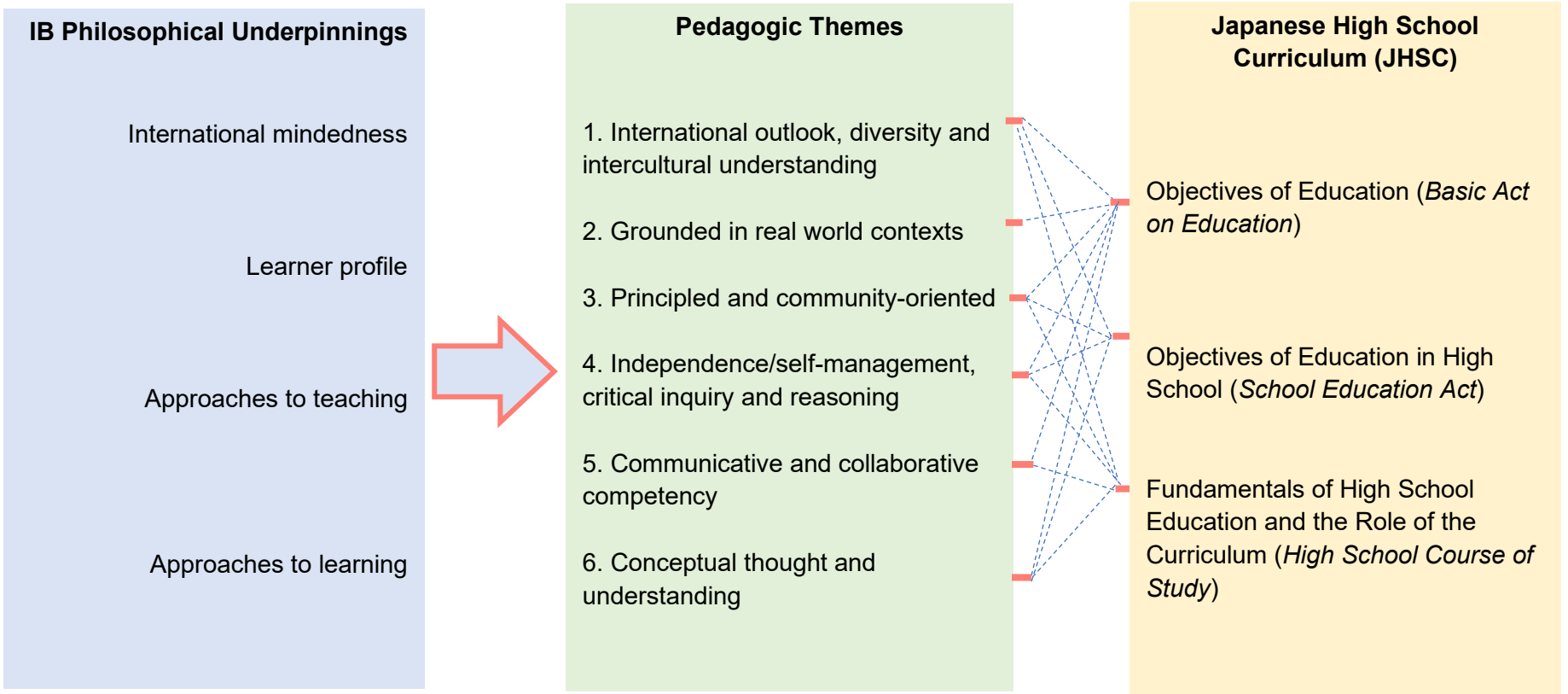
them, and create a culture rich in individuality, as builders of a peaceful and democratic nation and society, who value the public spirit, strive for the development of society and the nation, respect other countries, contribute to the peace and development of the international community and to the preservation of the environment, and have the initiative to open up the future.

(3) To endeavour to enrich education aimed at realizing healthy and safe lives and a rich sporting life by providing appropriate instruction on physical education and health in schools throughout all educational activities in consideration of the students' developmental stage. In particular, to promote nutrition education in schools and provide instruction on improving physical fitness, instruction on safety, and instruction on maintaining and improving mental and physical health appropriately in each subject and course, as well as in health and physical education, home economics, and special activities classes, in accordance with the characteristics of each class. Furthermore, through such instruction, while working in cooperation with families and the local community, to encourage the practice of appropriate physical education and health activities in daily life, and to consider cultivating the foundation for living a healthy, safe, and energetic life throughout one's life." [67]

[67] Ibid.

4.2 Philosophical Underpinnings

Figure 3: Philosophical underpinnings comparative analysis diagram for the DP and the JHSC.



The IB learner profile, which is used across all IB programmes including the DP, outlines 10 attributes that all students should strive towards.[68] Linked to these attributes, there are five categories of approaches to learning skills that all IB programmes aim to develop, as well as six categories of approaches to teaching principles. The table in Appendix B presents these qualities of the IB's underpinning philosophies along with the overview used in IB documentation to describe the quality of international-mindedness that also encircles all IB teaching and learning.

The six themes identified within the IB literature have a relatively consistent presence across all component parts (learner profile, approaches to teaching, approaches to learning, and international-mindedness). As a result, these themes present a 'boiled-down' version of the DP's philosophical underpinnings.

To identify the level of alignment in relation to the philosophical underpinnings between the DP and the JHSC, the project team mapped the philosophical underpinnings of the JHSC against six themes extracted from the DP's philosophical underpinnings.

Table 11: Philosophical underpinning themes.

Philosophical underpinning themes
• International outlook, diversity, and intercultural understanding • Grounded in real world contexts • Principled and community-oriented • Independence/self-management, critical inquiry, and reasoning • Communicative and collaborative competence • Conceptual thought and understanding

The mapping of the six DP themes onto the JHSC's philosophical underpinnings showed that most of these are present. The theme of *International outlook, diversity and intercultural understanding*, for instance, is well-evidenced, as the *Objectives of Education* make reference to "fostering...the value of respect for other countries and the desire to contribute to world peace and the development of the international community", "fostering the values of respect for justice" and "the desire to contribute to world peace".[69] Article 51 of the *School Education Act* also includes this theme through its intention that education "fosters rich humanity".[70] *The Fundamentals of High School Education* also mention that through moral education students will learn to "respect other countries, contribute to the peace and development of the international community". [71]

The DP theme, *Grounded in real world contexts*, is somewhat present in the *Objectives of Education,* with the latter including reference to "emphasising the relationship between one's career and one's everyday life", and "enhancing [students'] general and professional knowledge, techniques and skills, based on an awareness of their role in wider society".[72]

[68] International Baccalaureate. (2017). *What is an IB education?*
[69] Basic Act on Education (2006).
[70] School Education Act (1947). *Article 51.*
[71] MEXT. (2018). *High School Course of Study. Fundamentals of High School Education and the Role of the Curriculum.* p.19.
[72] Basic Act on Education (2006).

The *Principled and community-oriented* DP theme is well-evidenced in the *Objectives of Education*, where numerous references are made to students "actively participating in building our society and contributing to its development, in the public spirit". Additionally, the *Objectives of Education* include references that the role of education is to "foster[ing] the value of seeking the truth and cultivating a rich sensibility and sense of morality" and "foster[ing] the values of respect for justice".[73] Article 51 of the *School Education Act* also describes how high school education aims to cultivate "a broad and deep critical understanding of society, and a willingness to contribute to its improvement".[74] The *Fundamentals of High School Education* also mention that high school education should "cultivate rich hearts and creativity through moral education, experience-based activities, and a variety of expression and appreciation activities", with a particular focus on the role of moral education in "providing education on how to be and live as a human being". [75]

The DP theme of *Independence/self-management, critical inquiry, and reasoning* is also present in the *Objectives of Education*, as they focus on "developing individuals' abilities, cultivating creativity, and fostering a spirit of autonomy and independence by respecting the value of the individual" as well as "cultivating creativity".[76] Article 51 of the *School Education Act* also explicitly mentions the aim of encouraging students to "develop their own individuality" and "decide on a future career based on their individuality".[77] The *Fundamentals of High School Education* also states that the role of schools is to "'ensure that students acquire basic and fundamental knowledge and skills, and develop the necessary thinking, judgment, and expression skills to use this knowledge to solve problems".[78] Additionally, that moral education should "cultivate the morality that will serve as the foundation for students to think about how to be and live as a human being, act with independent judgment, and live better with others as independent individuals, taking into consideration that students are at a stage of development in which they strive for self-exploration and self-actualization and can act with an awareness as members of the nation and society".[79]

The *Communicative and collaborative competency* theme of the DP's philosophical underpinnings is present in the *Objectives of Education*. Article 2 refers to the role of education in "fostering the values of respect for justice, responsibility, equality between men and women, and mutual respect and cooperation" and encourages active participation "in building our society and contributing to its development, in the public spirit".[80] The *Fundamentals of High School Education* explicitly mention that high school education aims to "cultivate an attitude of proactively engaging in learning and encouraging collaboration with a variety of people". [81]

Conceptual thought and understanding is the least evident DP theme in the JHSC's philosophical underpinnings. There are hints to this theme in the *Objectives of Education*,

[73] Basic Act on Education (2006).
[74] School Education Act (1947). *Article 51.*
[75] MEXT. (2018). *High School Course of Study. Fundamentals of High School Education and the Role of the Curriculum.* p.19.
[76] Basic Act on Education (2006).
[77] School Education Act (1947). *Article 51.*
[78] MEXT. (2018). *High School Course of Study. Fundamentals of High School Education and the Role of the Curriculum.* p.19.
[79] Ibid.
[80] Basic Act on Education (2006).
[81] MEXT. (2018). *High School Course of Study. Fundamentals of High School Education and the Role of the Curriculum.* p.19.

which states “ensure that students acquire wide-ranging knowledge and culture” and “enhance general knowledge”. [82] Additionally, the *Fundamentals of High School Education* outline that the school should support students to develop “basic and fundamental knowledge and skills, and develop the necessary thinking, judgment, and expression skills”. [83] In this sense, conceptual thought and understanding are alluded to, but not explicitly emphasised to the same extent as in the DP.

Conversely, some themes are more evidenced in the JHSC’s philosophical underpinning. There are multiple references to the cultivation of students’ values, qualities and sensibilities, such as “fostering the value of respect for tradition and culture”. [84] Additionally, the *Fundamentals of High School Education* also mention that the role of education is the “development of Japanese people who will apply the spirit of respect for persons and reverence for life in the home, school and other parts of society, who are rich in spirit, respect traditions and culture, love the country and hometown that nurtured them, and create a culture rich in individuality, as builders of a peaceful and democratic nation and society, who value the public spirit, strive for the development of society and the nation”.[85] This differs from the DP theme of *International outlook, diversity and intercultural understanding* as it focuses on students’ ability to embrace and respect the national traditions and culture, whereas the DP emphasises the cultivation of an international outlook.

Additional themes that feature more prominently in the JHSC’s philosophical underpinnings include “fostering a healthy body”. [86] More specifically, the JHSC states that the role of education is to “promote nutrition education in schools and provide instruction on improving physical fitness, instruction on safety, and instruction on maintaining and improving mental and physical health appropriately in each subject and course, as well as in health and physical education, home economics, and special activities classes, in accordance with the characteristics of each class” and “encourage the practice of appropriate physical education and health activities in daily life, and to consider cultivating the foundation for living a healthy, safe, and energetic life throughout one's life”.[87]

In summary, all the DP themes are present in the JHSC philosophical underpinnings, though some are more present than others. The themes of *International outlook, diversity and intercultural understanding*, *Independence/self-management, critical inquiry, and reasoning*, *Principled and community-oriented* and *Communicative and collaborative competency*, are highly evident, whereas there is comparatively less emphasis on the DP themes of *Grounded in real-world contexts* and *Conceptual thought and understanding*. The inclusion of multiple references to fostering students’ values, qualities and sensitivities, and a healthy body, suggest that there are also some unique priorities underpinning the JHSC.

[82] Basic Act on Education (2006).
[83] MEXT. (2018). *High School Course of Study. Fundamentals of High School Education and the Role of the Curriculum.* p. 19.
[84] Basic Act on Education (2006).
[85] MEXT. (2018). *High School Course of Study. Fundamentals of High School Education and the Role of the Curriculum.* p. 19.
[86] School Education Act (1947). *Article 51.*
[87] MEXT. (2018). *High School Course of Study. Fundamentals of High School Education and the Role of the Curriculum.* p. 19.

4.3 Structure

There are six subject groups comprising the DP and students pursuing the Diploma award are normally required to select one subject from each of the six groups.[88] Students usually take three subjects at HL and three at SL. The DP also has three core components which are compulsory and are carried out alongside subjects. The JHSC contains general and specialised courses, each with their own subject areas and subjects, as detailed in section 4.1.2. As noted previously, students may also study integrated courses which incorporate both general and specialised subjects. To graduate, students need a minimum of 74 credits. Some general subjects are compulsory for all students, except in cases where an alternative subject achieves comparable outcomes.

The figures below present an overarching view of the DP and JHSC structure, including the subject groups in each.

Figure 4: Structural overview of the DP.

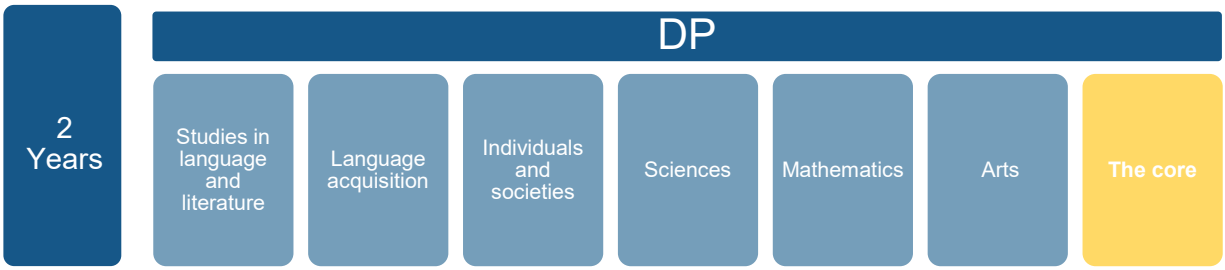
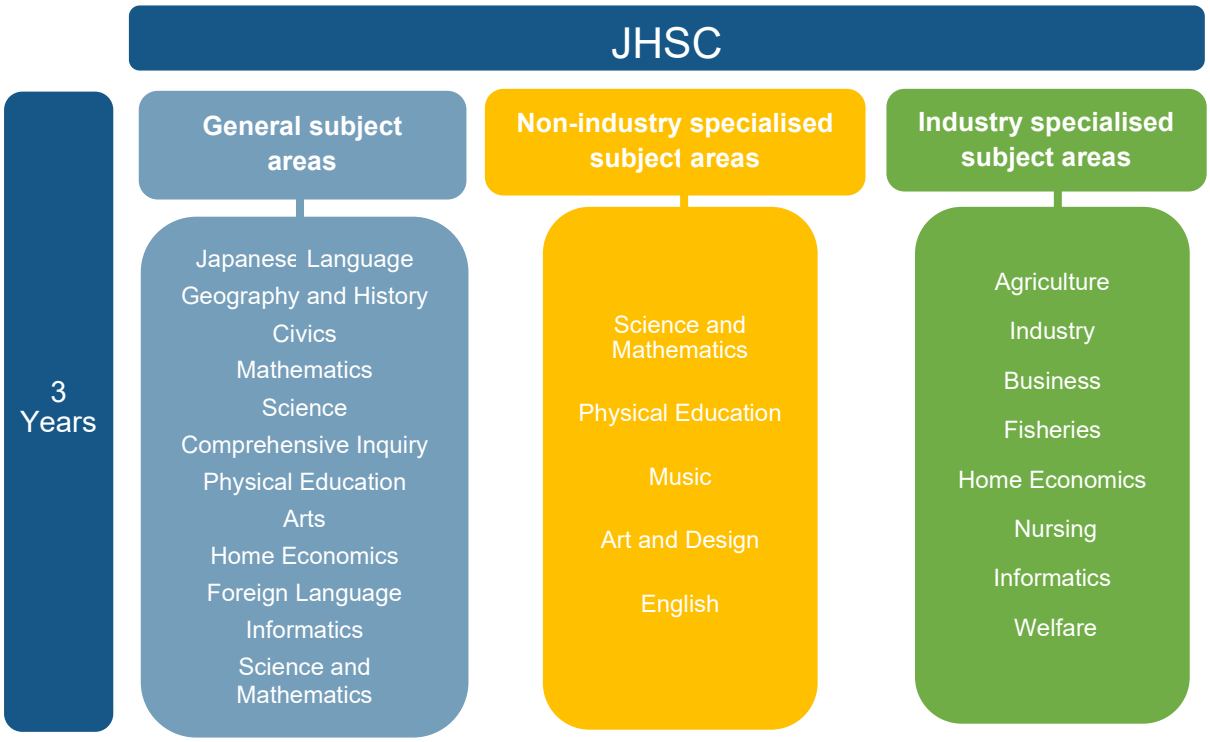


Figure 5: Structural overview of the JHSC.



[88] International Baccalaureate. (2021). *How the Diploma Programme works*. Available from: https://www.ibo.org/programmes/diploma-programme/what-is-the-dp/how-the-diploma-programme-works/

Both the DP and JHSC follow a baccalaureate-style approach, incorporating a broad range of subject areas. Several subject areas are common to both programmes, including language, foreign languages, science, maths, and art. However, their approach to social science subjects differ: the DP groups them within 'Individuals and societies', whereas the JHSC separates them into 'Geography and History' and 'Civics'. Additionally, the JHSC also includes Home Economics, Informatics, and Health and Physical Education as distinct subject areas, while the DP integrates some subjects related to these into other subject groups.

Both programmes also feature cross-disciplinary subjects: TOK in the DP and Comprehensive Inquiry in the JHSC. However, Comprehensive Inquiry takes a more 'hands on' approach and focuses on the inquiry process, whereas TOK is more theoretical and epistemological in nature. Another distinction is that the DP includes the Extended essay as part of its core, whereas the JHSC does not have a comparable component.

Structural differences between the programmes include their duration – the DP spans two years while the JHSC lasts three – and the inclusion of industry-related subject areas in the JHSC. The DP curriculum aligns more closely with the general courses, as it does not offer vocational-focused subject areas, such as agriculture. Additionally, the DP subjects are offered at two levels – SL and HL – while the JHSC subjects do not have this distinction. Instead, it offers a varying number of electives for each subject, which can take different focuses. For example, the DP offers history at SL or HL and the JHSC offers Modern and Contemporary History (compulsory), Advanced Japanese History (elective), and Advanced World History (elective).

The programmes also differ with regards to the number of subjects and hours of study per subject. DP students must complete six subjects – up to four at HL – while the JHSC requires students to study around 15 compulsory subjects totalling approximately 38-46 credits, plus elective subjects to reach a minimum of 74 credits. However, JHSC subjects tend to be smaller in scope than DP subjects, especially in comparison to those studied at HL. Indeed, DP subjects are typically studied over the duration of the two-year programme, with the recommended teaching hours per subject being 150 for SL and 240 for HL.[89] In contrast, JHSC subjects typically carry 2-4 credits, equating to approximately 59-117 hours of study per subject.[90]

In terms of total teaching hours, the total for the six DP subjects is between 1,170h and 1,260h. To meet the minimum credit requirements, the JHSC has a total of approximately 2,158h for the three years, which roughly amounts to 719h per year, or 1,439h over two years. The JHSC has higher a number of teaching hours in comparison to the DP, though the DP also requires the completion of the core.

4.4 Requirements and Associated Outcomes

There are no formal entrance requirements stipulated for the DP, as the IB envisages numerous educational pathways leading to upper secondary education.[91] However, the IB

[89] International Baccalaureate. (2024). *DP curriculum*.
[90] MEXT (2018) *High School Course of Study. Section 2: Organisation of the curriculum*. p. 20-29.
[91] International Baccalaureate. (2015). *Diploma Programme: From principles into practice*. p. 22.

recommends consulting the subject guides prior to enrolment to ensure an adequate understanding of programme and subject expectations.[92] In contrast, entry into high school in Japan is usually dependent on the successful completion of compulsory education and an entrance examination.[93,94,95]

The high school entrance examinations depend on the type of school (national, public and private).[96] For example, the public high school entrance examinations assess five subjects, including Japanese, English, maths, science, and social studies.[97] According to the Ministry of Education in Japan, the academic achievement examinations in public high schools are conducted by the education board of each prefecture or municipality in which the relevant school is located.[98] Regardless of the type of school, entrance to high school is based on a number of factors, such as the students' study reports and grades obtained in the academic achievement examinations.[99] Apart from the academic achievement test and the students' study reports, interviews with prospective students might also be used during the admission processes, however this depends on each high school.[100]

In terms of associated outcomes, both programmes aim to prepare students for higher education and/or employment. According to the DP documentation, although the DP is conceived as a preparatory programme for university matriculation and higher education focusing primarily on rigorous academic study, it can also prepare students for employment. Similarly, the JHSC describes its purpose as one of "enabling students to decide their future careers based on their individuality, enhancing their general and professional knowledge, techniques and skills, based on an awareness of their role in wider society".[101]

The IB diploma can often be used to grant direct entry into higher education institutions. In Japan, students who have completed twelve years of school education are eligible to enrol at university by taking the Common Test for University Admissions.[102] Students who have not completed twelve years of school education will firstly need to take the Upper Secondary School Equivalency Examination (高等学校卒業程度認定試験 *kotogakko-sotsugyo-teido-nintei-shiken*),[103] which certifies that students have the necessary academic competencies comparable to 12 years of school education.

[92] Ibid.
[93] MEXT. (2015). *Guidebook for Starting School. Procedures for entering Japanese Schools.* Available from: https://www.mext.go.jp/component/english/__icsFiles/afieldfile/2016/06/24/1303764_008.pdf
[94] School Education Act (1947). *Article 58 (2).*
[95] MEXT. (2015). *Guidebook for Starting School. Procedures for entering Japanese Schools.*
[96] School Education Act (1947). *Article 2(2).*
[97] Akabayashi, H. and Naoi, M., (2019*). 'Subject variety and incentives to learn: Evidence from public high school admission policies in Japan'*. Japan and the World Economy, 52, 100981. Available from: Subject variety and incentives to learn: Evidence from public high school admission policies in Japan - ScienceDirect
[98] Regulation for Enforcement of the School Education Act. (2018). *Article 90.* Available from: https://www.japaneselawtranslation.go.jp/en/laws/view/4575/en#je_ch7sc2
[99] Ibid.
[100] Akabayashi, H. and Naoi, M., (2019). *Subject variety and incentives to learn: Evidence from public high school admission policies in Japan*. Japan and the World Economy, 52,100981.
[101] School Education Act (1947). *Article 51.*
[102] National Information Center for Academic Recognition Japan. (n.d.). *Admission to Higher Education Institution.* Available from: https://www.nicjp.niad.ac.jp/en/japanese-system/admission.html
[103] MEXT. (n.d.). *Upper Secondary Equivalency Examination.* Available from: https://www.mext.go.jp/component/a_menu/education/detail/__icsFiles/afieldfile/2019/05/13/1291562_02.pdf

Overall, the requirements to study the JHSC are more formal than those of the DP, as high schools in Japan set entrance exams. Both the DP and JHSC can serve as preparatory programmes for higher education and employment. However, while the DP can grant direct entry into higher education, high school graduates in Japan typically need to take the Common Test for University Admissions or other entrance exams to gain admission.

4.5 Student Learning Pathways

To understand the levels of optionality and potential specialisation in each programme, it is instructive to look at what an individual student would be able to choose in practice. The following diagrams demonstrate the subject options available to an imagined student who knows that they would like to study physics at university after the completion of their upper secondary studies. The JHSC pathway focuses on a general rather than specialised course, as this aligns more closely with the DP. See the programme overviews in section 4.1 for further details on subject selection.

Figure 6: DP imagined pathway for a student wishing to study physics at university.

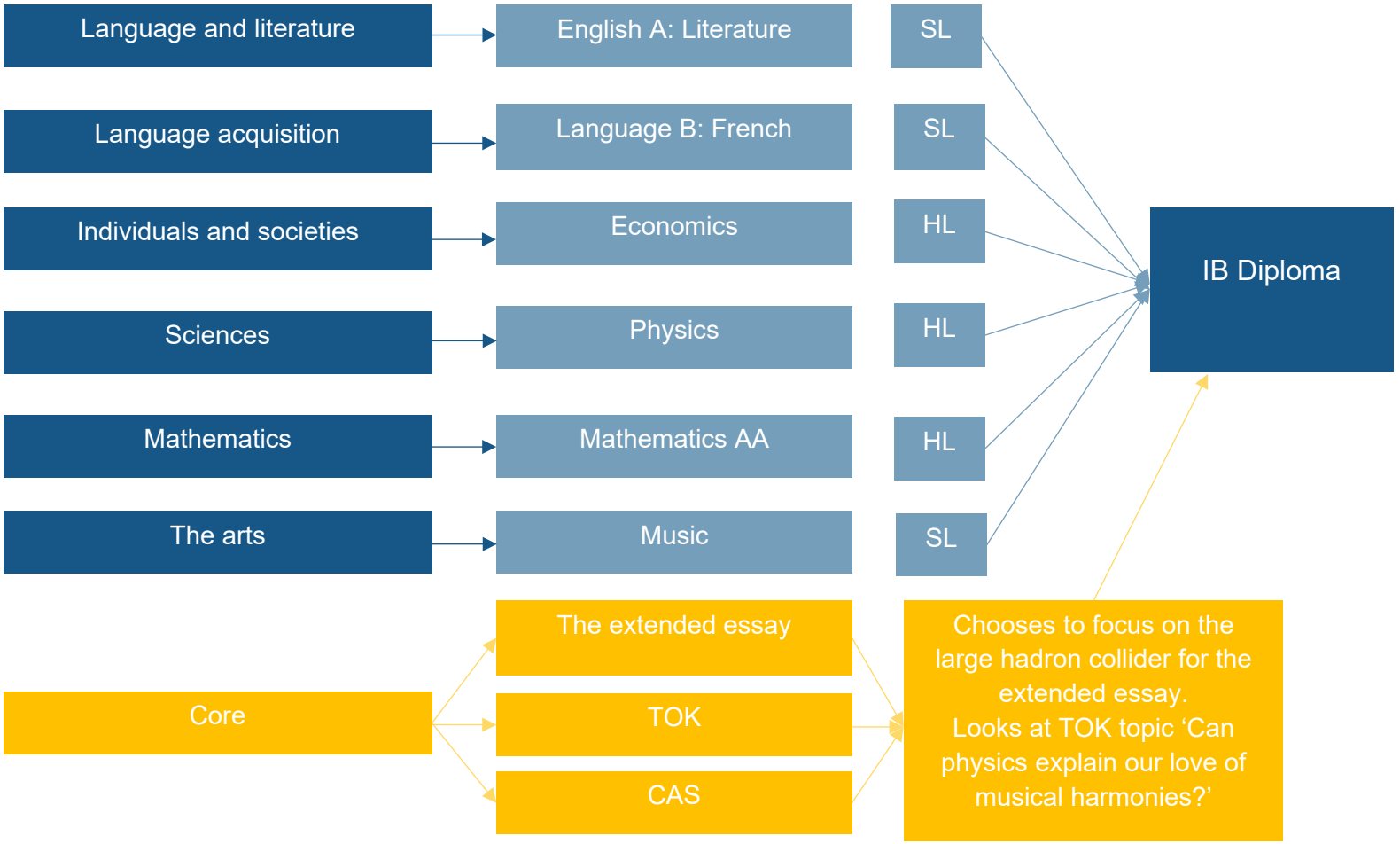
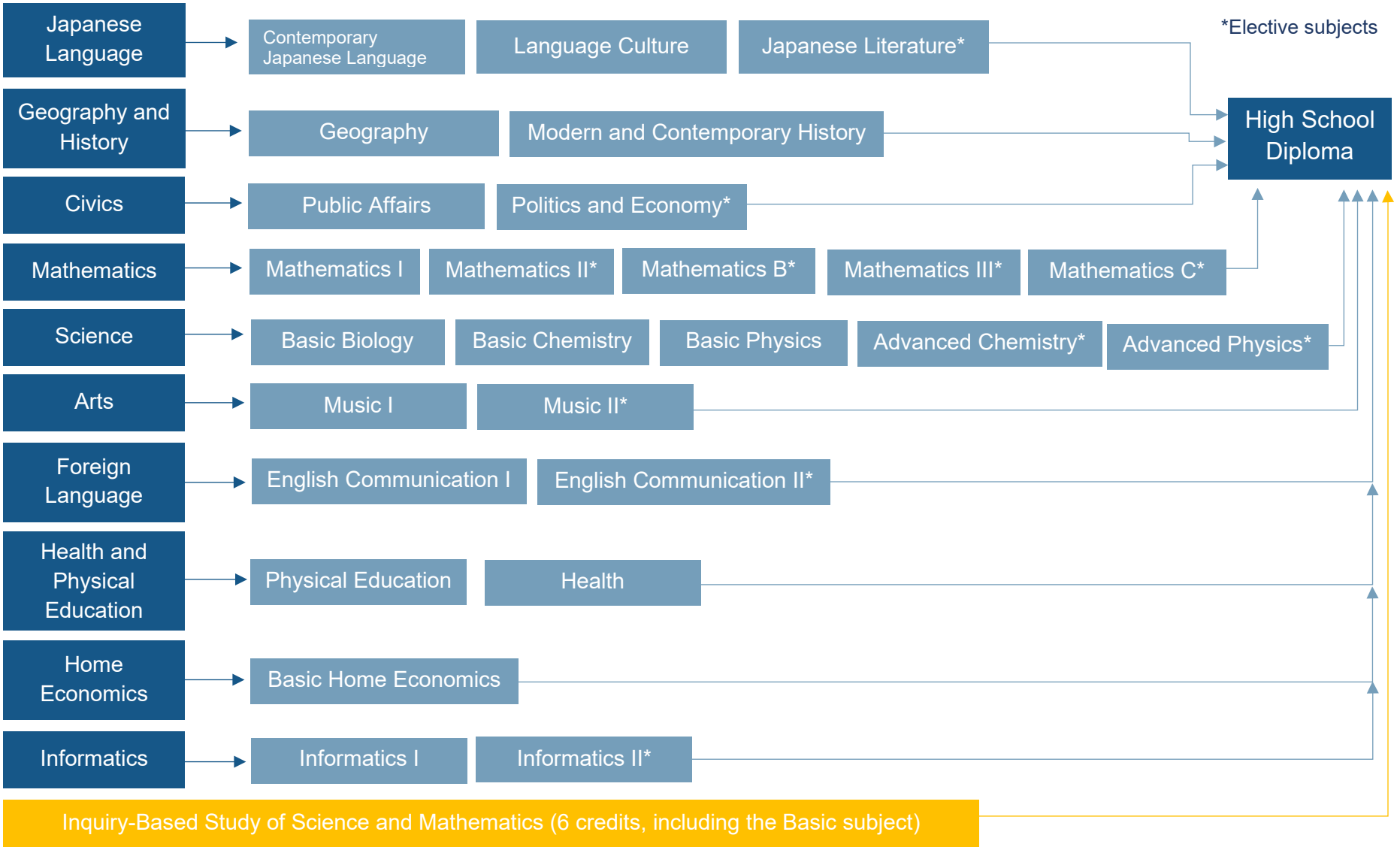


Figure 7: JHSC imagined pathway for a student wishing to study physics at university.



As illustrated in the diagrams above, students studying the JHSC cover a similar – if not slightly broader – range of subject areas compared to those in the DP. However, it is important to note that not all these areas are necessarily studied throughout high school, as they are in the DP. Many compulsory subjects are typically covered in the first year, allowing students to focus on elective subjects in the following two years. As it is not a requirement for any subject area to be continued beyond the compulsory subjects, there is scope for some areas and subjects to be studied at a more basic level than SL courses in the DP. For example, in the JHSC pathway above, only a two-credit subject (approximately 58 hours) is studied for Home Economics. Nevertheless, the credit requirements promote the maintenance of a broad course of study throughout high school. Indeed, it is not possible to meet the credit requirements by focusing on one single subject area (when studying general subjects). While it is possible to satisfy the credit requirements by selecting electives from just two subject areas, in practice, students are likely to spread their electives across multiple subject areas. This aligns with the curriculum's intention and university admission expectations, which emphasise a well-rounded education.

Both the DP and JHSC offer a significant degree of flexibility, albeit within different parameters. DP students are required to select one subject from six distinct subject areas; hence, they choose all their subjects. In contrast, some subjects are compulsory in the JHSC, although students have greater flexibility through the selection of electives. For example, in the JHSC, students can study multiple subjects within the same subject area (e.g. both history and geography), whereas DP students can only choose one subject per subject area/group.

There are also key differences in options for specialisation. In the DP, students typically select three subjects at HL from different subject areas. In the JHSC, students could specialise in three subject areas to a similar extent, but this would limit the coverage of other subject areas. Instead, they may opt for a more balanced approach by specialising in one subject area while spreading the rest of the elective credits across multiple areas. Moreover, while all DP subjects can be taken at HL, not all subjects in the JHSC are offered with the same level of specialisation. Subjects like mathematics and foreign languages have five elective options, allowing for deeper study, whereas subjects such as geography and the sciences only have one elective available. In some cases, students can deepen their specialisation by selecting electives with different focuses – for example, a student interested in literature could choose both Japanese Literature and Advanced Classics. In other cases, students might specialise by diversifying within a subject area – for example, by studying multiple science subjects.

The flexibility of the JHSC allows students to pursue pathways similar to those available in the DP, as illustrated in the example pathways above. Here, both programmes enable students to study physics as a stand-alone subject while also specialising in complementary subjects such as mathematics. Additionally, both pathways maintain a breadth of study by including literature, a foreign language, and music. However, key differences remain. For instance, the JHSC offers only one elective in physics, meaning the depth of study does not match that of a DP HL course. Instead, the pathway broadens science study through Advanced Chemistry. Furthermore, economics is not available as a stand-alone subject in the JHSC; the closest option is a small, two-credit module – Politics and Economy. Instead, the pathway allows for broader exposure to the social sciences through compulsory geography and history subjects.

Lastly, the JHSC example pathway focuses on a general course. However, students can choose a specialised course comprising of industry or non-industry specialised subjects. In

these cases, it is more likely that the breadth of study would be less maintained compared to the DP. In the case of a student aiming to pursue physics at university, they could study the Science and Mathematics specialised subject area, which has six electives that are larger in size compared to similarly-focused general subjects.

In summary, the JHSC and DP both offer a broad curriculum with significant optionality, though their structural differences lead to different pathways being available. While JHSC students study a wide range of subjects, not all are necessarily pursued throughout high school as in the DP. Generally, JHSC electives allow for more flexibility and control over the breadth and depth of study. For example, several elective subjects can be studied from one area, unlike the DP, which requires students to take one subject from each of six distinct areas. Another key difference is the level of specialisation available. In the DP this is consistently available across all subjects, whereas in the JHSC, some subjects, such as mathematics, have more specialisation available, while others, such as geography, have less. However, the flexibility in the JHSC allows students to choose pathways similar to those in the DP, balancing specialisation with breadth across different subject areas.

4.6 Assessment Methods

This section looks at the key features of assessment in both programmes by using a simple table followed by a short textual description of the key similarities and differences.

Table 12: Top-level assessment comparisons.

	DP	JHSC
External assessment	✓	×
Weighting	Varies by subject	0%
Mathematics	SL & HL: 80%	N/A
Sciences	SL & HL: 80%	N/A
Methods	Exam (Typically, two-three exam papers per subject)	N/A
Mathematics	SL: 2 papers of 90 minutes in duration each, with 80 marks available in each. HL: 3 papers with durations of 120, 120, and 60 minutes. The marks available for each paper are 110, 110, and 55, respectively. Question Types: compulsory short-response and extended response questions, incorporating problem solving in HL paper 3.	N/A
Sciences	SL: 3 papers worth 20%, 40%, and 20% of total weighting, with duration of 45, 75, and 60 minutes each. HL: 3 papers worth 20%, 36%, and 24% of total weighting, with duration of 60, 135, and 75 minutes each. Question Types: multiple choice, short and extended response, data-based and experiment-based; some optionality in paper 3.	N/A
Internal assessment	✓ (Often used)	✓
Weighting	Varies by subject	100%

Mathematics	SL & HL: 20%	100% of final grade determined by diverse assessment methodologies according to guidance outlined in the national curriculum
Sciences	SL & HL: 20%	100% of final grade determined by diverse assessment methodologies according to guidance outlined in the national curriculum
Methods	Vary by subject, but should follow IB guidance	Vary by subject but should be continuous, formative and summative, designed around subject-specific competencies, skills and knowledge.
Mathematics	SL & HL: A 'mathematical exploration' involving a piece of written work for 20 marks.	Combination of approaches designed by schools and teachers.
Sciences	A practical, individual investigation with 10 hours duration and 6-12 pages of write-up.	Combination of approaches designed by schools and teachers.

The table shows substantial differences in the two programmes' overall approach to assessment. The DP prioritises external assessment in the form of exams, while internal assessment only accounts for 20-30% of the final grade in each subject.[104] In contrast, the assessment conducted in the JHSC, which leads to the High School Diploma, is entirely school-based and therefore 100% internally assessed. Assessment in the JHSC is understood to be diagnostic, formative and summative, as well as continuous, aiming to provide feedback and facilitate the development of the knowledge and skills outlined in each subject's objectives. This is evident from the *High School Course of Study* which outlines that teachers should assess students' strengths, progress, and areas for development, and allow them to realise the value of what they have learnt. [105]

Despite a heavy emphasis on internal assessment, the assessment methods used in the JHSC may share some similarities with those used by the DP. For example, assessment in high schools can involve final written exams, which are used in the DP. Other assessment methods for the JHSC may include regular tests (e.g. midterms), coursework/assignments, practical assessments, class participation, and attendance.[106] The use of continuous assessment, such as class participation and attendance, constitutes a notable difference to the assessment methods used in the DP.

While the DP uses clear assessment objectives to demonstrate the nature and proportional importance of the skills assessed, the *High School Course of Study* simply specifies a requirement to evaluate the key subject-specific knowledge, skills and competences outlined in each subject's objectives. The table below presents a comparison of the DP assessment objectives and the JHSC objectives for the mathematics and sciences subjects compared in this study.

[104] International Baccalaureate. (2021). *Understanding DP Assessment*.
[105] MEXT. (2018). *High School Course of Study. Section 3: Curriculum implementation and learning assessment.* p. 28-29.
[106] National Information Center for Academic Recognition Japan. (n.d.). *Upper Secondary Education*. Available from: https://www.nicjp.niad.ac.jp/en/japanese-system/assessment.html

Table 13: Comparison of DP mathematics (AA and AI) subject's assessment objectives and the JHSC mathematics objectives.[107]

DP mathematics assessment objectives	JHSC mathematics objectives
AO1 – Knowledge and understanding	*To systematically understand basic concepts, principles, and laws in mathematics…*
AO2 – Problem solving	*This course develops students' ability to think critically and to express phenomena concisely, clearly and accurately using mathematical expressions.* *…and reflecting on the problem-solving process to deepen consideration, evaluate, and improve and develop the foundations of creativity.*
AO3 – Communication and interpretation	*…to acquire the skills to mathematize phenomena, interpret them mathematically, and express and process them mathematically.*
AO4 – Technology	N/A
AO5 – Reasoning	*Ability to use mathematics to logically consider phenomena, recognize the essence of phenomena and their relationships with other phenomena, and develop an integrated and expansive approach.* *An attitude of recognizing the merits of mathematics and actively trying to use mathematics, thinking persistently and making decisions based on mathematical reasoning…*
AO6 – Inquiry approaches	N/A

Table 14: Comparison of DP sciences subjects' assessment objectives and the JHSC science objectives.[108]

DP sciences assessment objectives	JHSC science objectives
AO1: Demonstrate knowledge	*Deepen understanding foresight, of and natural objects and phenomena…*
AO2: Knowledge understanding and application	*Through science, students will be involved in natural objects and phenomena, use scientific viewpoints and ways of thinking…*
AO3: Analyse, evaluate, and synthesize	*…conduct observations and experiments with…* *…through such activities, the aim is to develop the qualities and abilities necessary to scientifically explore natural objects and phenomena…* *…To develop the ability to investigate scientifically through observation, experiments, etc.*
AO4: Investigation skills	*…and acquire the skills in observations, experiments, etc. necessary for scientific exploration.* *…To develop the ability to investigate scientifically through observation, experiments, etc.* *…To develop an attitude of proactively engaging with natural objects and phenomena and of seeking to investigate them scientifically.*

As shown in the tables above, many of the same skills are assessed in the DP and the JHSC for the mathematics and science subject areas. Although the JHSC does not explicitly outline assessment objectives, the subject-specific objectives indicate the knowledge and skills to be assessed. In the area of mathematics, it can therefore be said that students would be

[107] MEXT (2018) *High School Course of Study. Section 4 Mathematics*. p. 91. Available from: 高等学校学習指導要領（平成 30 年告示）

[108] MEXT (2018) *High School Course of Study. Section 5 Science*. p. 103. Available from: 高等学校学習指導要領（平成 30 年告示）

assessed on their knowledge and understanding, problem-solving, communication and interpretation, and reasoning skills. However, unlike the DP, JHSC students are not assessed on their technology or inquiry skills within the mathematics subject area. In the area of science, students would likewise be expected to demonstrate in the assessment knowledge, understanding and application, analysis, evaluation, and synthesis, as well as investigative skills.

Overall, while both the DP and the JHSC incorporate internal assessment, the DP primarily uses external assessment, which is not a requirement for obtaining the High School Diploma in Japan. That said, although external assessment is not used, many students in Japan will experience it through the Common Test for University Admissions.[109] While some similarities may be present in the assessment activities used in both programmes (e.g. final written exams), the JHSC uses continuous assessment, which is not a feature of the DP. Finally, while the JHSC does not have specific assessment objectives, the skills targeted in the JHSC's objectives for each subject share similarities with those assessed by DP subjects.

[109] National Information Center for Academic Recognition Japan. (n.d.). *Admission to Higher Education Institution.* Available from: https://www.nicjp.niad.ac.jp/en/japanese-system/admission.html

5. Subject-Level Alignment

This section focuses on answering RQ3 and the sub-questions associated to it, namely:

Table 15: Research question 3.

RQ3: To what degree do the subjects align with regards to: 3.1: Content • Topics (i.e. scope of content area, breadth depth) • Learning activities (i.e. difficulty, demand). 3.2: Expected learning outcomes • Knowledge • Competences (i.e. subject-specific, 21st century competences).

For each subject area, there is a brief introduction to the subjects being compared, followed by an overview of the findings from the comparative analysis between the DP subjects and the JHSC comparison points regarding learning outcomes, content, and demand.

5.1 Mathematics

The following is the list of subjects used in the mathematics comparison analysis.

Mathematics: analysis and approaches[110]
Mathematics: analysis and approaches (AA) is a subject option from the mathematics group in the DP curriculum – offered at both SL and HL. This subject is intended for students who are interested in both real and abstract applications of mathematical concepts and enjoy problem solving and generalisation. SL is suitable for students who want to study a good level of mathematics, but not at an advanced level. Therefore, SL prepares students for further study in areas involving mathematical elements, such as geography. HL is suitable for students who want an in-depth study of mathematics and enjoy solving challenging problems. Therefore, HL prepares students for further study in mathematics, as well as other areas with a strong mathematical focus, such as physics and engineering.

Mathematics: applications and interpretation[111]
Mathematics: applications and interpretation (AI) is a subject option from the mathematics group in the DP curriculum – offered at both SL and HL. This subject is intended for students who are interested in exploring more practical applications of mathematics and would enjoy using mathematical models and technology. SL is most suitable for those who want to obtain a good level of knowledge of mathematics, with a focus on real-world applications. Therefore, SL prepares students for further study in areas with some practical mathematics elements, such as biology and business. HL is suitable for students wishing to gain more in-depth knowledge of mathematics, with a focus on real-world situations and the applications of mathematics.

The analysis considers both general and specialised mathematics subjects in the JHSC, as listed below.

[110] International Baccalaureate. (2019). *Mathematics: analysis and approaches guide*.
[111] International Baccalaureate. (2019). *Mathematics: applications and interpretation guide.*

General Subjects

- **Mathematics I, II, and III:** The first of these, Mathematics I (3 credits), is compulsory and designed to accommodate both students who complete high school mathematics with this subject alone and those who study further subjects. Mathematics II (4 credits) is studied after Mathematics I and comprises the core content of high school mathematics. Mathematics III (3 credits) follows Mathematics II and is designed for students who wish to study mathematics in depth and potentially enter specialised fields which require mathematics.[112]
- **Mathematics A, B, and C:** These subjects offer students the opportunity to broaden their mathematics study. Mathematics A complements the content of Mathematics I and can be taught in parallel. Mathematics B and C cover more advanced content than Mathematics I, thus should be studied after. These subjects can be studied individually, without the need to study the other. In each subject there is enough content for 3 credits, but content is usually selected such that each subject is worth 2 credits.[113]
- **Inquiry-Based Study of Science and Mathematics:** There are two subjects, Science and Mathematics Basic Inquiry and Science and Mathematics Inquiry**.** It is compulsory for students in specialised science and mathematics departments to study the inquiry-based subjects.[114]

Specialised Subjects

- **Mathematics I, Mathematics II, and Advanced Mathematics for the Science and Mathematics Course (SMC).**[115] Each of these subjects comprise a compilation of content from the general subjects, with certain areas of content extended. Mathematics I and II (SMC) are compulsory for all students in science and mathematics departments, as are the above-mentioned inquiry-based subjects.[116]

High school students in Japan can choose a variety of mathematics subjects and combinations. Given the flexibility in the JHSC, four pathways (below) have been selected for the comparative analysis with DP mathematics and will be particularly relevant for the content and demand alignment analysis. These pathways aim to represent two main groups of students: those who pursue a broad and balanced study of mathematics in upper-secondary without a focus on further specialisation, akin to SL students, and those with a strong interest in mathematics who may pursue further studies, similar to HL students.

- **General Subjects Pathway I (GSPI)**: Mathematics I, II, A and B and Basic Inquiry
- **General Subjects Pathway II (GSPII)**: Mathematics I, II, III, A, B and C, Basic Inquiry and Inquiry
- **Specialised Subjects Pathway I (SSPI)**: Mathematics I and II (SMC), Basic Inquiry and Inquiry
- **Specialised Subjects Pathway II (SSPII)**: Mathematics I and II (SMC), Advanced Mathematics (SMC), Basic Inquiry and Inquiry.

[112] MEXT. (2018). *High School Course of Study. Mathematics*. p. 91-97. Available from: 高等学校学習指導要領（平成 30 年告示）
[113] Ibid. p. 97-102.
[114] MEXT. (2018). *High School Course of Study. Science and Mathematics*. p. 196-198.
[115] Advanced Mathematics is also referred to as Special Topics in Mathematics.
[116] MEXT. (2018). *High School Course of Study. Science and Mathematics*. p. 435-437.

5.1.1 Learning Outcomes – Mathematics

This section compares and contrasts the learning outcomes of curricula falling within the category of mathematics. Ecctis extracted learning outcome themes from the DP mathematics subject group's aims and assessment objectives, which are the same for both AA and AI.

The learning outcomes for JHSC mathematics subjects are primarily drawn from the three main objectives articulated for the general mathematics subjects and the three (similar) objectives outlined for the specialised mathematics subjects. The objectives for the inquiry-based science and mathematics subjects are considered in addition to these.

The following summary table presents the learning outcome themes extracted from DP mathematics and indicates if, and where, they are judged to have presence within the learning outcomes of the JHSC.

Table 16: Presence of the DP mathematics subject group learning outcome themes in the JHSC.

Themes extracted from the learning outcomes in the DP mathematics subject group	Presence in the JHSC	
1. Be aware of, and engage with, mathematics in its wider context.		This theme is present in some subjects' objectives, namely Mathematics A and B and the inquiry-based studies.
2. Develop learning skills; having a positive and resilient attitude, working both independently and collaboratively, being reflective and evaluating work.		This theme is present in the third objective which describes recognising the merits of mathematics, persistent thinking, and reflecting on and evaluating work.
3. Use of inquiry-based approaches.		This theme is present in some subjects' objectives, namely the inquiry-based studies.
4. Understand the concepts, principles and nature of mathematics and apply concepts and procedures to a range of contexts.		This theme is strongly present in the objectives, particularly the first objective which focuses on knowledge, understanding and application.
5. Make links and generalisations.		This theme is present in the objectives, particularly in the second objective which describes understanding relationships between phenomena and developing an integrated approach.
6. Develop critical/creative thinking skills e.g. problem-solving and reasoning.		This theme is strongly present in the objectives, with the third objective emphasising problem-solving, reasoning, creativity, and making decisions.
7. Communicate mathematics clearly and in various forms.		This theme is present in the objectives, with the second objective highlighting the importance of clear and accurate expression.
8. Know how technology and mathematics influence each other and use technology to develop ideas and solve problems.		The use of technology is not explicitly mentioned in any of the objectives. While its use is certain, these skills are emphasised less in the objectives.

Key:

	This theme is well-evidenced in the learning outcomes of JHSC.		*This theme is partially evidenced in the learning outcomes of the JHSC.*		*This theme is not evidenced in the learning outcomes of the JHSC.*

Presence of the DP's Learning Outcome Themes

There is a reasonably strong alignment between the DP and JHSC learning outcomes for mathematics, with most of the DP's themes being evidenced. In the JHSC, the first mathematics objective (for both general and specialised mathematics subjects) focuses on understanding concepts, principles, and laws and applying these to a variety of contexts, which strongly aligns with the same theme in the DP (theme 4). Moreover, the second objective focuses on understanding relationships between phenomena and the use of mathematical communication, thus aligning with the DP themes of making links and generalisations, and accurate communication. The third objective emphasises valuing mathematics, actively engaging with it and demonstrating perseverance. It also focuses on utilising problem-solving, reasoning, reflection, evaluation, creativity, and decision-making skills. This objective therefore aligns closely with the DP themes of developing learning skills and employing critical and creative thinking skills.

The DP theme of engaging with mathematics in a wider context is partially present in the JHSC objectives. The objectives of general subjects describe students engaging with phenomena (their consideration, interpretation, mathematisation, and expression), though does not specify that these phenomena would link to, for example, global issues. The presence of this theme is more explicit in Mathematics A and B and in the inquiry-based subjects. Indeed, Mathematics A and B include units named *Mathematics and human activities* and *Mathematics and society*, respectively, which include considerations related to this DP theme. Moreover, the inquiry-based subjects can include the exploration of topics such as the environment.

The DP theme of the use of inquiry-based approaches is present in some subjects' objectives. Indeed, the inquiry-based subjects naturally have a strong focus on the use of these approaches. Furthermore, the specialised subjects' objectives indicate this theme may be present, stating "the aim is to develop the following qualities and abilities necessary for inquiry through mathematical activities, observations and experiments".[117] The DP theme of technology is not well-evidenced in the JHSC objectives. Indeed, there is no explicit mention to technology skills and thus technology receives a lesser emphasis compared to the DP learning outcomes.

Summary

Most DP themes are evidenced in the JHSC objectives, including understanding and application, mathematical communication, learning skills and critical thinking. However, the DP themes of engaging with mathematics in a wider context and the use of technology are only partially or minimally present. Inquiry-based approaches are present in some JHSC subjects, but not others. No significantly different themes emerge from the JHSC objectives, though the inquiry-based and specialised subjects have more emphasis on making links between science and mathematics specifically.

5.1.2 Content – Mathematics

This section compares the mathematics content of the DP and JHSC subjects. To support the visual comparison at-a-glance, their content is presented in the following diagrams.

[117] MEXT. (2018). *High School Course of Study. Section 9 Science and Mathematics.* p. 435

Figure 8: DP mathematics: analysis and approaches content visualiser.

	Standard level topics	Additional higher level topics
Topic 1 Number and algebra	1.1 Standard form; 1.2 Arithmetic sequences and series; 1.3 Geometric sequences and series; 1.4 Financial applications and geometric sequences and series; 1.5 Integer exponents and intro to logarithms; 1.6 Simple proof; 1.7 Rational exponents and laws of logarithms; 1.8 Sum of infinite convergent geometric sequences; 1.9 Binomial theorem (natural number)	1.10 Counting principles and extended binomial theorem; 1.11 Partial fractions; 1.12 Complex numbers intro; 1.13 Polar and Euler form; 1.14 Complex roots, De Moivre's theorem and powers/roots of complex numbers; 1.15 Proof by counter example, contradiction, and induction; 1.16 Solutions of systems of linear equations
Topic 2 Functions	2.1 Gradients and equations of straight lines; 2.2 Intro to functions; 2.3 Graphing functions; 2.4 Key features of graphs; 2.5 Composite, identity, and inverse functions; 2.6 Quadratic functions; 2.7 Solving quadratic equations and inequalities & the discriminant; 2.8 Reciprocal and rational functions; 2.9 Exponential and logarithmic functions; 2.10 Graphical and analytical solutions; 2.11 Transformations	2.12 Polynomial functions; 2.13 Harder rational functions; 2.14 Odd, even, and inverse functions; 2.15 Graphical and analytical solutions of inequalities; 2.16 Further graphs, including modulus and solutions
Topic 3 Geometry and trigonometry	3.1 Geometry recap; 3.2 Trigonometry recap; 3.3 Applications and diagrams; 3.4 Circles and radians; 3.5 Definitions, exact values, and sine rule for ambiguous case; 3.6 Identities and relationships; 3.7 Functions and transformations of sin, cos, and tan; 3.8 Solving trigonometric equations graphically and analytically	3.9 Reciprocal trigonometric ratios, identities, and inverse functions; 3.10 Compound angle identities and double angle for tan; 3.11 Symmetry properties; 3.12 Intro to vectors; 3.13 Scalar product and application; 3.14 Vector equation of a line and application; 3.15 Coincident, parallel, skew, and intersecting lines; 3.16 Cross product of vectors; 3.17 Planes; 3.18 Intersections and angles (planes)
Topic 4 Statistics and probability	4.1 Sampling; 4.2 Presenting data (tables, histograms, cumulative freq.); 4.3 Measures of central tendency and dispersion; 4.4 Correlation and regression line; 4.5 Intro to probability; 4.6 Diagrams, conditional probability, combined or independent events; 4.7 Discrete random variables; 4.8 Binomial distribution; 4.9 Normal distribution; 4.10 Equation of regression line of x on y; 4.11 Formulae for conditional probabilities and independent events; 4.12 Standardization of normal variables (z-values)	4.13 Bayes' theorem; 4.14 Continuous random variables
Topic 5 Calculus	5.1 Intro to limits and derivatives; 5.2 Increasing and decreasing functions; 5.3 Derivative of $f(x)=ax^n$; 5.4 Tangents and normal; 5.5 Definite integrals; 5.6 More derivatives and use of product, chain, and quotient rules; 5.7 The second derivative; 5.8 Maximum, minimum and inflection points, and optimization; 5.9 Kinematic problems; 5.10 Indefinite integrals and integration by inspection and substitution; 5.11 Definite integrals and area under and between curves	5.12 Continuity, differentiability, limits, and higher derivatives; 5.13 Evaluation of limits and L'Hôpital's rule; 5.14 Implicit differentiation; 5.15 Further derivatives and indefinite integrals; 5.16 Integration by substitution and by parts; 5.17 Volumes of revolution; 5.18 First order differential equations; 5.19 Maclaurin series
The toolkit and mathematical exploration	The exploration is a piece of written work that involves investigating an area of mathematics.	

Figure 9: DP mathematics: applications and interpretation content visualiser.

	Standard level topics	Additional higher level topics
Topic 1 Number and algebra	1.1 Standard form; 1.2 Arithmetic sequences and series; 1.3 Geometric sequences and series; 1.4 Financial applications of geometric sequences and series; 1.5 Integer exponents and intro to logarithms; 1.6 Approximation, estimation, bounds and errors; 1.7 Amortization and annuities using technology; 1.8 Using technology to solve systems of equations and polynomials	1.9 Laws of logarithms; 1.10 Rational exponents; 1.11 The sum of infinite geometric sequences; 1.12 Complex numbers; 1.13 Euler and Polar form; 1.14 Matrices; 1.15 Eigenvalues and eigenvectors
Topic 2 Functions	2.1 Gradients and equations of straight lines; 2.2 Intro to functions; 2.3 Graphing functions; 2.4 Key features of graphs; 2.5 Modelling with functions; 2.6 Modelling skills	2.7 Composite and inverse functions; 2.8 Transformations; 2.9 Modelling further functions; 2.10 Using logarithms to scale numbers and linearize data
Topic 3 Geometry and trigonometry	3.1 Geometry recap; 3.2 Trigonometry recap; 3.3 Applications and diagrams; 3.4 Circles, sectors, and arcs; 3.5 Equations of perpendicular bisectors; 3.6 Voronoi diagrams	3.7 Radians; 3.8 Sin, Cos, Tan definitions, and Pythagorean identity; 3.9 Matrix transformations; 3.10 Vectors introduction and notation; 3.11 Vector equation of a line; 3.12 Vector application to kinematics; 3.13 Scalar and cross product; 3.14 Graph theory, simple graphs, directed graphs, and subgraphs; 3.15 Adjacency matrices and weighted adjacency tables; 3.16 Decision math
Topic 4 Statistics and probability	4.1 Sampling; 4.2 Presenting data (tables, histograms, cumulative freq.); 4.3 Measures of central tendency and dispersion; 4.4 Correlation and regression line; 4.5 Intro to probability; 4.6 Diagrams, conditional probability, combined or independent events; 4.7 Discrete random variables; 4.8 Binomial distribution; 4.9 Normal distribution; 4.10 Spearman's rank; 4.11 Hypothesis testing, chi-squared and t-tests	4.12 Collecting and organising data and testing for reliability and validity; 4.13 Regression, residuals, coefficient of determination; 4.14 Linear transformations, linear combinations, unbiased estimations; 4.15 Central Limit theorem; 4.16 Confidence Intervals; 4.17 Poisson Distribution; 4.18 Further hypothesis testing; 4.19 Transition matrices and Markov chains
Topic 5 Calculus	5.1 Intro to limits and derivatives; 5.2 Increasing and decreasing functions; 5.3 Derivative of $f(x)=ax^n$; 5.4 Tangents and normal; 5.5 Definite integrals; 5.6 Maximum and minimum points; 5.7 Optimisation; 5.8 Area using trapezoidal rule	5.9 More derivatives and the chain, product, and quotient rule; 5.10 Second derivatives; 5.11 Finding further integrals and integration by inspection and substitution; 5.12 Area of a region and volumes of revolution; 5.13 Kinematic problems; 5.14 Differential equations; 5.15 Slope fields and their diagrams; 5.16 Euler's method and numerical solutions to differential equations and coupled systems; 5.17 Phase portraits; 5.18 Simple second order differential equations
The toolkit and mathematical exploration	The exploration is a piece of written work that involves investigating an area of mathematics.	

Figure 10: JHSC mathematics subjects visualiser.

General subjects	Mathematics	Mathematics I	Numbers and formula	Shapes and measurement	Quadratic functions	Data analysis				
		Mathematics II	Various expressions	Geometry and equations	Exponential functions and logarithmic functions	Trigonometric functions	Differentiation and integration			
		Mathematics III	Limits of sequences and functions	Differentiation	Integration methods					
		Mathematics A	Properties of figures	Number of cases and probability	Mathematics and human activities					
		Mathematics B	Numerical sequences	Statistical inference	Mathematics and social life					
		Mathematics C	Vectors	Curves on the plane and the complex plane	Ingenuity in mathematical expression					
	Inquiry-Based Study of Science and Mathematics	Basic-inquiry	*To acquire the following knowledge and skills:* (a) Understanding the significance of inquiry. (b) Understanding the process of inquiry. (c) An understanding of research ethics. (d) (Basic) skills in observation, experiments, surveys, etc. (e) (Basic) skills for analysing phenomena. (f) (Basic) skills for summarising and presenting the results of research.							
		Inquiry	*Students will acquire the basic knowledge and skills shown in the content through the process of exploring the following:* (A) Matters related to natural and social phenomena. (B) Matters relating to cutting-edge science and interdisciplinary fields. (C) Matters concerning the natural environment. (D) Matters relating to science and technology. (E) Matters related to mathematical phenomena.							
Specialised subjects	Science and Mathematics	Mathematics I (SMC)	Numbers and formula*	Shapes and measurement	Quadratic functions	Exponential functions and logarithmic functions	Data analysis	Number of cases and probability		
		Mathematics II (SMC)	Various expressions	Numerical sequences	Trigonometric functions and the complex plane	Geometric figures and equations*	Limits	Differential calculus	Integration*	Statistical inference*
		Advanced Mathematics (SMC)	Vectors*	Matrices and their applications*	Discrete mathematics*	Mathematics and daily life and society				

An asterisk (*) indicates the topics where the general subjects' content has been extended to include new material.

Structure

The JHSC organises mathematics into subjects, both general and specialised. Students of both the DP and JHSC are required to study mathematics content as part of their respective programmes. Indeed, the DP requires students to study at least a SL course in mathematics (either AA or AI) and the JHSC requires students to study at least Mathematics I, or to have achieved equivalent outcomes in another subject (such as a specialised subject). Students studying in the science and mathematics department must take the specialised subjects Mathematics I (SMC) and Mathematics II (SMC).

The JHSC general subjects are more elective in style than the DP subjects. Indeed, each individual subject is smaller in comparison to DP subjects and focuses on a narrower range of content. Students can tailor their mathematics study by choosing from the general subjects Mathematics I, II, III, A, B, and C, whereas, in the DP, students choose only one subject to study. Furthermore, in the subjects Mathematics A, B and C, students can select the content that they wish to study to attain two credits. This contrasts to the DP subjects in which all content is compulsory. Hence, the general subjects offer more flexibility and optionality for mathematics study than the DP. However, both are similar in the regard that they provide opportunity to specialise in mathematics, with the offer of doing a HL course in either AA or AI in the DP and the offer of Mathematics III and Mathematics C in the JHSC.

The structure of the JHSC specialised subjects is more similar to that of the DP. The three specialised subjects cover all the content of the six general subjects and expand on it in certain areas (see Figure 10). As a result, they tend to encompass more material, making them more akin to DP subjects. In addition to being fewer and larger, all content within the specialised subjects is compulsory, offering less flexibility for customisation. Like DP HL subjects, the specialised subjects allow for a deeper study of mathematics. However, since Mathematics I and II (SMC) are compulsory for students in science and mathematics departments, they do not offer a less specialised pathway, such as DP SL subjects.

Finally, the DP differs to JHSC by offering stand-alone subjects with distinct thematic focuses, such as AA and AI.

Content Alignment

This section will compare the alignment of mathematics content in the DP and JHSC. The following tables present a simplified summary of the content alignment that the four selected JHSC pathways have with the SL and additional higher level content (AHL) of each DP topic.

Table 17: Summary of the content alignment between JHSC pathways and the main topics in AA.

	AA topics	GSPI	GSPII	SSPI	SSPII
SL	1. Number and algebra				
	2. Functions				
	3. Geometry and trigonometry				
	4. Statistics and probability				
	5. Calculus				
AHL	1. Number and algebra				
	2. Functions				
	3. Geometry and trigonometry				
	4. Statistics and probability				
	5. Calculus				
	Mathematics exploration				

Table 18: Summary of the content alignment between JHSC pathways and the main topics in AI.

	AI topics	GSPI	GSPII	SSPI	SSPII
SL	1. Number and algebra				
	2. Functions				
	3. Geometry and trigonometry				
	4. Statistics and probability				
	5. Calculus				
AHL	1. Number and algebra				
	2. Functions				
	3. Geometry and trigonometry				
	4. Statistics and probability				
	5. Calculus				
	Mathematics exploration				

Key:

	Strong presence of this topic in the JHSC pathway.		*Partial presence of this topic in the JHSC pathway.*		*Little or no presence of this topic in the JHSC pathway.*

- General Subjects Pathway I (GSP1): Mathematics I, II, A, B and Basic Inquiry
- General Subjects Pathway II (GSP2): Mathematics I, II, III, A, B and C and Inquiry subjects
- Specialised Subject Pathway I (SSP1): Mathematics I and II (SMC) and Inquiry subjects
- Specialised Subject Pathway II (SSP2): Mathematics I and II (SMC), Advanced Mathematics (SMC) and Inquiry subjects.

General Subjects Pathway I

(The study of Mathematics I, II, A, and B and Basic Inquiry)

This pathway has strong alignment with SL mathematics content in the DP, slightly more so with AA than AI. The JHSC subjects in this pathway cover key topics such as sequences and series, quadratic functions, exponential and logarithmic functions, trigonometric relationships and identities, presenting data, summary statistics, probability, discrete random various, the binomial and normal distribution, derivatives and integrals of polynomials, and maximum and minimum points. This leads to at least partial alignment with the SL content in all DP topics, with strong alignment for most.

Alignment is stronger with AA's *Number and algebra* content than AI's, as the pathway includes binomial theorem and proof but not financial applications such as amortization and

annuities. Similarly, alignment is stronger with AA's *Functions* content, as the JHSC subjects do not explicitly focus on the modelling of functions. In contrast, alignment is stronger with AI's *Calculus* content, as the pathway does not include AA SL content such as differentiation rules, the second derivative, and integration by inspection and substitution.

While alignment is overall judged to be strong with the SL content of most topics, not all SL subtopics are necessarily covered. For example, reciprocal and rational functions, transformations, and Voronoi diagrams are not included. Furthermore, whilst hypothesis testing is introduced, it is not covered to the same extent as AI's SL or AHL content.

The JHSC pathway has very little alignment with AHL content. However, it can be noted that there are couple of subtopics covered, including counting principles (AA), proof by induction (AA), factor theorem (AA) and a few other subtopics that are SL content in AA and AHL content in AI.

Lastly, there is some content in the JHSC subjects which is not covered in one, or both, DP mathematics subjects (see Table 19). Most significantly, Mathematics II covers some different geometry content such as equations of circles, loci and more coverage of the properties of geometrical figures. Moreover, Mathematics A and B include the units *Mathematics and Human Activities* and *Mathematics and Social Life*. While these are not distinct subtopics in DP mathematics, their content shares similarities with the links and considerations to be embedded in DP mathematics, such as the social, cultural and historical contexts of mathematics.

Table 19: Content in covered in the JHSC pathway (GSPI) that is not covered in the DP subjects.

Significant content not in AA (only)	Significant content not in AI (only)
• Concepts of hypothesis testing (Math B)	• Binomial theorem (Math II) • Proof (Math B) • Counting principles (Math A) • Double angle identities (Math II) • Factor theorem (Math II)
Significant content not in either DP mathematics subject	
• Linear programming (Math II) • Loci (Math II) • Equation of a circle (Math II) • Euclidean algorithms (Math A) • More properties of geometric figures (Math A) • Mathematics and human activities (as a distinct subtopic) (Math A) • Mathematics and social life (as a distinct subtopic) (Math B)	

Overall, General Subjects Pathway I has strong alignment with SL mathematics content and has similar breadth and depth to SL subjects. There is limited alignment with AHL content, and the pathway has significantly less breadth and depth than HL subjects. Lastly, the Basic Inquiry subject in the JHSC pathway covers inquiry skills but does not require students to be as independent as the DP mathematical exploration, resulting in only partial alignment.

General Subjects Pathway II
(The study of Mathematics I, II, III, A, B, and C and Inquiry subjects)

This pathway includes the study of all the subjects in GSPI, as well as Mathematics III, Mathematics C, and the Inquiry subject. Therefore, this section will focus on how these additional subjects impact alignment with DP mathematics.

Mathematics III covers further differentiation and integration content, thus alignment with the DP's *Calculus* SL and AHL content increases. Indeed, the subject covers further derivatives, differentiation rules, the second derivative, area under a curve, and volumes of revolution. Moreover, Mathematics III has a unit that covers limits of functions, which aligns with AA's AHL content regarding continuity, differentiability and limits. The same unit also covers limits of sequences which is not covered by DP mathematics. Mathematics III also covers some more DP *Functions* content such as rational functions, and composite and inverse functions.

Mathematics C includes coverage of vectors; thus, it increases the alignment with the DP's *Geometry and trigonometry* AHL content. However, the extent of coverage is less, particularly in comparison to AA. Mathematics C also covers similar content regarding complex numbers, which increases alignment with AHL content in *Number and algebra*. Moreover, Mathematics C covers matrices and discrete graphs, which are subtopics in AI.

Generally, Mathematics III and C align with DP AHL content, though there are several subtopics which are not covered, including most AA and AI AHL content from *Statistics and probability*. Conversely, there are a few areas that are covered in Mathematics III and C which are not in one, or either, of the DP subjects (see Table 20). Most notably these are limits of sequences and conics.

Table 20: Mathematics content in covered in the JHSC pathway (GSPII) that is not covered in the DP subjects.

Significant content not in AA (only)	Significant content not in AI (only)
• Concepts of hypothesis testing and confidence intervals (Math B) • Matrices (Math C) • Discrete graphs (Math C)	• Binomial theorem (Math II) • Proof (Math B) • Counting principles (Math A) • Double angle identities (Math II) • Factor theorem (Math II) • Rational functions (Math III) • Limits of functions (Math III)
Significant content not in either DP mathematics subject	
• Linear programming (Math II) • Loci (Math II) • Equation of a circle (Math II) • Euclidean algorithms (Math A) • More properties of geometric figures (Math A)	• Recurrence sequences (Math B) • Mathematics and human activities (as a distinct subtopic) (Math A) • Mathematics and social life (as a distinct subtopic) (Math B) • Limits of sequences (Math III) • Conics (Math C)

Overall, General Subjects Pathway II (all general subjects combined) has reasonable content alignment with DP HL subjects. Since this pathway covers a substantial amount of DP content, along with other content, the breadth and depth of mathematics content can be considered comparable to that of DP HL mathematics. Lastly, the Inquiry subject in the pathway develops

inquiry skills and requires students to conduct independent research, thus it aligns strongly with the DP's mathematical exploration.

Specialised Subjects Pathway I
(The study of Mathematics I (SMC), Mathematics II (SMC), and the Inquiry subjects)

Most of the specialised subjects' content is drawn from the general subjects. Specialised subject Mathematics I (SMC) covers all content from Mathematics I, some content from Mathematics II and Mathematics B, and a very small amount from Mathematics III. Specialised subject Mathematics II (SMC) covers the rest of the content from Mathematics II and III, most of Mathematics B, and some of Mathematics C. Therefore, this pathway encompasses a considerable amount of content that is in General Subjects Pathway II and thus has somewhat similar alignment to DP mathematics, though with a few notable differences.

Whilst some content from Mathematics C is covered, the specialised subjects Mathematics I and II (SMC) do not cover the vectors, matrices or discrete graphs subtopics. Therefore, there is, in comparison to General Subjects Pathway II, less alignment with AHL content in *Geometry and trigonometry* and AI's AHL content in *Number and algebra*. This pathway also does not cover the topics of *Mathematics and Human Activities* (from Mathematics A) and *Mathematics and Social Life* (from Mathematics B).

Instead, a few topics from the general subjects are expanded on. Indeed, Mathematics II (SMC) extends the *Statistical Inference* topic from Mathematics B to include continuous random variables, uniform distributions, and probability density functions, which increases alignment with AA's *Statistics and probability* AHL content. The extension also includes more hypothesis testing content, such as chi-squared tests and t-tests, which aligns with AI's *Statistics and probability* SL content. Furthermore, solving simple first order differential equations is added, which is also present in DP *Calculus* AHL content.

Table 21 presents the content in this pathway that is not covered in one, or both, DP subjects.

Table 21: Mathematics content in covered in the JHSC pathway (SSPI) that is not covered in the DP subjects.

Significant content not in AA (only)	Significant content not in AI (only)
• Hypothesis testing, confidence intervals, chi-squared tests and t-tests (Math II SMC)	• Binomial theorem (Math II) • Proof (Math B) • Counting principles (Math A) • Double angle identities (Math II) • Factor theorem (Math II) • Rational functions (Math III) • Limits of functions (Math III) • Continuous random variables (Math II SMC)
Significant content not in either DP mathematics subject	
• Linear programming (Math II) • Loci (Math II) • Equation of a circle (Math II) • Euclidean algorithms (Math A)	• More properties of geometric figures (Math A) • Recurrence sequences (Math B) • Limits of sequences (Math III) • Conics (Math C)

Overall, Specialised Subjects Pathway I has reasonable alignment with DP HL subjects. Indeed, most SL content is covered, as well as AHL content from several topics. As the

pathway covers a considerable amount of DP content, in addition to other subtopics, the breadth and depth of mathematics content can be considered similar to that of DP HL mathematics. The alignment is slightly stronger with AA content than AI content.

Specialised Subjects Pathway II
(Mathematics I (SMC), Mathematics II (SMC), Advanced Mathematics (SMC) and Inquiry subjects)

The specialised subjects combined encompass all the content from the general subjects. Therefore, the alignment to DP mathematics is similar to the General Subjects Pathway II. That said, the specialised subjects extend the content in certain areas, which leads to a slightly stronger alignment. Advanced Mathematics (SMC) covers the vectors content of Mathematics C and extends it to include vector equations of lines and places, thus increasing alignment with DP *Geometry and trigonometry* content. However, it can be noted that AA's coverage of vectors remains more extensive. Advanced Mathematics (SMC) also extends the content of Mathematics C regarding matrices and discrete graphs. It covers more of what is addressed in DP AI, though still to a lesser extent.

It can be noted that some AHL content is not present in either the general or specialised subjects. Notably, this includes eigenvalues and eigenvectors (AI), modelling functions (AI), reciprocal trigonometric ratios (AA), cross product and further vector content (AA), non-linear regression (AI), Poisson distribution (AI), transition matrices and Markov chains (AI), Maclaurin series (AA), slope fields and phase portraits (AI), and second order differential equations (AI).

Table 22 presents the content in this pathway that is not covered in one, or both, DP subjects.

Table 22: Mathematics content in covered in the JHSC pathway (SSPII) that is not covered in the DP subjects.

Significant content not in AA (only)	Significant content not in AI (only)
• Hypothesis testing, confidence intervals, Chi-squared tests and t-tests (Math II SMC) • Discrete graphs and applications (Advanced Math SMC) • Matrices (Advanced Math SMC)	• Binomial theorem (Math II) • Proof (Math B) • Counting principles (Math A) • Double angle identities (Math II) • Factor theorem (Math II) • Rational functions (Math III) • Limits of functions (Math III) • Continuous random variables and probability density functions (Math II SMC) • Vector equations of planes (Advanced Math SMC)
Significant content not in either DP mathematics subject	
• Linear programming (Math II) • Loci (Math II) • Equation of a circle (Math II) • Euclidean algorithms (Math A) • More properties of geometric figures (Math A)	• Recurrence sequences (Math B) • Limits of sequences (Math III) • Conics (Math C) • Mathematics and human activities (as a distinct subtopic) (Math A) • Mathematics and social life (as a distinct subtopic) (Math B)

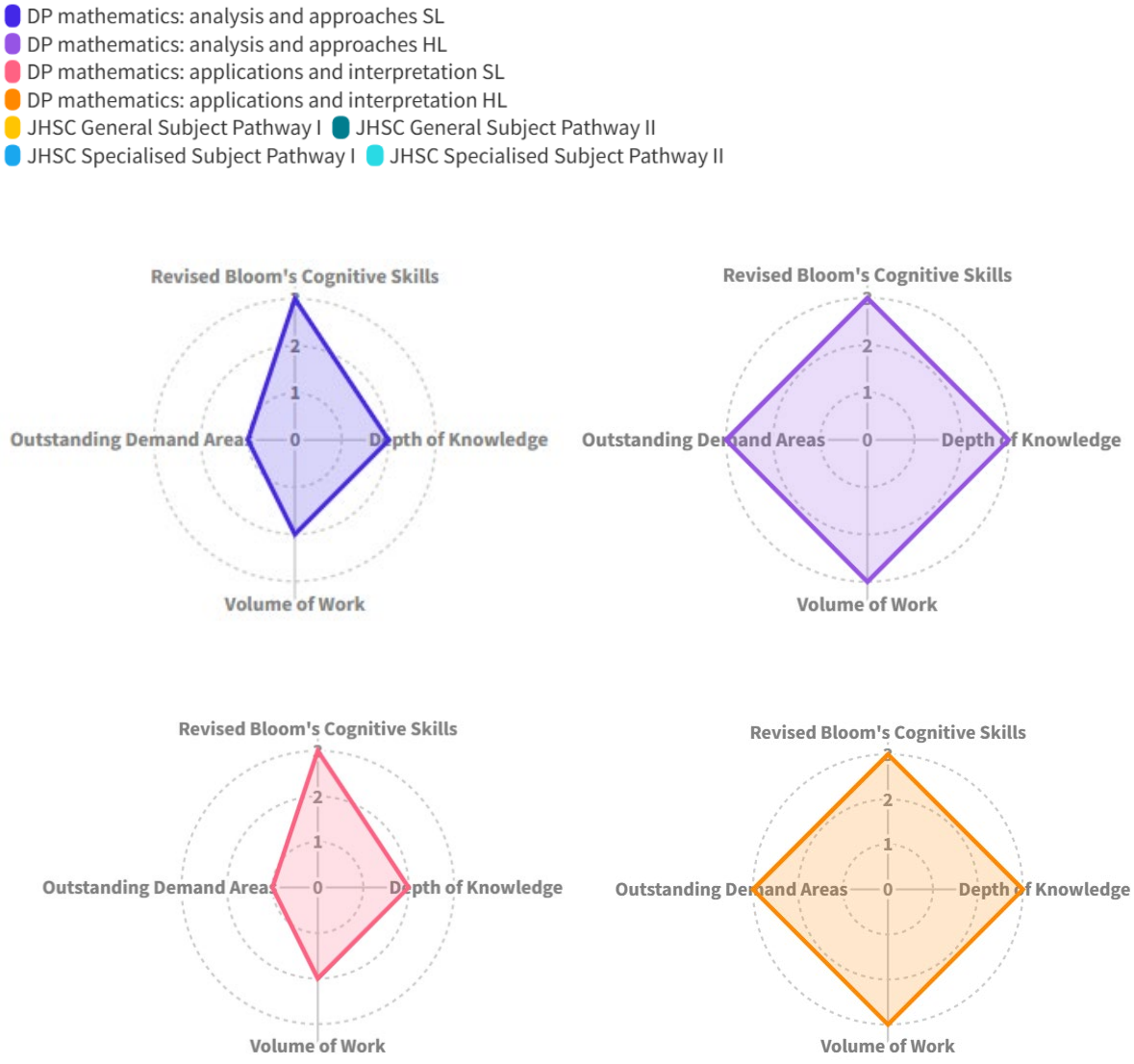
Overall, Specialised Subjects Pathway II has considerable alignment with DP mathematics content. The specialised subjects encompass all the general subjects' content and extends it.

Therefore, the breadth and depth of this pathway's content can be considered similar, if not somewhat greater than, that of DP HL subjects.

5.1.3 Demand – Mathematics

This section considers the alignment between the DP mathematics subjects and the selected JHSC pathways with regards to demand. The DP and JHSC subjects were analysed using the same demand tool in order to create a demand profile for DP AA (SL and HL), DP AI (SL and HL), JHSC General Subjects Pathway I, JHSC General Subjects Pathway II, JHSC Specialised Subjects Pathway I, and JHSC Specialised Subjects Pathway II. These demand profiles are presented below in the form of radar diagrams, with superimposed diagrams at the end also being featured to enable immediate visual comparison.

Figure 11: Visual representations of subject and pathway demand.



The panel of experts carried out a detailed analysis of each course and reached a consensus on the scores shown in the profiles above. The following points were particularly important within the panel discussion:

- Regarding the scores for **Bloom's Cognitive Skills**:
  - The DP mathematics subject group learning outcomes apply to all subjects hence the scores are the same for AA (SL and HL) and AI (SL and HL). These outcomes were given a score of 3 on the basis that they strongly evidence the development of critical and creative thinking skills through their focus on reasoning, inquiry-based approaches, reflection, generalisation, unfamiliar contexts, and consideration of wider implications.
  - All JHSC pathways received a score of 3 due to the objectives for both general and specialised subjects consistently featuring higher-order thinking skills, such as critical thinking, making decisions based on mathematical reasoning, reflecting on and evaluating problem-solving and inquiry processes, and developing creativity.

- Regarding the scores for **Depth of Knowledge**:
  - Both DP mathematics subjects at SL were given a score of 2. Both subjects were judged to cover the topics of 'Number and algebra', 'Functions', 'Geometry and trigonometry', 'Statistics and probability', and 'Calculus' in considerable detail, building in complexity and requiring a substantial amount of pre-requisite knowledge. At HL, both DP mathematics subjects were awarded a score of 3 for depth of knowledge. The subjects were judged to cover topics in a high level of detail, with many subtopics having high complexity and requiring a large amount of pre-requisite knowledge.
  - General Subject Pathway I received a score of 2 due to a wide range of topics being covered in a considerable, although not high, level of detail. The rest of the pathways received a score of 3, due to most topics being studied in very high detail. Furthermore, the objectives also contributed to the pathway scores, as they emphasised an integrated and expansive approach to learning, as well as indicating opportunities for extended thinking in the inquiry-based subjects.

- Regarding the scores for **Volume of Work**:
  - Both DP mathematics subjects at SL were deemed to comprise a moderate-heavy volume of work and were given a score of 2. The panel concluded that the teaching time allotted to cover the different concepts was short (150 hours) but acknowledged that some subtopics contained basic concepts and recapped prior learning, hence 2 was deemed an appropriate score. For HL, both DP mathematics subjects were considered to have a heavy volume of work, due to the short amount of time allocated (240 hours) and the level of complexity of the content, which combined merited a score of 3.
  - General Subjects Pathway I scored a 1 due to the content being spread over several subjects which overall led to a standard time allocation for the content, thus representing a moderate workload. General Subjects Pathway II and Specialised Subjects Pathway I both received a score of 1.5. These pathways similarly spread the content across multiple subjects, however, the breadth and depth of the subjects meant that the workload was deemed to be slightly more than moderate. Finally, Specialised Subjects Pathway II was given a score of 2. Indeed, the additional content and complexity led to it being judged as having a moderate to heavy workload.

- Regarding the scores for **Outstanding Areas of Subject Demand**:
  - Both DP mathematics subjects at SL contained one area of outstanding demand, which was the ‘mathematical exploration’. This element of the SL subjects was considered to apply skills typically needed in higher education, such as extended writing and presentation of mathematical concepts, student-led exploration, and academic writing skills. Therefore, a score of 1 was awarded to both SL subjects for the inclusion of this element. In addition to this, both subjects at HL had further areas of outstanding demand. For mathematics: analysis and approaches, some of the identified outstanding areas of demand were proof by induction, complex numbers (De Moivre’s theorem), vectors (cross product, equations of planes and intersections), and Maclaurin series. For mathematics: applications and interpretation, some identified areas of outstanding demand were eigenvalues and eigenvectors, nonlinear regression, Markov chains, second order differential equations, slope fields, Euler’s method, and phase portraits. Overall, there was a high number of outstanding areas of demand and a score of 3 was awarded to both HL subjects.
  - General Subjects Pathway I received a score of 1 as the Basic Inquiry subject and inclusion of proof methods were deemed enough to be considered as one area of outstanding demand. General Subjects Pathway II was given a score of 2 for its inclusion of the Inquiry subject, proof, limits of sequences and functions, coverage of complex numbers, and polar coordinates. Specialised Subjects Pathway I received a score of 3 for these areas in addition to continuous random various and probability density functions and differential equations. Specialised Subjects Pathway II also received a score of 3 for these areas as well as its coverage of vectors.

5.2 Sciences

The following is the list of subjects used in the science comparison analysis.

DP physics[118]
Physics is a subject option from the DP sciences subject group, offered at both SL and HL. This subject has content that is common to both SL and HL, as well as AHL content that is featured only in the HL. Thus, the HL has greater breadth and depth than SL. This subject is intended to prepare students for university courses such as engineering, physics, and others requiring a strong science background. HL is suitable for those intending to pursue further study in an area requiring a strong background in physics.

DP chemistry[119]
Chemistry is a subject option offered within the DP sciences subject group, at both SL and HL. This subject has content that is common to both SL and HL, as well as AHL content that is featured only in the HL. Thus, the HL has greater breadth and depth than SL. This subject is designed to prepare students for university courses such as medicine, biological science and environmental science. HL is suitable for those intending to pursue further study in an area requiring a strong background in chemistry.

DP biology[120]
Biology is a subject option within the DP sciences subject group, offered at both SL and HL. This subject has content that is common to both SL and HL, as well as AHL content for HL. Thus, HL has greater breadth and depth than SL. This subject is designed to prepare students for university courses such as biology, medicine, dentistry, and biomedical engineering. HL is suitable for those intending to pursue further study in an area requiring a strong background in biology.

The analysis considers both general and specialised science subjects in the JHSC, as described below.

General Subjects[121]
The JHSC organises the sciences into single-discipline subjects. Students are required to study either Science and Human Life along with one of Basic Physics, Basic Chemistry, Basic Biology, or Basic Earth Science, or alternatively, any three of the Basic subjects. Equivalent outcomes may also be achieved through a different subject, such as a specialised course. Each Basic subject serves as a prerequisite to the corresponding Advanced subject (e.g., Basic Physics is required to study Advanced Physics). The analysis will focus on the Advanced subjects listed below, as they align more closely with upper secondary level than the Basic subjects.

- **JHSC Advanced Physics**
- **JHSC Advanced Chemistry**
- **JHSC Advanced Biology**

[118] International Baccalaureate. (2023). *Physics guide*.
[119] International Baccalaureate. (2023). *Chemistry guide*.
[120] International Baccalaureate. (2023). *Biology guide*.
[121] MEXT. (2018). *High School Course of Study. Science.* p. 103-130. Available from: 高等学校学習指導要領（平成 30 年告示）

Specialised Subjects[122]

The JHSC also offers specialised science subjects, with one subject available for each science discipline. These subjects combine the content from the corresponding Basic and Advanced general subjects while proving opportunities for further expansion. The analysis will focus on the subjects listed below.

- **Physics for the Science and Mathematics Course – Physics (SMC)**
- **Chemistry for the Science and Mathematics Course – Chemistry (SMC)**
- **Biology for the Science and Mathematics Course – Biology (SMC)**

5.2.1 Learning Outcomes – Sciences

This section compares and contrasts the learning outcomes of curricula falling within the category of science. Ecctis extracted learning outcome themes for DP physics, chemistry and biology from the sciences subject group's aims and assessment objectives, hence the themes are the same for all the sciences. The JHSC defines three overarching objectives for the science subject area, outlining the qualities and abilities students should develop. These concise objectives are further elaborated in the *Commentary on the High School Curriculum Guidelines for Science*. Both the objectives and their explanations were considered in the learning outcome analysis. The following table displays the presence of the learning outcome themes that were extracted from the DP science learning outcomes and indicates if and where they were judged to have presence within the learning outcomes of the JHSC science subjects.

Table 23: Presence of the DP sciences subject group learning outcome themes in the JHSC science subjects.

Themes extracted from the learning outcomes of the DP sciences subject group	Presence in the JHSC	
1. Conceptual understanding and making connections.		Partially present in the science objectives.
2. Use and application of knowledge, methods, tools, and techniques that characterise science.		Partially present in the science objectives.
3. Creativity and critical thinking (problem-solving, analysis, evaluation, and synthesis).		Partially present in the further explanations of the science objectives.
4. Apply skills necessary to carry out insightful and ethical investigations (planning, collecting data, organising, following ethical guidelines).		Strongly present in the science objectives. Skills in scientific exploration and investigation are greatly emphasised.
5. Development of technological skills.		Not generally evident in the science objectives, but present in Physics (SMC).
6. Effective collaboration and communication.		Not evident in the science objectives.
7. Awareness of global and local problems and the environmental, ethical, cultural, and social impact of science.		Partially present in the further descriptions of the science objectives.

Key:

	This theme is well-evidenced in the learning outcomes of the JHSC.		*This theme is partially evidenced in the learning outcomes of JHSC.*		*This theme is not evident in the learning outcomes of the JHSC.*

[122] MEXT. (2018). *High School Course of Study. Science and Mathematics.* p. 437-441.

Presence of the DP's Learning Outcome Themes

The JHSC learning outcomes for science have some degree of alignment with most of the DP learning outcome themes. However, the DP themes tend to only be partially present, and two themes have little to no presence in the JHSC learning outcomes. The extent to which each theme is present in the JHSC learning outcomes is discussed below.

1. Conceptual understanding and making connections

This DP theme is partially present in the JHSC science learning outcomes. The first science objective describes students deepening their understanding of natural objects and phenomena and its further description states that students will understand scientific concepts, principles and laws. However, conceptual understanding, or making connections within the subject or to other subjects is not explicitly required by the objectives.

2. Use and application of knowledge, methods, tools, and techniques that characterise science

This DP theme is also partially present in the JHSC science learning outcomes. The science objectives somewhat demonstrate this theme through expectations that students think scientifically, make observations, and develop skills for conducting scientific exploration and investigation. These aspects may encompass methods, tools and techniques that characterise science, but it is not explicit enough to determine a strong presence of this theme.

3. Creativity and critical thinking (problem-solving, analysis, evaluation, and synthesis)

This DP theme is partially present in the JHSC science learning outcomes. Critical and creative thinking skills are not explicitly evident in the science objectives themselves, however the further explanation of these describe students independently identifying and considering problems, analysing natural objects and phenomena in terms of qualitative and quantitative relationships, and making judgements based on scientific evidence. However, analysis, evaluation and synthesis generally receive less emphasis compared to the DP science learning outcomes.

4. Apply skills necessary to carry out insightful and ethical investigations

There are many references in the JHSC learning outcomes to investigations and the skills required to conduct them. Indeed, the science objectives describe how students will develop skills related to experiments, the ability to investigate scientifically and an attitude of "proactively engaging with natural objects and phenomena"[123]. The further explanations of the objectives state that students should make predictions or hypotheses and conduct observations and experiments to verify these. They also include that students will conduct experiments on a topic of their choosing and analyse and interpret the results. Hence there is an overall strong presence of this DP theme in the JHSC learning outcomes.

5. Development of technological skills

This DP theme has little to no presence in the JHSC learning outcomes, as the science objectives do not focus on the development of technology skills. Indeed, while students are to find topics for investigation and analyse results, there are no explicit references to the use of technology or how to achieve these objectives. However, the development of technology skills receives more focus in the specialised Physics (SMC) subject, which requires students to deal with analytical techniques using computers.

[123] MEXT. (2018). *High School Course of Study. Science*. p 103.

6. Effective collaboration and communication

Effective collaboration and communication skills are not included in the JHSC learning outcomes. While these skills may be used during scientific inquiry and experiments, there are no specific requirements in JHSC the learning outcomes.

7. Awareness of global and local problems and the environmental, ethical, cultural, and social impact of science

This DP theme has a partial presence in the JHSC science learning outcomes. The explanation of the science objectives highlights aspects of the current global context, including the conservation of the natural environment and the growing role of science and technology. It emphasises that, to build a sustainable society that takes into account global issues, it is important for students to consider multiple perspectives and make evidence-based judgements. However, there is no explicit requirement for students to be aware of global issues, nor is there clear evidence that they need to consider the cultural, ethical and social impacts of science.

Other Themes in the JHSC

There are no significantly different themes or skills within the JHSC science learning outcomes which are not also present in DP science learning outcomes.

Summary

Among the DP science learning outcome themes, only developing skills for scientific investigation is well-evidenced in the JHSC science learning outcomes. Four other themes–conceptual understanding, methods and techniques that characterise science, critical thinking skills, and awareness of local and global problems–are partially present. However, two DP themes–the development of technological skills and the use of communication and collaboration–have little to no presence in the JHSC science learning outcomes. While these skills may be incorporated into science teaching and learning, they receive less emphasis in the JHSC science outcomes compared to the DP.

5.2.2 Content – Physics

This section compares and contrasts the content of the DP and JHSC falling within the category of physics. To support visual comparison at-a-glance, the content of the DP and JHSC physics subjects are presented below in diagrams which show the key topics and subtopics included in each.

Figure 12: DP physics content visualiser.[124]

A. Space, time and motion	A.1 Kinematics	A.2 Forces and momentum	A.3 Work, energy and power	A.4 Rigid body mechanics (HL only)	A.5 Galilean and special relativity (HL only)
B. The particulate nature of matter	B.1 Thermal energy transfers	B.2 Greenhouse effect	B.3 Gas laws	B.4 Thermodynamics (HL only)	B.5 Current and circuits
C. Wave behaviour	C.1 Simple harmonic motion (SL + AHL)	C.2 Wave model	C.3 Wave phenomena (SL + AHL)	C.4 Standing waves and resonance	C.5 Doppler effect (SL + AHL)
D. Fields	D.1 Gravitational fields	D.2 Electric and magnetic fields	D.3 Motion in electromagnetic fields	D.4 Induction (HL only)	
E. Nuclear and quantum physics	E.1 Structure of the atom (SL + AHL)	E.2 Quantum physics (HL only)	E.3 Radioactive decay (SL + AHL)	E.4 Fission	E.5 Fusion and stars
Experimental programme	Practical work	Collaborative sciences project	Scientific investigation		

[124] '(HL only)' and '(SL + AHL)' are used to flag, respectively, topics only taught at HL and topics taught at both SL and HL, but which also feature additional higher level content.

Figure 13: JHSC physics content visualiser.

General Subjects	**Basic Physics**	(1) Motion and energy of objects	(a) How to express motion	(b) Various forces and their functions	(c) Mechanical energy		
		(2) Various physical phenomena and the use of energy	(a) Waves	(b) Heat	(c) Electricity	(d) Energy and its uses	(e) Physics in the world
	Advanced Physics	(1) Various exercises	(a) Motion in a plane	(b) Momentum	(c) Circular motion and simple harmonic motion	(d) Gravitation	(e) Motion of gas molecules
		(2) Waves	(a) How waves propagate	(b) Sound	(c) Light		
		(3) Electricity and magnetism	(a) Electricity and electric current	(b) Electric current and magnetic fields			
		(4) Atoms	(a) Electrons and light	(b) Atoms and atomic nuclei	(c) The future shaped by physics		
Specialised Subjects	**Physics for the Science and Mathematics Course**	(1) Force and motion	Refer to forces and motion content in Basic and Advanced Physics. The content will cover circular motion, simple harmonic motion, gravitation, heat and temperature, and the motion of gas molecules, and these contents will be expanded as necessary. For example, the rotational motion of a rigid body around a fixed axis can be considered.				
		(2) Waves	Refer to the waves content taught in Basic and Advanced Physics. The properties of waves, how to express waves, sound, light, etc., will be covered, and these contents will be expanded as necessary. For example, the structure and function of Fresnel lenses can be considered.				
		(3) Electricity and magnetism	Refer to electricity and magnetism content in Basic and Advanced Physics. The content will cover charge and electric fields, electric circuits, electric current and magnetic fields, electromagnetic induction and electromagnetic waves, etc., and these contents will be expanded as necessary. For example, a more advanced treatment of alternating currents will be provided.				
		(4) Atoms	Refer to atom content in Basic and Advanced Physics. The content will cover particle and wave nature, atoms and atomic nuclei, the future of physics, etc. These contents will be developed and expanded according to the needs of the students. For example, the origin of the universe and matter could be considered.				
		In addition, in the course of dealing with these topics, sensor-based measurements and computer-based methods for familiar physical phenomena will be discussed. Analytical techniques using computers will also be dealt with. For example, the movement of an object measured using a sensor.					

Structure

Like DP physics, the JHSC general subjects offer two levels of study, Basic Physics and Advanced Physics. Similar to how AHL content builds upon SL content, the Advanced Physics content builds on that of Basic Physics. However, Basic Physics has significantly lesser breadth and depth than SL. This reflects that Japan's upper secondary begins a year earlier and also requires students to study a wider range of science disciplines.

The JHSC specialised subjects do not offer different levels of study for physics. Instead, a single subject, Physics (SMC), is offered, which covers the content from both Basic Physics and Advanced Physics, with opportunities for further expansion.

DP physics content is divided into five overarching themes: *Space, time and motion*, *The particulate nature of matter*, *Wave behaviour*, *Fields*, and *Nuclear and quantum physics*. The JHSC physics subjects are organised into a similar number of broad areas, some of which are similar to those in DP physics. Specifically, Advanced Physics is organised into *(1) Various exercises*, *(2) Waves*, *(3) Electricity and magnetism*, and *(4) Atoms*. Likewise, Physics (SMC) is organised into *(1) Forces and Motion, (2) Waves*, *(3) Electricity and magnetism*, and *(4) Atoms.*

Content Alignment

The following table presents a simplified summary of the content alignment that JHSC physics has, at the topic-level, with DP physics (SL and AHL content). The analysis of JHSC Advanced Physics also considers the content that will have been studied in the pre-requisite subject, Basic Physics. Physics (SMC) encompasses the content from Advanced Physics (and Basic Physics) and expands it. An asterisk (*) indicates alignment exclusive to Physics (SMC).

Table 24: Summary of the content alignment between the DP physics topics and JHSC physics content.

DP physics themes and topics	Presence of SL content in Advanced Physics/Physics (SMC)	Presence of AHL content in Advanced Physics/Physics (SMC)
A. Space, time and motion		
A.1 Kinematics		N/A
A.2 Forces and momentum		N/A
A.3 Work, energy and power		N/A
A.4 Rigid body mechanics	N/A	*
A.5 Galilean and special relativity	N/A	
B. The particulate nature of matter		
B.1 Thermal energy transfers		N/A
B.2 Greenhouse effect		N/A
B.3 Gas laws		N/A
B.4 Thermodynamics	N/A	
B.5 Current and circuits		N/A
C. Wave behaviour		
C.1 Simple harmonic motion		
C.2 Wave model		N/A
C.3 Wave phenomena		
C.4 Standing waves and resonance		N/A
C.5 Doppler effect		
D. Fields		
D.1 Gravitational fields		
D.2 Electric and magnetic fields		

DP physics themes and topics	Presence of SL content in Advanced Physics/Physics (SMC)	Presence of AHL content in Advanced Physics/Physics (SMC)
D.3 Motion in electromagnetic fields		N/A
D.4 Induction	N/A	
E. Nuclear and quantum physics		
E.1 Structure of the atom		
E.2 Quantum physics	N/A	
E.3 Radioactive decay		
E.4 Fission		N/A
E.5 Fusion and stars		N/A
Experimental programme		

Key:

	Strong presence of this topic in the JHSC.		*Partial presence of this topic in the JHSC.*		*Little or no presence of this topic in the JHSC.*	N/A	*This topic does not exist at the respective level.*
*Content is only in the specialised subject, Physics (SMC).							

Overall, JHSC physics content has reasonable alignment with the SL content in DP physics. There is strong or partial alignment with the SL content of most topics across the five DP physics themes. Thus, the breadth of study of DP physics at SL and JHSC Advanced Physics is similar. The topics which JHSC physics aligns the strongest with are *A.1 Kinematics, A2. Force and momentum, B.3 Gas laws, C.1 Simple harmonic motion, C.2 Wave model, E.1 Structure of the atom,* and *E.3 Radioactive decay*. In addition, the emphasis in the JHSC on scientific investigation results in a strong alignment with the DP's experimental programme at SL. Practical work, inquiry, and consideration of problems are all present in JHSC physics, though it can be noted that there is no evidence of a collaborative project.

However, JHSC physics content does not align with the DP topics of *B.2 Greenhouse effect* and *E.5 Fusion and stars*. Moreover, it can be noted that the majority of alignments that JHSC physics has with SL content are partial, rather than strong. This is due to the JHSC not necessarily covering these topics in as much depth and detail as SL. For example, with regards to *D.1 Gravitational fields*, JHSC Advanced Physics covers Kepler's three laws of orbital motion, but not gravitational field strength. It can be noted that quantitative content is generally less present in JHSC Advanced Physics.

Furthermore, JHSC physics content has little to no alignment with AHL content in DP physics. Although the occasional AHL subtopic is present – such as the first law of thermodynamics – not enough AHL content is covered to conclude a partial or strong alignment with any topic.

However, Basic and Advanced Physics content can be developed and expanded in the specialised subject, Physics (SMC). Only a few examples of this extended content are provided, such as the rotational motion of a rigid body and alternating currents. Therefore, Physics (SMC) has the potential to offer greater breadth and depth than Advanced Physics and align more closely with DP physics content. However, the extent of this cannot be confirmed and may vary depending on the students taking the subject.

As shown in table 25 below there is some content covered in JHSC physics which is not present in DP physics. This includes some different content covered pertaining to electric circuits, as well as a topic dedicated to exploring future real-world applications of physics.

Although DP physics encourages links to real-world contexts in physics, this is not an isolated topic. Furthermore, Physics (SMC) covers one or two other concepts regarding Fresnel lenses and a more advanced treatment of alternating currents.

*Table 25: JHSC physics content which is not covered in the DP.**

Significant JHSC physics content which is not included in the DP*
• **Electrical circuits content.** E.g. Kirchhoff's laws. • **Future of physics topic.** Learning about how physics applies to a wide range of fields and plays a major role in shaping the society of the future. Cutting-edge physics theories are discussed, such as quantum mechanics, relativity, and cosmology, as well as nanotechnology and biomolecules. Concrete examples of physics and its applications which are expected to develop in the future are covered, such as geomechanics, material science, and geophysical exploration. • **Fresnel lenses** (Physics SMC only) • **Alternating currents** – advanced treatment (Physics SMC only)

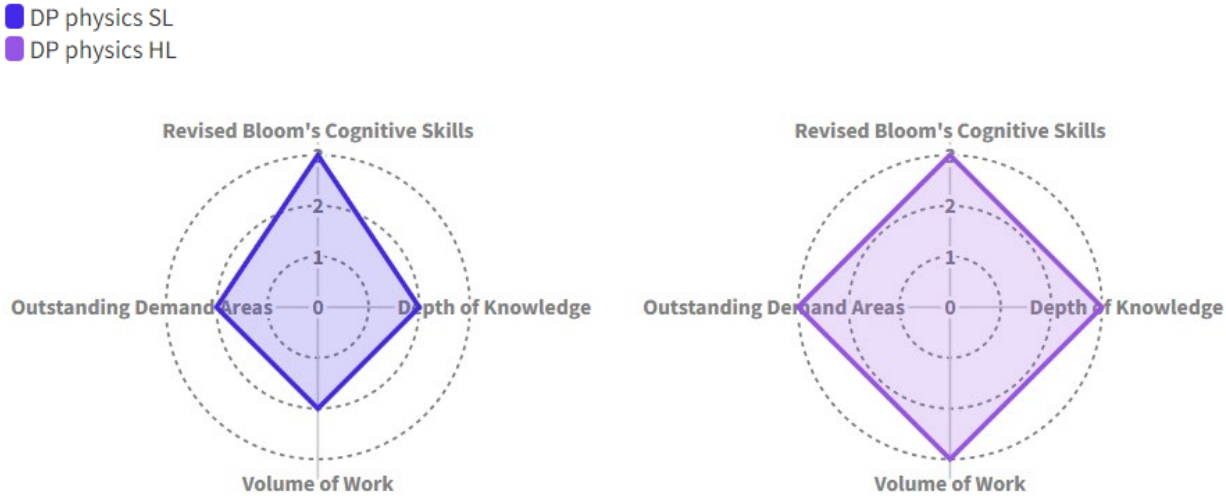
*Notably, 'significant content' does not include topics which are typically studied *prior* to upper secondary

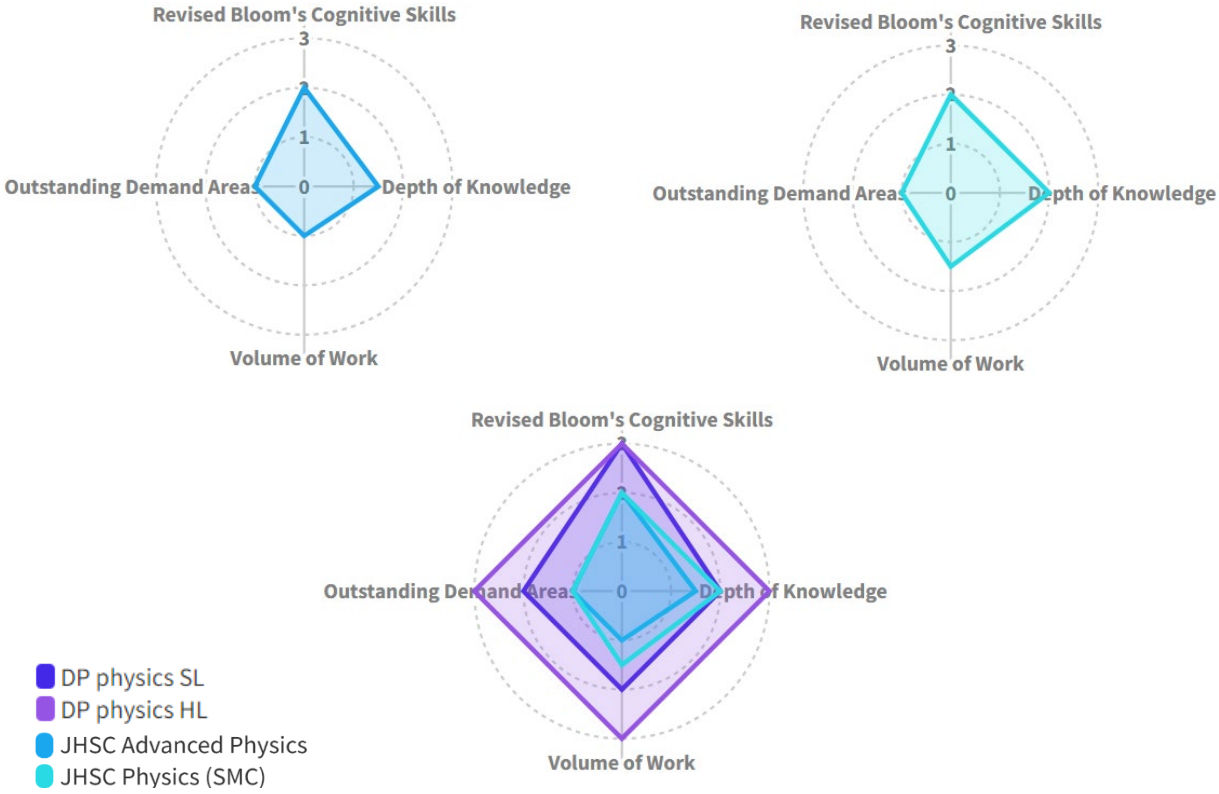
Overall, students studying Advanced Physics will cover a similar breadth of content to DP physis at SL, though likely with somewhat less depth. Physics (SMC) covers the same content as the general subjects while allowing opportunity for expansion. Hence, it may offer greater breadth and depth and align more closely with DP physics content. However, the volume of content and extent of alignment cannot be confirmed and are likely to vary.

5.2.3 Demand – Physics

The DP and JHSC physics subjects were analysed using the same demand tool in order to create a demand profile for DP physics SL, DP physics HL, JHSC Advanced Physics, and JHSC Physics (SMC). These demand profiles are presented below in the form of radar diagrams, with the last diagram showing all profiles superimposed in one place, enabling immediate visual comparison.

Figure 14: Visual representations of subject demand.





The panel of experts carried out a detailed analysis of each course and reached a consensus on the scores shown in the profiles above. The following points were particularly important within the panel discussion:

- Regarding the scores for **Bloom's Cognitive Skills**:
  - DP physics has the same learning outcomes for both SL and HL, meaning that these scores are the same. These were judged to merit a score of 3 due to the high levels of critical thinking, critical awareness and elements of synthesis and creation present in the majority of Aims and Assessment Objective 3.
  - Advanced Physics and Physics (SMC) both received a score of 2. While there was evidence of higher-order thinking skills, particularly in the context of conducting scientific experiments, the emphasis was on analysis, rather than evaluation and synthesis. As a result, a score of 2, rather than 3, was deemed appropriate.

- Regarding the score for **Depth of Knowledge**:
  - DP physics SL was deemed to merit a score of 2 for depth of knowledge due to the mathematical pre-requisite skills and competences required to access the course, as well as the moderate to high level of cognitive complexity of the knowledge that students are expected to acquire. As to the HL course, the greater depth and additional opportunities provided for extended thinking in the additional higher level option topics pushed the score to a 3.
  - Advanced Physics received a score of 1.5. While some of the activities outlined for the subject demonstrated strategic thinking, the depth of the content covered was not sufficient to merit a score of 2, thus Advanced Physics was assigned a score of 1.5. Physics (SMC) received a score of 2, based on the assumption that the content of Advanced Physics would be extended.

- Regarding the scores for **Volume of Work**:
  - The DP physics SL was judged to comprise a moderate-heavy workload (a score of 2) as students are exposed to multiple physics topics, with each topic being allocated a standard to short amount of time. The volume demands of the HL course, on the other hand, were found to be sufficient to meet a score of 3. Even though the number of topics per hour is smaller, these topics are covered in great depth and with a focus on application.
  - Advanced Physics received a score of 1. The subject covers a breadth of content, but the majority of time is spent on topics of basic depth, resulting in a moderate volume of work. Physics (SMC) received a score of 1.5, based on the assumption that its content would be broader and deeper than Advanced Physics. However, this is an estimate, as the extent of additional content is not defined, and schools have the flexibility to determine the number of credits for the subject.

- Regarding the scores for **Outstanding Areas of Subject Demand**:
  - For the DP physics SL course (awarded a score of 2), the IA scientific investigation research project that students need to undertake, the linking questions outlined in the syllabus and the collaborative sciences project were considered to be areas of stretch. In addition to the latter, the HL course features additional higher-level topics which were deemed to include additional areas of stretch, meriting a score of 3.
  - Both Advanced Physics and Physics (SMC) received a score of 1. The emphasis on project-based learning and exploration of current and future real-world applications of physics were considered sufficient to justify this score.

5.2.4 Content – Chemistry

This section compares and contrasts the content of the DP and JHSC falling within the category of chemistry. To support visual comparison at-a-glance, the content of the DP and JHSC chemistry subjects are presented below in diagrams which show the key topics and subtopics included in each.

Figure 15: DP chemistry content visualiser.[125]

Structure	**Structure 1. Models of the particulate nature of matter**	Structure 1.1 – Introduction to the particulate nature of matter	Structure 1.2 – The nuclear atom (SL + AHL)	Structure 1.3 – Electron Configurations (SL + AHL)	Structure 1.4 – Counting particles by mass: The mole	Structure 1.5 – Ideal gases
	Structure 2. Models of bonding and structure	Structure 2.1 – The ionic model	Structure 2.2 – The covalent model (SL + AHL)	Structure 2.3 – The metallic model (SL + AHL)	Structure 2.4 – From models to materials (SL + AHL)	
	Structure 3. Classification of matter	Structure 3.1 – The periodic table: Classification of elements (SL + AHL)	Structure 3.2 – Functional groups: Classification of organic compounds (SL + AHL)			
Reactivity	**Reactivity 1. What drives chemical reactions?**	Reactivity 1.1 – Measuring enthalpy changes	Reactivity 1.2 – Energy cycles in reactions (SL + AHL)	Reactivity 1.3 – Energy from fuels	Reactivity 1.4 – Entropy and spontaneity (HL only)	
	Reactivity 2. How much, how fast and how far?	Reactivity 2.1 – How much? The amount of chemical change	Reactivity 2.2 – How fast? The rate of chemical change (SL + AHL)	Reactivity 2.3 – How far? The extent of chemical change (SL + AHL)		
	Reactivity 3. What are the mechanisms of chemical change?	Reactivity 3.1 – Proton transfer reactions (SL + AHL)	Reactivity 3.2 – Electron transfer reactions (SL + AHL)	Reactivity 3.3 – Electron sharing reactions	Reactivity 3.4 – Electron-pair sharing reactions (SL + AHL)	
Experimental programme	Practical work	Collaborative sciences project	Scientific investigation			

[125] '(HL only)' and '(SL + AHL)' are used to flag, respectively, topics only taught at HL and topics taught at both SL and HL, but which also feature additional higher level content.

Figure 16: JHSC chemistry content visualiser.

General Subjects	**Basic Chemistry**	(1) Chemistry and human life	(a) Chemistry and matter	A. Chemical characteristics	B. Separation and purification of substances	C. Elements and compounds	D. Thermal motion and the three states of matter
		(2) The structure of mater	(a) The constituent particles of matter	A. Atomic structure	B. Electron configuration and periodic table		
			(b) Substances and chemical bonds	A. Ions and ionic bonds	B. Molecules and covalent bonds	C. Metals and metallic bonds	
		(3) Transformation of matter and its uses	(a) Amount of substance and chemical reaction formula	A. Amount of substance	B. Chemical reaction formula		
			(b) Chemical reactions	A. Acids, bases and neutralization			
			(c) Chemistry in the world	A. Chemistry opens a new world			
	Advanced Chemistry	(1) State of matter and equilibrium	(a) State of matter and its changes	A. State change	B. Properties of gas		
			(b) Solutions and equilibrium	A. Dissolution equilibrium	B. Solutions and their properties		
		(2) Change and equilibrium of substances	(a) Chemical reactions and energy	A. Chemical reactions and heat/light	B. Batteries	C. Electrolysis	
			(b) Chemical reactions and chemical equilibrium	A. Reaction rate	B. Chemical equilibrium and its shift	C. Ionization equilibrium	
		(3) Properties of inorganic substances	(a) Inorganic substances	A. Main group elements	B. Transition elements		
		(4) Properties of organic compounds	(a) Organic compounds	A. Hydrocarbons			
			(b) Polymer compounds	A. Synthetic polymer compounds	B. Natural polymer compounds		
		(5) The role of chemistry	(a) Chemistry in human life	A. Various substances and human life	B. Chemistry building the future		
Specialised Subjects	**Chemistry for the Science and Mathematics Course**	(1) Chemistry and human life	Refer to content in Basic Chemistry (Chemistry and human life). Contents will be expanded as necessary, e.g. green sustainable chemistry.				
		(2) Material composition	Refer to content in Basic Chemistry (Structure of matter). These contents will be developed and expanded, for example, on electron orbitals and molecular shapes.				
		(3) Changes in materials and their uses	Refer to content in Basic Chemistry (Transformation of matter and its uses) and Advanced Chemistry (Chemical reactions and energy). Content will be expanded as necessary, e.g. neutralization titration of a mixed solution may be considered.				

		(4) State of matter and chemical equilibrium	Refer to content in Advanced Chemistry (State of matter and equilibrium and Chemical reactions and chemical equilibrium). Content will be expanded as necessary, e.g. consideration of the direction of reaction, considering enthalpy, entropy, and Gibbs energy, etc.
		(5) Properties of inorganic substances	Refer to content in Advanced Chemistry (Properties of inorganic substances). Content will be expanded as necessary, e.g. the electron configuration of transition metal ions.
		(6) Properties of organic compounds	Refer to content in Advanced Chemistry (Properties of organic substances). Content will be expanded as necessary, e.g. the study of substitution reactions and addition reactions focusing on electron transfer.
		(7) The role of chemistry	Refer to content in Advanced Chemistry (The role of chemistry). Content will be expanded as necessary, e.g. by researching new materials
		In addition, in the course of dealing with these topics, instrumental analysis and its principles and theories will also be covered.	

Structure

Like DP chemistry, the JHSC general subjects offer two levels of study, Basic Chemistry and Advanced Chemistry. Similar to how AHL content builds upon SL content, the Advanced Chemistry content builds on that of Basic Chemistry. However, Basic Chemistry has significantly lesser breadth and depth than SL. This reflects that Japan's upper secondary begins a year earlier and also requires students to study a wider range of science disciplines.

The JHSC specialised subjects do not offer different levels of study for chemistry. Instead, a single subject, Chemistry (SMC), is offered, which covers the content from both Basic Chemistry and Advanced Chemistry, with opportunities for further expansion.

The DP chemistry content is divided into two main areas: *Structure* and *Reactivity*. These are further split into three sections, each organised into several subtopics. In contrast, JHSC chemistry subjects are divided into between three and seven topics.

Content Alignment

The following table presents a simplified summary of the content alignment that JHSC chemistry has, at the topic-level, with DP chemistry (SL and AHL content). The analysis of JHSC Advanced Chemistry also considers the content that will have been studied in the pre-requisite subject, Basic Chemistry. Chemistry (SMC) encompasses the content from Advanced Chemistry (and Basic Chemistry) and expands it. An asterisk (*) indicates alignment exclusive to Chemistry (SMC).

Table 26: Summary of content alignment between the DP chemistry topics and the JHSC chemistry subjects.

DP chemistry topics	Presence of SL content in Advanced Chemistry/ Chemistry (SMC)	Presence of AHL content in Advanced Chemistry/ Chemistry (SMC)
Structure 1. Models of the particulate nature of matter		
Structure 1.1 – Introduction to the particulate nature of matter		N/A
Structure 1.2 – The nuclear atom		
Structure 1.3 – Electron configurations		
Structure 1.4 – Counting particles by mass: The mole		N/A
Structure 1.5 – Ideal gases		N/A
Structure 2. Models of bonding and structure		
Structure 2.1 – The ionic model		N/A
Structure 2.2 – The covalent model		
Structure 2.3 – The metallic model		
Structure 2.4 – From models to materials		
Structure 3. Classification of matter		
Structure 3.1 – The periodic table: Classification of elements		
Structure 3.2 – Functional groups: Classification of organic compounds		*
Reactivity 1. What drives chemical reactions?		
Reactivity 1.1 – Measuring enthalpy changes		N/A
Reactivity 1.2 – Energy cycles in reactions		

DP chemistry topics	Presence of SL content in Advanced Chemistry/ Chemistry (SMC)	Presence of AHL content in Advanced Chemistry/ Chemistry (SMC)
Reactivity 1.3 – Energy from fuels		N/A
Reactivity 1.4 – Entropy and spontaneity (AHL only)	N/A	*
Reactivity 2. How much, how fast and how far?		
Reactivity 2.1 – How much? The amount of chemical change		N/A
Reactivity 2.2 – How fast? The rate of chemical change		
Reactivity 2.3 – How far? The extent of chemical change		
Reactivity 3. What are the mechanisms of chemical change?		
Reactivity 3.1 – Proton transfer reactions		
Reactivity 3.2 – Electron transfer reactions		
Reactivity 3.3 – Electron sharing reactions		N/A
Reactivity 3.4 – Electron-pair sharing reactions		
Experimental programme		

Key:

	Strong presence of this topic in the JHSC.		*Partial presence of this topic in the JHSC.*		*Little or no presence of this topic in the JHSC.*	N/A	*This topic does not exist at the respective level.*
*Content is only in the specialised subject, Chemistry (SMC).							

Overall, the JHSC chemistry content has reasonable alignment with the SL content in DP chemistry. Indeed, JHSC chemistry has strong or partial alignment with the SL content of most topics across *Structure* and *Reactivity*. Thus, the breadth of study of DP chemistry at SL and JHSC Advanced Chemistry is similar. JHSC chemistry content has the strongest alignment with the topic *Structure 1. Models of the particulate nature of matter*, followed by *Structure 2. Models of bonding and structure*. In addition, the emphasis in the JHSC on scientific investigation results in a strong alignment with the DP's experimental programme at SL. Practical work, inquiry, and consideration of problems are all present in JHSC chemistry, though it can be noted that there is no evidence of a collaborative project.

The JHSC chemistry content has the least alignment with *Reactivity 3. What are the mechanisms of chemical change?* Moreover, most alignments that JHSC chemistry has with SL content are partial, rather than strong. This is due to JHSC chemistry not necessarily covering all the SL concepts in these topics and subtopics. For example, with regards to *Structure 2.3 – The metallic model*, JHSC chemistry covers a topic on metallic bonds, though does not include understandings about their strength. JHSC chemistry generally has little to no alignment with AHL content in DP chemistry.

However, content can be developed and expanded in the specialised subject, JHSC Chemistry (SMC). Only a few examples of this extended content are given, such as entropy and Gibbs' energy, substitution and addition reactions, and instrumental analysis. Therefore, JHSC Chemistry (SMC) has the potential to offer greater breadth and depth than JHSC

Advanced Chemistry and align more closely with DP chemistry content. However, the extent of this cannot be confirmed and may vary depending on the students taking the subject.

As shown in table 27 below, there is some content covered in JHSC chemistry which is not present in DP chemistry. This includes some different content covered such as dissolution equilibrium, colloidal solutions, electrolysis, polymer compounds, as well a topic dedicated to exploring real-world applications of chemistry. Although DP chemistry encourages links to real-world contexts in chemistry, it is not an isolated topic.

Table 27: JHSC chemistry content which is not covered in the DP.

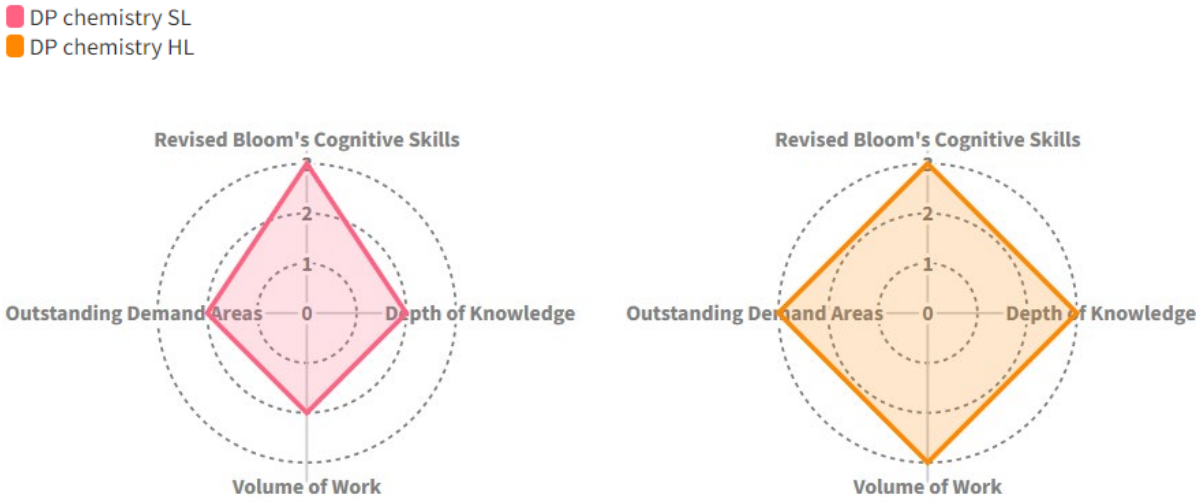
Significant JHSC chemistry content which is not included in the DP
• Dissolution equilibrium, solubility of gases and Henry's law • Colloidal solutions – Tyndall effect, Brownian motion, dialysis and electrophoresis • Faraday's law (Electrolysis) • Resins and monosaccharides (Polymer compounds) • The role of chemistry topic

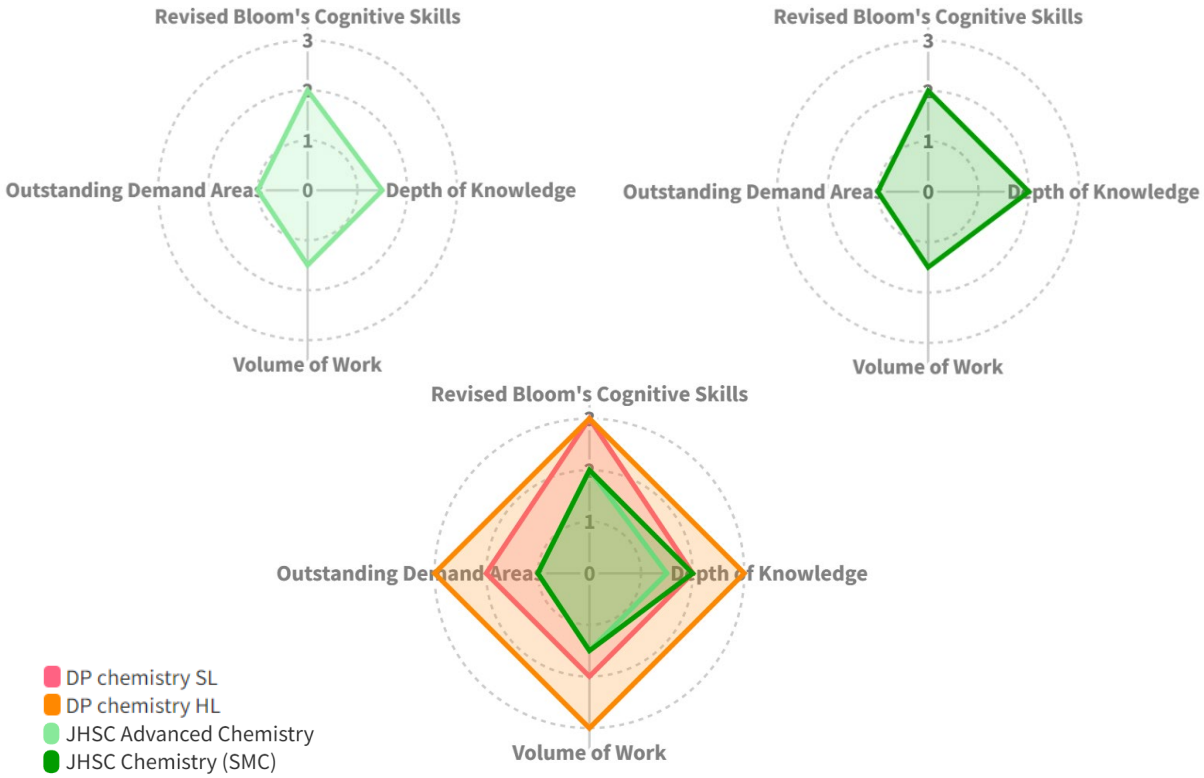
Overall, students studying Advanced Chemistry will cover a similar breadth of content to DP chemistry at SL, though likely with somewhat less depth. Chemistry (SMC) covers the same content as the general subjects while allowing opportunity for expansion. Hence, it may offer greater breadth and depth and align more closely with DP chemistry content. However, the volume of content and extent of alignment cannot be confirmed and are likely to vary.

5.2.5 Demand – Chemistry

The DP and JHSC chemistry subjects were analysed using the same demand tool in order to create a demand profile for DP chemistry SL, DP chemistry HL, JHSC Advanced Chemistry, and JHSC Chemistry (SMC). These demand profiles are presented below in the form of radar diagrams, with the last diagram showing all profiles superimposed in one place, enabling immediate visual comparison.

Figure 17: Visual representations of subject demand.





The panel of experts carried out a detailed analysis of each course and reached a consensus on the scores shown in the profiles above. The following points were particularly important within the panel discussion:

- Regarding the scores for **Bloom's Cognitive Skills**:
  - DP chemistry has the same learning outcomes for both SL and HL, meaning that these scores are the same. These were judged to merit a score of 3 due to the high levels of critical thinking, critical awareness and elements of synthesis and creation present in the majority of Aims and Assessment Objective 3.
  - Advanced Chemistry and Chemistry (SMC) both received a score of 2. While there was evidence of higher-order thinking skills, particularly in the context of conducting scientific experiments, the emphasis was on analysis, rather than evaluation and synthesis. As a result, a score of 2, rather than 3, was deemed appropriate.

- Regarding the score for **Depth of Knowledge**:
  - DP chemistry SL was deemed to merit a score of 2 for depth of knowledge due to the mathematical pre-requisite skills and competences required to access the course, as well as the moderate to high level of cognitive complexity of the knowledge that students are expected to acquire. As to the HL course, the greater depth and additional opportunities provided for extended thinking in the additional higher level option topics pushed the score to a 3.
  - Advanced Chemistry received a score of 1.5. While some of the activities outlined for the subject demonstrated strategic thinking, the depth of the content covered was not sufficient to merit a score of 2, thus Advanced Chemistry was assigned a

score of 1.5. Chemistry (SMC) received a score of 2, based on the assumption that the content of Advanced Chemistry would be extended.

- Regarding the scores for **Volume of Work**:
  - The DP chemistry SL was judged to comprise a moderate-heavy workload (a score of 2) as students are exposed to multiple chemistry topics, with each topic being allocated a standard to short amount of time. The volume demands of the HL course, on the other hand, were found to be sufficient to meet a score of 3 as, even though the number of topics per hour is smaller, these topics are covered in great depth and with a focus on application.
  - Both Advanced Chemistry and Chemistry (SMC) received a score of 1.5. Advanced Chemistry covers a breadth of content, with the majority of time spent on topics of basic depth. However, it was judged that there were more instances of depth in its content compared to the other sciences, resulting in a score of 1.5. Chemistry (SMC) also received a score of 1.5, as there was not enough evidence to indicate that the volume of work would be moderate-heavy. However, the score is an estimate, as the extent of additional content in specialised subjects is not defined, and schools have the flexibility to determine the number of credits for the subject.

- Regarding the scores for **Outstanding Areas of Subject Demand**:
  - For the DP chemistry SL course (awarded a score of 2), the IA scientific investigation research project that students need to undertake, the linking questions outlined in the syllabus and the collaborative sciences project were considered to be areas of stretch. In addition to the latter, the HL course features additional higher-level topics which were deemed to include additional areas of stretch, meriting a score of 3.
  - Both Advanced Chemistry and Chemistry (SMC) received a score of 1. The emphasis on project-based learning and exploration of real-world applications of chemistry were considered sufficient to justify of a score of 1.

5.2.6 Content – Biology

This section compares and contrasts the content of the DP and JHSC falling within the category of biology. To support visual comparison at-a-glance, the content of the DP and JHSC biology subjects are presented below in diagrams which show the key topics and subtopics included in each.

Figure 18: DP biology content visualiser.[126]

A: Unity and diversity	**1. Molecules**	A1.1 Water*	A1.2 Nucleic acids*	
	2. Cells	A2.1 Origins of cells (HL only)	A2.2 Cell structure*	A2.3 Viruses (HL only)
	3. Organisms	A3.1 Diversity of organisms*	A3.2 Classification and cladistics (HL only)	
	4. Ecosystems	A4.1 Evolution and speciation*	A4.2 Conservation of biodiversity	
B: Form and function	**1. Molecules**	B1.1 Carbohydrates and lipids	B1.2 Proteins*	
	2. Cells	B2.1 Membranes and membrane transport*	B2.2 Organelles and compartmentalization*	B2.3 Cell specialization*
	3. Organisms	B3.1 Gas exchange*	B3.2 Transport*	B3.3 Muscle and motility (HL only)
	4. Ecosystems	B4.1 Adaptation to environment	B4.2 Ecological niches	
C: Interaction and interdependence	**1. Molecules**	C1.1 Enzymes and metabolism*	C1.2 Cell respiration*	C1.3 Photosynthesis*
	2. Cells	C2.1 Chemical signalling (HL only)	C2.2 Neural signalling*	
	3. Organisms	C3.1 Integration of body systems*	C3.2 Defence against disease	
	4. Ecosystems	C4.1 Populations and communities	C4.2 Transfers of energy and matter	
D: Continuity and change	**1. Molecules**	D1.1 DNA replication*	D1.2 Protein synthesis*	D1.3 Mutations and gene editing*
	2. Cells	D2.1 Cell and nuclear division*	D2.2 Gene expression (HL only)	D2.3 Water potential*
	3. Organisms	D3.1 Reproduction*	D3.2 Inheritance*	D3.3 Homeostasis*
	4. Ecosystems	D4.1 Natural selection*	D4.2 Sustainability and change*	D4.3 Climate change*
Experimental programme	Practical work	Collaborative sciences project	Scientific investigation	

*Includes additional higher level (AHL) content.

[126] Unless specified as HL only, all the above are studied in SL and HL, with the latter also including the AHL content.

Figure 19: JHSC biology content visualiser.

General Subjects	**Basic Biology**	(1) Characteristics of organisms	(a) Commonality and diversity of living organisms			
			(b) Genes and their functions	A. Genetic information and DNA	B. Genetic information and protein synthesis	
		(2) Regulation of the human body	(a) Regulation by the nervous system and endocrine system	A. Transmission of information	B. Mechanism for maintaining the internal environment	
			(b) Immunity	A. Function of the immune system		
		(3) Biodiversity and ecosystems	(a) Vegetation and succession			
			(b) Ecosystems and conservation	A. Ecosystems and biodiversity	B. Ecosystem balance and conservation	
	Advanced Biology	(1) Evolution of living things	(a) The origin of life and the evolution of cells			
			(b) Mechanisms of genetic change and evolution	A. Genetic changes	B. Mechanism of evolution	
			(c) Phylogeny and evolution of organisms	A. Phylogeny and evolution of organisms	B. Human lineage and evolution	
		(2) Life phenomena and materials	(a) Cells and molecules	A. Biological materials and cells	B. Life phenomena and proteins	
			(b) Metabolism	A. Respiration	B. Photosynthesis	
		(3) Genetics	(a) Expression and development of genetic information	A. Genetic information and its expression	B. Regulation of gene expression	C. Development and gene expression
			(b) Technology that handles genes	A. Genetic technology		
			(b) Animal reactions	A. Reception and response to stimuli	B. Animal behaviour	
			(c) Plant responses to the environment	A. Plant responses to the environment		
		(5) Ecology and the environment	(a) Populations and communities	A. Population	B. Biological communities	
			(b) Ecosystem	A. Material production and circulation in ecosystems	B. Ecosystems and human life	

Specialised Subject	**Biology for the Science and Mathematics Course**	(1) Characteristics and evolution of living organisms	Refer to content in Basic Biology (Characteristics of the organism) and Advanced Biology (Evolution of living things). Contents will be expanded as necessary, e.g., phylogenetic classification based on comparison of DNA and proteins between organisms will be considered.
		(2) Life phenomena and materials	Refer to content in Advanced Biology (Life phenomena and matter). Experiments on proteins are to be included to explore the functions and properties of enzymes.
		(3) Expression and development of genetic information	Refer to content in Advanced Biology (Expression and development of genetic information). Contents will be expanded as necessary, e.g., gene recombination technology may be considered. Genetic experiments are to be included.
		(4) Ecology environment	Refer to content in Basic Biology (Biodiversity and ecosystems) and Advanced Biology (Ecology and environment). Including field observations or surveys. Contents will be expanded as necessary, e.g., the current situation regarding changes in and conservation of global ecosystems and the consideration of concrete measures to protect them.

Structure

Like DP biology, the JHSC general subjects offer two levels of study, Basic Biology and Advanced Biology. Similar to how AHL content builds upon SL content, the Advanced Biology content builds on that of Basic Biology. However, Basic Biology has significantly lesser breadth and depth than SL. This reflects that Japan's upper secondary begins a year earlier and also requires students to study a wider range of science disciplines. The JHSC specialised subjects do not offer different levels of study for biology. Instead, a single subject, Biology (SMC), is offered, which covers the content from both Basic Biology and Advanced Biology, with opportunities for further expansion.

DP biology content is organised down into four themes: *Unity and Diversity*, *Form and Function*, *Interaction and Interdependence*, and *Continuity and Change*. Each of these themes has four levels of organisation within them: *Molecules*, *Cells, Organisms*, and *Ecosystems*, which are then organised into topics. In contrast, JHSC biology subjects organise content between three and seven topics.

Content Alignment

The following table presents a simplified summary of the content alignment that JHSC biology has with the themes and levels of DP biology (SL and AHL content). The analysis of JHSC Advanced Biology also considers the content that will have been studied in the pre-requisite subject, Basic Biology. Biology (SMC) encompasses the content from Advanced Biology (and Basic Biology) and expands it.

Table 28: Summary of content alignment between the DP biology themes and levels and JHSC biology content.

DP biology themes and levels	Presence of SL content in Advanced Biology/Biology (SMC)	Presence of AHL content in Advanced Biology/Biology (SMC)
A Unity and Diversity		
A1 Molecules		
A2 Cells		
A3 Organisms		
A4 Ecosystems		
B Form and Function		
B1 Molecules		
B2 Cells		
B3 Organisms		
B4 Ecosystems		
C Interaction and Interdependence		
C1 Molecules		
C2 Cells		
C3 Organisms		
C4 Ecosystems		N/A
D Continuity and Change		
D1 Molecules		
D2 Cells		
D3 Organisms		
D4 Ecosystems		
Experimental Programme		

Key:

	Strong presence of this level in the JHSC.		*Partial presence of this level in the JHSC.*		*Little or no presence of this level in the JHSC.*	N/A	*This does not exist at the respective level.*

Overall, JHSC biology content has limited alignment with DP biology content. There is some alignment, primarily with the SL content of the themes *C. Interaction and Interdependence* and *A. Unity and Diversity*. However, there is little to no alignment with the DP themes *B. Form and Function* and *D. Continuity and Change*. Indeed, most of the key topics from the levels of these themes, such as *B2.3 Cell specialisation*, *B3.1 Gas exchange*, *B3.2 Transport*, *B4.2 Ecological niches*, *D3.2 Inheritance*, *D4.2 Sustainability and change*, and *D4.3 Climate change* have little to no presence in the content of JHSC biology. In addition, there are also topics from other themes which have little to no presence, such as *A1.1 Water*, *A1.2 Nucleic acids*, *A4.2 Conservation of biodiversity*, and *C3.2 Defence against disease.*

The topics that JHSC biology best aligns with are *C1.2 Cell respiration*, *C4.1 Populations and communities*, and *D1.1 DNA replication*. In addition, the emphasis in the JHSC biology on scientific investigation results in a strong alignment with the DP's experimental programme at SL. Practical work, inquiry, and consideration of problems are all present in JHSC biology, though it can be noted that there is no evidence of a collaborative project. Moreover, it can be noted that a small amount of AHL content is present in JHSC biology. JHSC Advanced Biology covers a topic on the origin of life and the evolution of cells, which somewhat aligns with the HL topic of *A2.1 Origins of cells* and the AHL content of *A2.2 Cell structure*. There is also partial alignment with the AHL content of *C3.1 Integration of body systems* and *D4.1 Natural selection*.

Content can be developed and expanded in the specialised subject, Biology (SMC). However, only a few examples of this extended content are given, such as genetic experiments, phylogenetic classification, immunodeficiency, and field observations. Therefore, Biology (SMC) has the potential to offer greater breadth and depth than Advanced Biology and aligns more closely with DP biology content. However, the extent of this cannot be confirmed and may vary depending on the students taking the subject.

As shown in table 29 below, there is some content covered in JHSC biology which is less present, or not included, in DP biology. This includes some different content covered pertaining to genetic drift, genetic technology, animal behaviour and the nitrogen cycle.

Table 29: JHSC biology content which is not covered in the DP.

Significant JHSC biology content which is not included in the DP*
• Mechanisms of evolution – genetic drift • Genetic technology – restriction enzymes, vectors, and gene amplification techniques • Animal behaviour and the relationship to the functioning of the nervous system • Ecosystems – content on the nitrogen cycle.

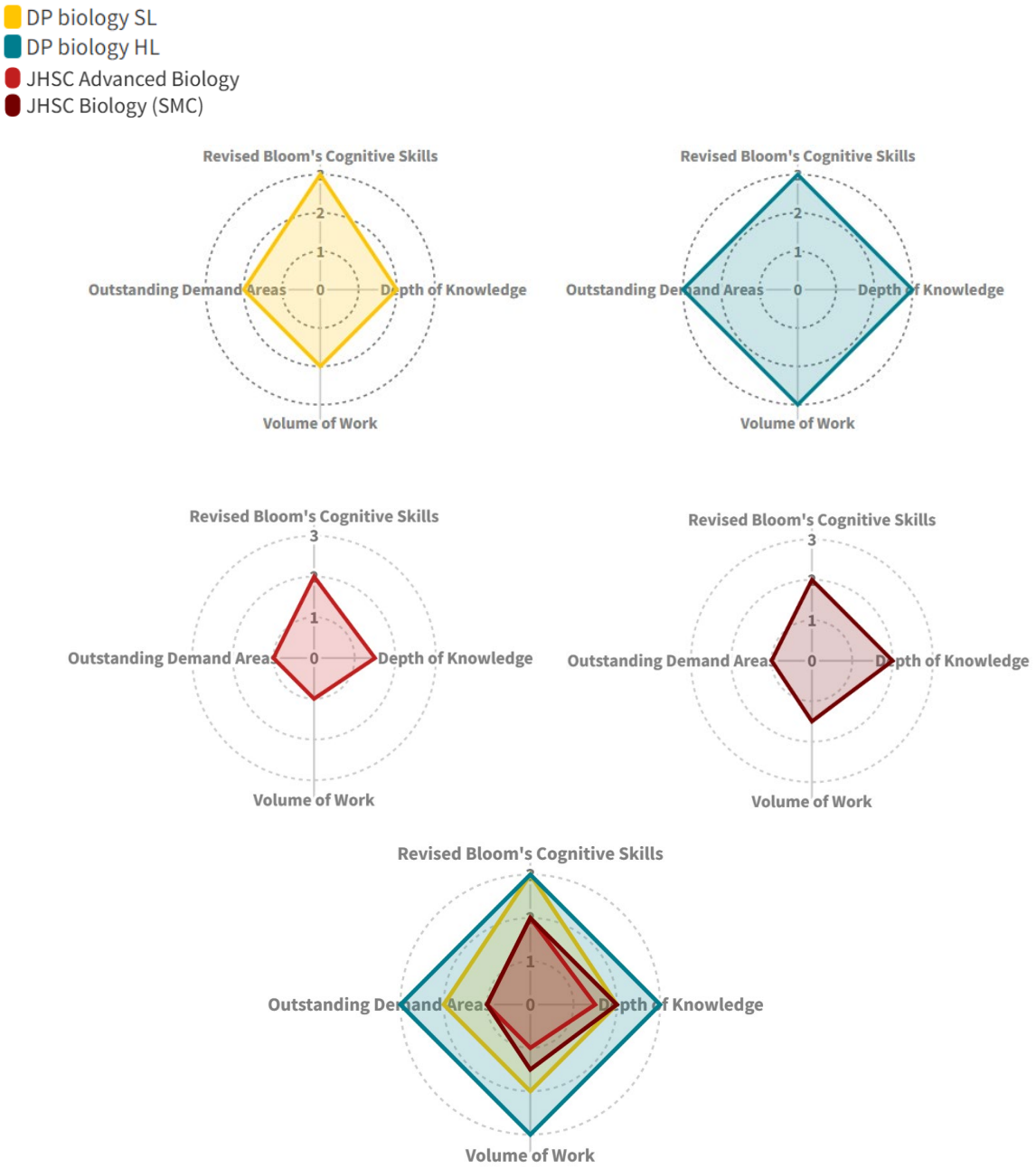
*Some of these areas are present in the DP but the coverage is more limited in comparison to the JHSC.

Overall, the content alignment between DP and JHSC biology is fairly limited. Advanced Biology covers a significantly lesser breadth of content than DP biology SL and HL. The depth of content of Advanced Biology is somewhat less than that of DP SL, however, it can be noted that it may cover some more complex concepts in the occasional area. Biology (SMC) covers the same content as the general subjects while allowing opportunity for expansion. Hence, it may offer greater breadth and depth and align more closely with DP biology content. However, the volume of content and extent of alignment cannot be confirmed and are likely to vary.

5.2.7 Demand – Biology

The DP and JHSC biology subjects were analysed using the same demand tool in order to create a demand profile for DP biology SL, DP biology HL, JHSC Advanced Biology, and JHSC Biology (SMC). These demand profiles are presented below in the form of radar diagrams, with the last diagram showing all profiles superimposed in one place, enabling immediate visual comparison.

Figure 20: Visual representations of subject demand.



The panel of experts carried out a detailed analysis of each course and reached a consensus on the scores shown in the profiles above. The following points were particularly important within the panel discussion:

- Regarding the scores for **Bloom's Cognitive Skills**:
  - DP biology has the same learning outcomes for both SL and HL, meaning that these scores are the same. These were judged to merit a score of 3 due to the high levels of critical thinking, critical awareness and elements of synthesis and creation present in the majority of Aims and Assessment Objective 3.
  - Advanced Biology and Biology (SMC) both received a score of 2. While there was evidence of higher-order thinking skills, particularly in the context of conducting scientific experiments, the emphasis was on analysis, rather than evaluation and synthesis. As a result, a score of 2, rather than 3, was deemed appropriate.

- Regarding the score for **Depth of Knowledge**:
  - DP biology SL was deemed to merit a score of 2 for depth of knowledge due to the pre-requisite skills and competences (e.g. interpretation of graphs data, mathematics skills, some chemistry and geography links) required to access the course, as well as the moderate to high level of cognitive complexity of the knowledge that students are expected to acquire. As to the HL course, the greater depth and additional opportunities provided for extended thinking in the additional HL topics pushed the score to a 3.
  - Advanced Biology received a score of 1.5. While some of the activities outlined for the subject demonstrated strategic thinking, the depth of the content covered was not sufficient to merit a score of 2. Biology (SMC) received a score of 2, based on the assumption that the content of Advanced Biology would be extended.

- Regarding the scores for **Volume of Work**:
  - The DP biology SL was judged to comprise a moderate-heavy workload (a score of 2) as students are exposed to multiple biology topics, with each topic being allocated a standard to short amount of time. The volume demands of the HL course, on the other hand, were found to be sufficient to meet a score of 3 – even though the proportion of topics per allocated teaching hour is smaller, these topics are covered in great depth and with a focus on application.
  - Advanced Biology received a score of 1. The subject covers a breadth of content, but the majority of time is spent on topics of basic depth, resulting in a moderate volume of work. Biology (SMC) received a score of 1.5, based on the assumption that its content would be broader and deeper than Advanced Biology. However, this score is an estimate, as the extent of additional content is not defined, and schools have the flexibility to determine the number of credits for the subject.

- Regarding the scores for **Outstanding Areas of Subject Demand**:
  - For the DP biology SL course (awarded a score of 2), the IA scientific investigation research project that students need to undertake, the linking questions outlined in the syllabus and the collaborative sciences project were considered to be areas of stretch. In addition to the latter, the HL course features additional higher-level topics which were deemed to include additional areas of stretch, meriting a score of 3.
  - Both Advanced Biology and Biology (SMC) received a score of 1, based on the emphasis on project-based learning and scientific inquiry.

5.3 Literature

The following is the list of literature subjects used in the comparative analysis.

Language A: literature[127]
Language A: literature is a subject option from the studies of language and literature group in the DP curriculum and is available at both SL and HL. In this subject, students focus exclusively on literary texts, adopting a variety of approaches to textual criticism. Students explore the nature of literature, the aesthetic function of literary language and textuality, and the relationship between literature and the world.

Japanese Literature[128]
Japanese Literature is an elective subject in the JHSC, studied after completing the compulsory Japanese Language subjects: Contemporary Japanese Language and Language Culture. This subject enables students to read, appreciate, and evaluate the emotions, settings and expressive styles of various literary forms. Additionally, it helps students develop the skills to write their own literary compositions.

Advanced Classics[129]
Advanced Classics is another elective subject in the JHSC, taken after the compulsory Japanese Language subjects: Contemporary Japanese Language and Language Culture. This subject emphasises deeper understanding of traditional language and culture through the study of classical literature. It examines the social and cultural aspects of the individual and the society that surrounds them.

5.3.1 Learning Outcomes – Literature

This section compares and contrasts the learning outcomes of curricula falling within the category of literature. Ecctis extracted learning outcome themes for DP language A: literature from its aims and assessment objectives. The learning outcomes for JHSC literature subjects were primarily drawn from the three objectives outlined for the Japanese Language subject area and the subject-specific objectives for Japanese Literature and Advanced Classics.

The following summary table presents the learning outcome themes extracted from DP language A: literature and indicates if, and where, they are judged to have presence within the learning outcomes of the JHSC literature subjects.

[127] International Baccalaureate. (2019). *Language A: literature guide*.
[128] MEXT. (2018). *High School Course of Study. Japanese Literature*. p. 40-42. Available from: 高等学校学習指導要領（平成 30 年告示）
[129] Ibid, *Advanced Classics.* p. 45-47.

Table 30: Presence of DP language A: literature learning outcome themes in the JHSC literature learning outcomes.

Themes extracted from the learning outcomes for DP language A: literature	Presence in the JHSC literature subjects	
1. Develop knowledge of a wide range of literary texts.		This theme is partially present in the learning outcomes, as the JHSC is less prescriptive regarding the breadth of texts.
2. Understand the relationship between context and text.		This theme is strongly present in the learning outcomes for Advanced Classics, but less present in those for Japanese Literature.
3. Extract meaning and interpret texts.		Interpretation is a key feature of the learning outcomes, with a strong emphasis on developing a deeper understanding of texts.
4. Improve understanding of the writer's craft.		This theme is reflected in the learning outcomes, which focus on deepening understanding of literary texts, including their characteristics and techniques. However, there is less emphasis on analysis and evaluation.
5. Formulate and express ideas in a variety of ways.		This theme is present in the learning outcomes, which highlight communication with others as well as persuasive and clear writing.
6. Develop an appreciation of intertextuality and interdisciplinarity.		Intertextuality is present in the learning outcomes, while interdisciplinarity is not.
7. Explore identity through the study of language and literature.		This theme is strongly present in the JHSC learning outcomes.

Key:

	This theme is well-evidenced in the learning outcomes of the JHSC literature subjects.		*This theme is partially evidenced in the learning outcomes of the JHSC literature subjects.*		*This theme is not evidenced in the learning outcomes of the JHSC literature subjects.*

Presence of the DP's Learning Outcome Themes

There is moderate alignment between the DP and JHSC learning outcomes for literature. All of the DP's themes are at least partially evidenced and some are well-evidenced in the JHSC learning outcomes.

The JHSC learning outcomes include interpreting texts by considering their structure, development and expressions, as well as engaging with multiple perspectives and deepening one's own, which aligns with the DP's theme of extracting meaning and interpretation. Similarly, the DP's theme of formulating and expressing ideas in various ways is well-evidenced, as the JHSC learning outcomes expect students to communicate confidently and write in well-structured and persuasive ways. In addition, the DP theme of exploring identity through language and literature is strongly reflected in the JHSC outcomes. Indeed, the outcomes include fostering self-confidence as bearers of Japan's language culture, promoting lifelong enjoyment of reading, understanding its benefits, and using it for self-improvement, societal engagement, and enriching perspectives on humans, society, and nature.

The DP theme of understanding the writer's craft is somewhat reflected in the JHSC learning outcomes. Both the DP and JHSC require students to deepen their understanding of literary characteristics, including stylistic and rhetorical techniques. However, unlike the DP, the JHSC outcomes do not explicitly emphasise analysis or evaluation.

The DP theme of developing knowledge of a wide range of literary texts is partially present in the JHSC learning outcomes. While engaging with literary texts is present, the requirement for these to be diverse is not explicit. However, students studying both Japanese Literature and Advanced Classics would encounter a breadth of texts.

The DP theme of understanding the relationship between context and text is partially evidenced. It is strongly present in Advanced Classics learning outcomes but less so in those for Japanese Literature. The latter includes consideration of a work's background, but not explicitly in relation to culture, global issues, or multiple perspectives. In contrast, Advanced Classics emphasises the relationship between Japanese and Chinese culture, the influence of classical texts on modern language, and the evaluation of classical works from multiple perspectives.

Intertextuality is present in the JHSC learning outcomes, as seen through references to comparisons between works. However, analysis and evaluation are emphasised to a much lesser extent. Moreover, since interdisciplinarity is also not present in the learning outcomes, this results in a partial alignment with the DP theme.

Presence of the Other Learning Outcome Themes

Some skills are emphasised more in the JHSC learning outcomes than in the DP's. Specifically, the JHSC learning outcomes place greater emphasis on extending vocabulary, in order to enrich writing and understand classic texts. Additionally, there is a stronger focus on developing imagination and enriching one's own perspectives, feelings, and ways of thinking. Lastly, the JHSC requires students to write a variety of their own literary compositions, which is less of a focus in DP language A: literature.

Summary

The alignment between the DP and JHSC learning outcomes for literature is moderate. Key DP themes such as interpreting texts, formulating and expressing ideas, and exploring identity are well-evidenced in the JHSC outcomes. However, themes like understanding the writer's craft, knowledge of diverse literary texts, the relationship between context and text, and interdisciplinarity are only partially reflected. Additionally, the JHSC emphasises extending vocabulary, developing imagination, and writing literary compositions more than the DP.

5.3.2 Content – Literature

This section compares the literature content of the DP and JHSC subjects. To support the visual comparison at-a-glance, their content is presented in the following diagrams.

Figure 21: DP language A: literature content visualiser.

Areas of exploration	**Readers, Writers and Texts**	Why and how do we study literature?	How are we affected by literary texts in various ways?	In what ways is meaning constructed, negotiated, expressed and interpreted?	How does language use vary amongst among literary forms?	How does the structure or style of a text affect meaning?	How do literary texts offer insights and challenges?
	Time and Space	How important is the cultural or historical context to the production and reception of a literary text?	How do we approach literary texts from different times and cultures to our own?	To what extent do literary texts offer insight into another culture?	How does the meaning and impact of a literary text change over time?	How do literary texts reflect, represent or form a part of cultural practices?	How does language represent social distinctions and identities?
	Intertextuality: Connecting Texts	How do literary texts adhere to and deviate from conventions associated with literary forms or text types?	How do conventions and systems of reference evolve over time?	In what ways can literary diverse texts share points of similarity?	How valid is the notion of a "classic" literary text?	How can literary texts offer multiple perspectives of a single issue, topic or theme?	In what ways can comparison and interpretation be transformative?
Literary works (nine for SL and 13 for HL)*	**Literary texts should take into account the following considerations:**	Works written originally in the language studied, by authors on the *Prescribed reading list*: minimum of four (SL)/five (HL) Works translated into the language of the course, by authors on the *Prescribed reading list*: minimum of three (SL)/four (HL) Works freely chosen: two for SL and four for HL					
		Authors	Literary forms	Period	Place		

*For teaching from 2024, SL will require seven works and HL will require 10 works, with the following expectations:

- Works written originally in the language studied, by authors on the *Prescribed reading list*: minimum of three (SL)/four (HL)
- Works translated into the language of the course, by authors on the *Prescribed reading list*: minimum of two (SL)/three (HL)
- Works freely chosen: two for SL and three for HL
- Works must be selected to cover three (SL)/four (HL) literary forms, three periods and three countries or regions in at least two continents.

Figure 22: JHSC literature content visualiser.

Japanese Literature	**Knowledge and skills**	**Matters concerning the characteristics and usage of words**	The function of words	Vocabulary	Sentences and writings	Techniques of expression		
		Matters relating to Japan's language and culture	Traditional language and culture, origins and changes of words	Reading				
	Thinking ability, judgement ability, and expressive ability	**Writing**	Setting the topic, collecting information and examining the content	Consideration of configuration	Formation and writing of ideas	Deliberation	Language activities	
		Reading	Understanding structure and content	Examination and interpretation (1)	Examination and interpretation (2)	Formation and sharing of ideas (1)	Formation and sharing of ideas (2)	Examples of language activities
Advanced Classics	**Knowledge and skills**	**Matters concerning the characteristics and usage of words**	Vocabulary	Sentences and writings	Techniques of expression			
		Matters relating to Japan's language and culture	Traditional language and culture	Origins, changes and diversity of words	Reading			
	Thinking ability, judgement ability, and expressive ability	**Reading**	Understanding structure and content	Examination and interpretation (1)	Examination and interpretation (2)	Formation and sharing of ideas (1)	Formation and sharing of ideas (2)	Examples of language activities

Structure

The JHSC offers two literature-focused subjects: Japanese Literature and Advanced Classics. In the DP's *Studies in language and literature* subject group, literature is studied in all subjects but is the sole focus of only language A: literature. Unlike the JHSC, the DP does not offer a literary subject dedicated to classical texts.

DP language A: literature is available at SL and HL. HL expands on SL through additional literary texts and assessments. In contrast, students of the JHSC can take both Japanese Literature and Advanced Classics, but these subjects are independent of each other and have distinct focuses. Therefore, specialisation pathways in literature differ between the DP and JHSC.

Subject content in DP language A: literature is structured into three overlapping, conceptual areas of exploration: the nature of interactions between *readers, writers and texts*; the way texts interact with *time and space*; and *intertextuality*: *connecting texts,* meaning how texts interact with one another. Each area of exploration includes a list of guiding conceptual questions for consideration. For example, in *Readers, writers and texts*, it is suggested that students consider "How does the structure or style of a text affect meaning?".[130]

In contrast, the content of JHSC subjects is organised into two broad categories: *Knowledge and skills* and *Thinking ability, judgment ability and expressive ability*. *Knowledge and skills* is divided into *Matters concerning the characteristics and usage of words* and *Matters relating to Japan's language and culture*, each with subcategories that vary between the two subjects. *Thinking ability, judgment ability, and expressive ability* is divided into writing and reading, though Advanced Classics only includes reading. These sections are similarly further subdivided. Overall, the structure of literature-focused subjects in the DP and JHSC largely differ.

Content Alignment

This section will compare the alignment of literature content in the DP and JHSC subjects. The following table presents a simplified summary of the content alignment that JHSC literature subjects have with the guiding conceptual questions in DP language A: literature. While the guiding conceptual questions are not prescribed or formally assessed, considering whether these are indicated to be present in the JHSC subjects helps assess the extent to which each area of exploration may be considered generally.

[130] International Baccalaureate. (2019). *Language A: literature guide*. p. 23.

Table 31: Summary of the content alignment between DP language A: literature and the JHSC subjects.

DP language A: literature – areas of exploration and guiding questions	Presence in Japanese Literature	Presence in Advanced Classics
Areas of exploration – readers, writers and texts		
Why and how do we study literature?		
How are we affected by literary texts in various ways?		
In what ways is meaning constructed, negotiated, expressed and interpreted?		
How does language use vary among literary forms?		
How does the structure or style of a text affect meaning?		
How do literary texts offer insights and challenges?		
Areas of exploration – time and space		
How important is the cultural or historical context to the production and reception of literary text?		
How do we approach literary texts from different times and cultures to our own?		
To what extent do literary texts offer insight into another culture?		
How does the meaning and impact of a literary text change over time?		
How do literary texts reflect, represent, or form a part of cultural practices?		
How does language represent social distinctions and identities?		
Areas of exploration – intertextuality: connecting texts		
How do literary texts adhere to and deviate from conventions associated with literary forms?		
How do conventions and systems of reference evolve over time?		
In what ways can diverse literary texts share points of similarity?		
How valid is the notion of a “classic” literary text?		
How can literary texts offer multiple perspectives of a single issue, topic or theme?		
In what ways can comparison and interpretation be transformative?		

Key:

	There is strong presence of this guiding question in the JHSC subject.		*There is partial presence of this guiding question in the JHSC subject.*		*There is little or no presence of this guiding question in the JHSC subject.*

The use of guiding questions in DP language A: literature encourages more metacognitive thinking compared to how content is presented in JHSC subjects. Nonetheless, the JHSC content aligns with the areas of exploration and indicates that concepts related to those prompted by the guiding questions will be considered.

The content of the JHSC subjects aligns well with the *Readers, writers and texts* area of exploration in DP language A: literature. Both Japanese Literature and Advanced Classics involve the study and analysis of a wide range of literary forms and text types, including novels, short stories, poetry, scripts, and critical essays. Similar to DP language A: literature, students learn how different styles, structures, expressions, and techniques are used in various texts and the effects of these. However, whereas DP language A: literature focuses on how meaning is affected, the JHSC emphasises deeper comprehension of the text. Like DP language A: literature, JHSC subjects encourage students to explore diverse interpretations alongside their own. In Japanese Literature particularly, students recognise literature’s power to enrich imaginations, emotions, and perspectives, thus they will similarly understand how texts affect the reader and literature’s aesthetic nature. As well as considering the reader, both

JHSC subjects require students to engage with the writers' thoughts, feelings, perspectives and intentions within literary texts.

Both JHSC subjects engage students in studying texts from different cultures and periods, which aligns with the *Time and space* area of exploration in DP language A: literature. In Japanese Literature, students study classical, modern and contemporary literature, including translated texts. In Advanced Classics, the focus is on literature from the classical period and the relationship between Japanese and Chinese culture. Similar to DP language A: literature, students consider the historical, cultural, and social context in which the texts were created and the influence of these factors. The JHSC subjects also explore how literary texts reflect cultural practices, both contemporary and traditional in Japan. Advanced Classics delves deeper into how literary texts shape cultural practices, particularly the impact of Chinese texts on philosophical ideas. The content of Advanced Classics also indicates consideration of different approaches to literary texts across time, recognising that modern perspectives may be different. Furthermore, the content of Advanced Classics indicates consideration of how the meaning and impact of a text changes, acknowledging that works handed down through generations receive various evaluations. As in DP language A: literature, the time and space considerations in the JHSC subjects aim to deepen students' interpretation of literary texts.

Intertextuality and text comparison are key features of both the DP language A: literature and JHSC subjects. In JHSC subjects, students compare texts that explore similar themes or topics. Japanese Literature, for instance, involves comparing modern, foreign, and classical works, as well as texts within the same genre. Advanced Classics incorporates both synchronic and diachronic comparisons, also examining how language has evolved over time and in relation to social contexts. These comparative approaches broaden and deepen students' understanding and interpretation of texts and align with the *Intertextuality: connecting texts* area of exploration in DP language A: literature.

There are some differences between the content of JHSC subjects and DP language A: literature. Naturally, Advanced Classics differs by focusing on literature from the classical period. While DP language A: literature includes classical works on its prescribed reading list, they are not the primary focus. Moreover, both JHSC subjects, particularly Advanced Classics, place a stronger emphasis on expanding vocabulary. In Advanced Classics, students must learn more characters to effectively read the literature. Additionally, JHSC subjects emphasise an understanding of Japanese culture and its development, whereas DP language A: literature focuses more on understanding cultures different from one's own. Finally, Japanese Literature has a more explicit requirement for students to produce their own literary compositions, which may result in less emphasis on critical text analysis, a key focus of DP language A: literature. The key differences are summarised in the table below.

Table 32: Content in covered in JHSC literature subjects that is not covered in DP language A: literature.

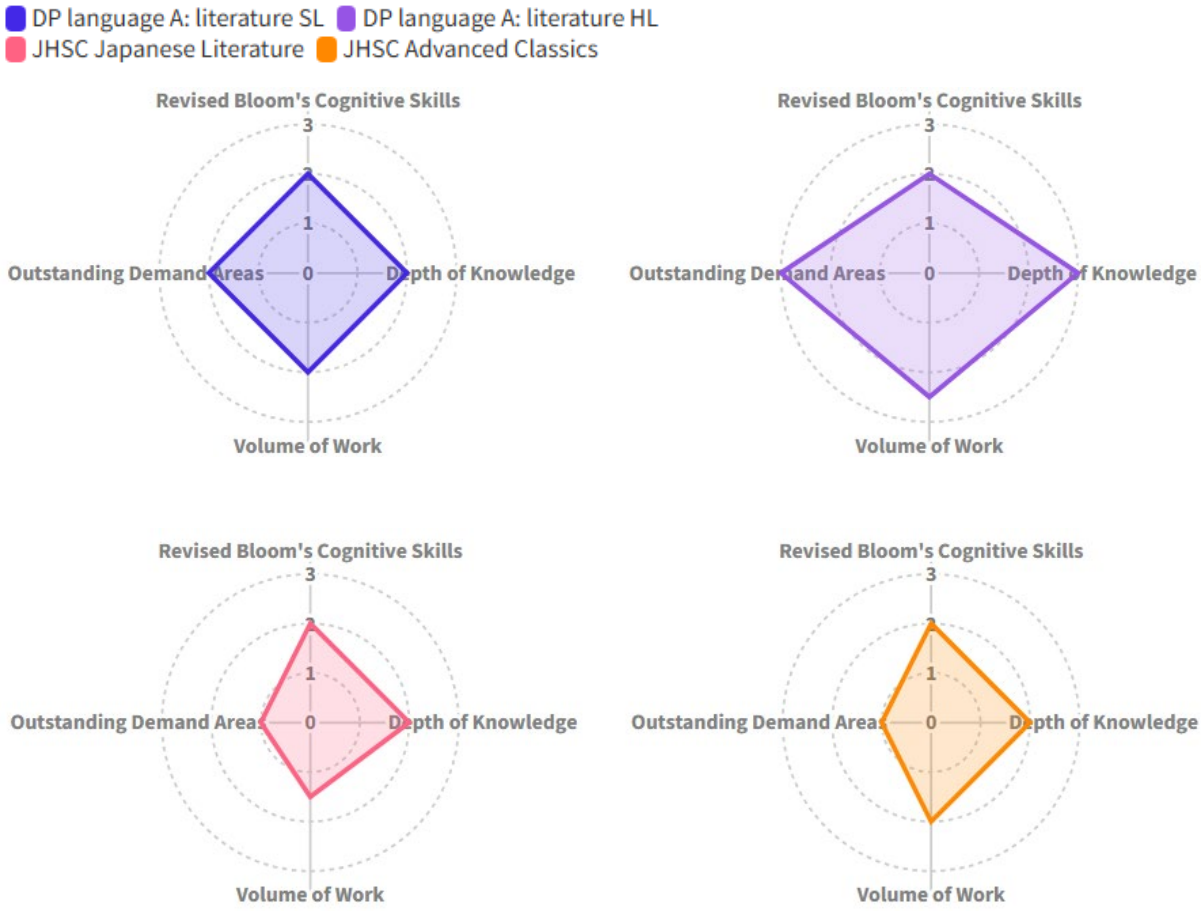
Significant content not in DP language A: literature
• Focus on classics (Advanced Classics) • Less prescriptive regarding the selection of texts for study • Stronger focus on students understanding their own culture, rather than other cultures • Stronger emphasis on expanding vocabulary • More explicit requirement to produce literary compositions, particularly in Japanese Literature

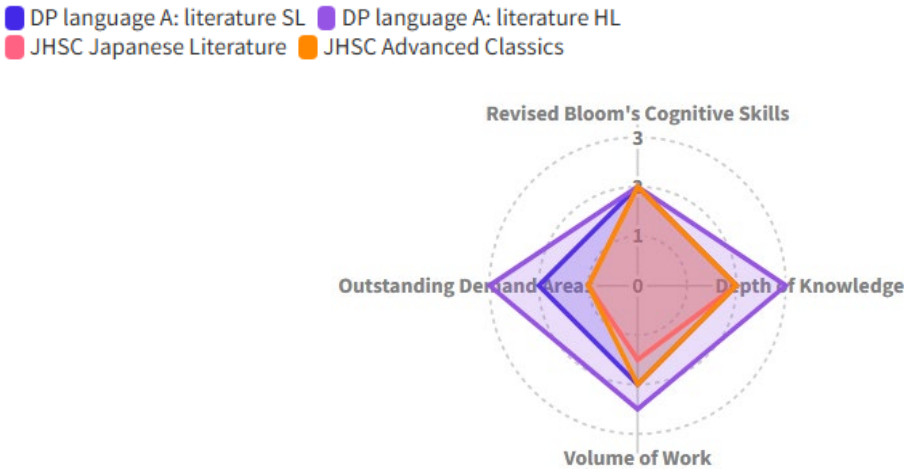
The content of the JHSC literature subjects aligns closely with the areas of exploration in DP language A: literature. However, while the DP requires that each area of exploration is addressed equally, how areas are balanced in the JHSC subjects is not specified. Additionally, JHSC subjects are less prescriptive regarding the number and type of texts studied, making direct comparisons with DP language A: literature SL and HL courses challenging. However, Japanese Literature is allocated approximately 116 hours, with at least 83 hours dedicated to reading and the remainder to writing. Advanced Classics has the same number of teaching hours, though no time is allocated to writing. This suggests that the volume of study is more comparable to SL courses than HL courses. If studied together, the combined breadth and depth may be more similar to HL courses.

5.3.3 Demand – Literature

This section considers the alignment between the DP and JHSC literature subjects in terms of demand. The DP and JHSC subjects were analysed using the same demand tool in order to create a demand profile for DP language A: literature SL, DP language A: literature HL, JHSC Japanese Literature, and JHSC Advanced Classics. These demand profiles are presented below in the form of radar diagrams, with superimposed diagrams at the end also being featured to enable immediate visual comparison.

Figure 23: Visual representations of subject and pathway demand.





The panel of experts carried out a detailed analysis of each course and reached a consensus on the scores shown in the profiles above. The following points were particularly important within the panel discussion:

- Regarding the scores for **Bloom's Cognitive Skills**:
  - DP language A: literature has the same learning outcomes for both SL and HL, meaning that these scores are the same. The DP subjects were judged to show elements of sophisticated metacognition, whilst also indicating that some evaluation and synthesis was present. However, in both cases, the majority of learning outcomes focused on analysis, application, and knowledge and understanding. Therefore, a score of 2 was provided to both.
  - Japanese Literature received a score of 2. Although the learning outcomes emphasised developing an understanding of Japanese language and culture and applying this to engage with others, the content and the language activities suggest opportunities for higher-order thinking skills. These include some evaluation of works, considering different interpretations, and writing literary compositions, such as short stories). Similarly, Advanced Classics was given a score of 2. Despite the objectives emphasising understanding and application, the content includes references to evaluation activities and a consistent focus on analysing and drawing comparisons.

- Regarding the scores for **Depth of Knowledge**:
  - DP language A: literature SL was judged to merit a score of 2, as it was found to provide several opportunities for strategic thinking. Moreover, the subject content encourages conceptual thinking of language as a subject, as well as some opportunity for extended thinking. For DP language A: literature HL, the long-term reflective nature of the HL essay – which is based on the exploration carried out throughout the course in the learner portfolio – was found to feature a significant component of extended thinking, resulting in a score of 3.
  - Both Japanese Literature and Advanced Classics received a score of 2. Japanese Literature was given this score due to the numerous writing activities that require students to develop their own literary compositions. These activities involve collecting and organising information and developing ideas, thus demonstrating strategic thinking. Advanced Classics received its score due to its own opportunities for strategic thinking, such as through evaluating work from various

perspectives, conducting research, discussing ideas with others, as well as developing poetry. Additionally, the subject demonstrates depth in considerations of culture and drawing comparisons to modern works.

- Regarding the scores for **Volume of Work**:
  - DP language A: literature SL was judged to comprise a moderate-heavy workload, warranting a score of 2, as students are expected to engage with a high number of themes and spend a significant proportion of their time on issues beyond basic conceptual depth, including complex multidisciplinary concepts. For the DP language A: literature HL, the panel agreed on a volume of work demand score of 2.5 due to the higher number of texts studied (compared to SL) and the addition of the HL essay. The proportion of time spent on complex reasoning was judged to push the volume of work score into a 2.5.[131]
  - Japanese Literature was given a score of 1.5. This score reflects the subject's coverage of a typical breadth of themes in the study of literature, while also dedicating part of the course to creative writing. Advanced Classics received a score of 2, as it covers a broad range of themes, including in-depth considerations of culture and the characteristics of classical works, within a relatively short period of time, representing a moderate to heavy workload. However, it is important to note that the JHSC does not prescribe the number of texts students should study, making it challenging to assess the volume of work in practice.

- Regarding the scores for **Outstanding Areas of Subject Demand**:
  - A score of 2 was awarded to the DP language A: literature SL due to the significant presence of challenging guiding questions in the subject guide – providing frequent opportunities for higher order thinking – the expansive and exploratory nature of the syllabus, and because students may explore different schools of thought and interrogate the development of texts over time. For the DP language A: literature, it was deemed that the HL essay and the requirement to explore an additional translated text pushed the score to a 3.
  - Japanese Literature received a score of 1 for its emphasis on creative writing, which was deemed to be a demanding component. Advanced Classics also received a score of 1 due to the challenge of exploring literary themes in unfamiliar language and contexts, which can be difficult for modern-day readers to understand.

[131] The volume of work scores for DP language A: literature were based on the subject guide with first assessment from 2021. For teaching from 2024, the number of texts required for SL changes from nine to seven and from 13 to 10 for HL.

5.4 Language Acquisition

The following is the list of language acquisition subjects used in the comparative analysis.

DP language B[132]
Language B is a subject offered within the DP's language acquisition subject group. This subject aims to develop students' ability to communicate in the target language through the study of language, themes and texts. Students are to develop conceptual understandings and the ability to communicate in familiar and unfamiliar contexts. The subject is available at SL and HL, with the latter requiring the study of two literature works originally written in the target language. The subject develops receptive, productive and interactive skills, with different levels of competency expected between SL and HL.

For the JHSC, the analysis considers both general and specialised Foreign Language/English subjects, as listed below.

General Subjects

English Communication I, II, and III[133]
English Communication I, II, and III are situated within the Foreign Language subject area of the JHSC. English Communication I is a compulsory subject for all high school students, while English Communication II and III are elective subjects. In these subjects, students learn to communicate in English, develop their ability to express themselves appropriately, and convey information and ideas accurately. Through integrated language activities, these subjects develop skills in the five key areas of: listening, reading, speaking (interaction), speaking (presentation), and writing.

Logic and Expression I, II, and III[134]
In addition to English Communication subjects, the Foreign Language subject area in the JHSC also offers the elective subjects of Logic and Expression I, II, and III. The subjects are each worth two credits and, if studied, must be taken in order. These subjects particularly aim to develop students' skills in speaking (interaction), speaking (presentation), and writing.

Specialised Subjects

Comprehensive English I, II, and III[135]
Comprehensive English I, II, and III are situated in the specialised English subject area of the JHSC. The content of specialised subjects Comprehensive English I, II, and III is based on that of the general subjects of English Communication I, II, and III, respectively. Additionally, the content included in the general subjects is developed and expanded on in the specialised subjects. In these subjects, students learn to communicate in English, develop their ability to express themselves appropriately, and convey information and ideas accurately. These

[132] International Baccalaureate. (2018). *Language B guide.*
[133] MEXT (2018). *High School Course of Study. Foreign Language,* p.163-167. Available from: 高等学校学習指導要領（平成 30 年告示）
[134] Ibid, p. 172-178.
[135] MEXT. (2018). *High School Course of Study. English.* p. 460-467.

subjects develop skills in the five key areas of: listening, reading, speaking (interaction), speaking (presentation), and writing.

Debate and Discussion I and II[136]
Debate and Discussion I and II are also situated in the specialised English subject area of the JHSC. The content of Debate and Discussion I is based on that of Logic and Expression I, while the content of Debate and Discussion II is based on that of Logic and Expression II and III. These subjects aim to enhance students' abilities to generate ideas, express themselves, and communicate in English through interactive speaking activities.

Essay Writing I and II[137]
Essay Writing I and II are also situated in the specialised English subject area of the JHSC. The content of Essay Writing I is based on that of Logic and Expression I, while the content of Essay Writing II is based on that of Logic and Expression II and III. These subjects aim to enhance students' skills in organising information, forming ideas, and effectively expressing and communicating in English through writing.

High school students can choose a variety of foreign language subjects and combinations. Given the flexibility in the JHSC, four pathways (below) have been selected for the comparative analysis with DP language B and will be relevant for the content and demand alignment analysis. These pathways aim to represent two main groups of students: those who pursue a broader and balanced study of foreign languages in upper secondary without a focus on further specialisation, akin to SL students, and those with a strong interest in foreign languages who may pursue further studies, similar to HL students.

- **General Subjects Pathway I (GSPI)**: English Communication I and II, Logic and Expression I and II
- **General Subjects Pathway II (GSPII)**: English Communication I, II, and III, and Logic and Expression I, II, and III
- **Specialised Subjects Pathway I (SSPI)**: Comprehensive English I and II, Debate and Discussion I and Essay Writing I
- **Specialised Subjects Pathway II (SSPII)**: Comprehensive English I, II, and III, Debate and Discussion I and II, and Essay Writing I and II.

5.4.1 Learning Outcomes – Language Acquisition

This section compares and contrasts the learning outcomes of the curricula falling within the category of language acquisition. For DP language B, Ecctis extracted learning outcome themes from its aims and assessment objectives. The learning outcomes for the JHSC subjects were drawn from the overarching objectives for the Foreign Language subject area (general subjects) and the English subject area (specialised subjects), as well as the objectives for each individual subject.

[136] Ibid, p. 467-470.
[137] Ibid, p. 470-474.

The following summary table presents the learning outcome themes that were extracted from DP language B and indicates if and where they were judged to have presence within the objectives of the JHSC Foreign Language and English subjects.

Table 33: Presence of the DP Language B learning outcome themes in JHSC Foreign Language/English subjects.

Themes extracted from DP language B learning outcomes	Presence in JHSC Foreign Language/English subjects	
1. Communicate clearly, effectively, accurately, and with fluency in a range of contexts and situations and for a variety of purposes and audiences.		Present in the overarching subject area and subject-specific objectives, which emphasise the development of effective communication skills for a variety of purposes, situations and contexts.
2. Develop an appreciation and understanding of cultures and perspectives.		Present in the overarching subject area objectives, as these include references to developing students' understanding of the culture behind a foreign language. This is also present in the subject-specific objectives which emphasise the consideration of the listener, reader, speaker and writer.
3. Understand and use appropriate language structures, registers and formats for different contexts.		Present in the subject area and subject-specific objectives, which describe developing students' ability to understand and effectively use vocabulary, grammar, and language functions to communicate in different contexts.
4. Develop critical-and-creative thinking and use inquiry approaches.		Somewhat present in the subject-specific objectives, as these include the ability to identify and communicate solutions to problems and develop creative logical structures. However, critical and creative thinking is not evident in all subject-specific objectives. This theme is not present in the subject area objectives. Also, neither the subject area objectives nor the subject-specific objectives include references to inquiry skills.
5. Clearly and coherently organise and present ideas on different topics.		Present in the subject area and subject-specific objectives, as these include references to developing the ability to organise and present ideas on a range of everyday topics in a logical manner.
6. Prepare students for further study, work and leisure in a foreign language.		Present in the subject area and subject-specific objectives, which include references to developing the ability to apply knowledge and communicate actively and independently.

Key:

	This theme is well-evidenced in the learning outcomes of JHSC subjects.		*This theme is partially evidenced in the learning outcomes of JHSC subjects.*		*This theme is not evident in the learning outcomes of JHSC subjects.*

Presence of the DP's Learning Outcome Themes

There is a high level of alignment between DP and JHSC language acquisition learning outcomes, with most of the DP's themes being well-evidenced in the objectives of the general and specialised subjects in the Foreign Language and English subject areas. The presence of each DP theme in the JHSC objectives is discussed in more detail below.

1. Communicate clearly, effectively, accurately, and with fluency in a range of contexts and situations and for a variety of purposes and audiences

This DP theme is well-evidenced across the JHSC subject area and the subject-specific objectives and is primarily demonstrated through speaking (interaction and presentation) and writing activities. Indeed, JHSC objectives require students to apply their knowledge and skills to appropriately communicate and express ideas through speaking and writing, according to the purpose, context and situation.

2. Develop an appreciation and understanding of cultures and perspectives

This DP theme is well-evidenced in the JHSC language acquisition learning outcomes. Indeed, according to the JHSC subject area objectives of Foreign Language and English, students are expected to deepen their understanding of the culture behind a foreign language. Additionally, the subject-specific objectives highlight that students should be considerate of other parties in their communication, namely the listeners, readers, speakers and writers. This particularly aligns with the second DP assessment objective: understanding and using language appropriately for a range of interpersonal and/or intercultural contexts and audiences.

3. Understand and use appropriate language structures, registers and formats for different contexts.

This DP theme is well-evidenced in the JHSC language acquisition learning outcomes. Indeed, the subject area and subject-specific objectives describe developing students' ability to: understand and appropriately use vocabulary, expressions, grammar, and language functions in sentences and phrases; apply knowledge to grasp the outline and main points in a conversation; and to share and convey information, thoughts and feelings in different contexts and for a variety of purposes.

4. Develop critical and creative thinking skills and use inquiry approaches.

This DP theme is somewhat evidenced in the JHSC language acquisition learning outcomes. Critical and creative thinking skills are somewhat present in the subject-specific objectives of some general and specialised subjects, though not in the overarching objectives of the JHSC language acquisition learning outcomes. The subject-specific objectives of Logic and Expression I, II, and III, Debate and Discussion I and II, and Essay Writing I and II include references to identifying and communicating solutions to problems and developing creative logical structures while speaking and writing. However, critical and creative thinking is not present in the objectives of all subjects and there is less emphasis on skills such as analysis and reflection generally. Additionally, the use of inquiry approaches is not present in any of the JHSC language acquisition objectives. For these reasons, a partial alignment with this DP theme is concluded.

5. Clearly and coherently organise and present ideas on different topics.

This DP theme is clearly present in the JHSC language acquisition objectives. Indeed, the JHSC describes that students are expected to share and convey information, thoughts and feelings in everyday topics, and express their opinion in different contexts and for a variety of purposes. Moreover, students are required to pay attention to logic, speak and write in a logical manner, develop logical and consistent arguments, and organise information, opinions, and ideas using logical structures when speaking and writing. Different subjects have different expectations from students based on their level. For example, in a more basic level subject, such as Logic and Expression I, students are expected to talk and communicate their opinions

and assertations using logical structures and developments, whereas in more advanced subjects such as Logic and Expression III, students are expected to write detailed, multi-paragraph texts on everyday topics using well-structured and well-developed logic.

6. Prepare students for further study, work and leisure in a foreign language

This DP theme is present in the JHSC language acquisition learning outcomes. Indeed, the theme is implicitly present in the objectives, which describe the productive, receptive and interactive skills students are to acquire. Moreover, one of the overarching objectives describes the aim for students to actively and independently communicate in a foreign language.

Presence of Other Learning Outcome Themes

There are no significantly different themes or skills within the JHSC Foreign Language/English learning outcomes which are not also present in DP language B learning outcomes.

Summary

Overall, there is strong alignment between the language acquisition learning outcomes of the DP and JHSC. The JHSC objectives similarly require students to effectively communicate in a range of contexts and situations, develop an appreciation and understanding of cultures and perspectives, understand and use appropriate language functions for different contexts, clearly organise and present ideas, and be prepared for further study, work and leisure in a foreign language. However, the DP learning outcome theme of developing critical-and-creative thinking and using inquiry approaches is only somewhat evident in the JHSC learning outcomes, since not all subject objectives include these types of skills and the specific skills of analysis, reflection and inquiry skills are generally less evident.

5.4.2 Content – Language Acquisition

This section compares the content of DP and JHSC language acquisition subjects. To support the visual comparison at-a-glance, their content is presented in the following diagrams.

Figure 24: DP language B content visualiser.

Communication	Receptive skills SL	Receptive skills HL			
	Productive skills SL	Productive skills HL			
	Interactive skills SL	Interactive skills HL			
Themes	Identities: Explore the nature of the self and what it is to be human.	Experiences: Explore and tell the stories of the events, experiences and journeys that shape our lives.	Human ingenuity: Explore the ways in which human creativity and innovation affect our world.	Social organisation: Explore the ways in which groups of people organise themselves, or are organised, through common systems or interests.	Sharing the planet: Explore the challenges and opportunities faced by individuals and communities in the modern world.
Conceptual understanding	Audience: Students understand that language should be appropriate for the person(s) with whom one is communicating.	Context: Students understand that language should be appropriate to the situation in which one is communicating.	Purpose: Students understand that language should be appropriate to achieve a desired intention, goal or result when communicating.	Meaning: Students understand that language is used in a range of ways to communicate a message.	Variation: Students understand that differences exist within a given language, and that speakers of a given language are generally able to understand each other.
Texts	Personal texts	Professional texts	Mass media texts		
Literature	Encouraged for both courses, but only required for HL (two literary texts)				
Principles of course design	Variety	Integration	Transparency		

Figure 25: JHSC Foreign Language subjects content visualiser.

General subjects	English Communication I English Communication II English Communication III	**Matters related to the characteristics and rules of English** A. Audio B. Punctuation C. Words, collocations and idiomatic expressions D. Sentence structure and grammar points	**Items related to organising information, forming thoughts, and expressing and communicating in English** A. Listen to and read English on every day and social topics and understand the outline and meaning of information and ideas. Accurately grasping the main points, details, and intentions of a speaker or writer, and summarizing one's own thoughts. B. Information and ideas gained from listening to or reading English on every day and social topics. To express information and one's own thoughts appropriately through speaking and writing while utilizing language. C. Organize the content of everyday and social topics and speak and write in English to convey the main points.	**Matters related to language activities and the functions of language** **Language activities:** A. Listening B. Reading C. Speaking (Interaction) D. Speaking (Presentation) E. Writing **Functions of language:** A. Examples of situations in which language is used. B. Examples of language functions
	Logic and Expression I Logic and Expression II Logic and Expression III	**Matters related to the characteristics and rules of English** Items related to logical structure, development, and expression A. The structure and development of logic according to purpose, scene, situation, etc. B. Expressions that effectively convey information, ideas, etc.	**Items related to organising information, forming thoughts, and expressing and communicating in English** A. To express information and ideas obtained by listening to or reading English on everyday topics and social topics. To express information and one's own thoughts appropriately through speaking and writing while utilizing language. B. Organize the content of everyday and social topics and speak and write in English to convey the main points.	**Matters related to language activities and the functions of language** **Language activities:** A. Speaking (Interaction) B. Speaking (Presentation) C. Writing **Functions of language:** A. Examples of situations in which language is used. B. Examples of language functions

Figure 26: JHSC English subjects content visualiser.

Specialised subjects	Comprehensive English I Comprehensive English II Comprehensive English III	**Matters related to the characteristics and rules of English** A. Audio B. Punctuation C. Words, collocations and idiomatic expressions D. Sentence structure and grammar points	**Items related to organizing information, forming thoughts, and expressing and communicating in English** A. Listen to and read English on every day and social topics and understand the outline and meaning of information and ideas. Accurately grasping the main points, details, and intentions of a speaker or writer, and summarizing one's own thoughts. B. Information and ideas gained from listening to or reading English on every day and social topics. To express information and one's own thoughts appropriately through speaking and writing while utilizing language. C. Organize the content of everyday and social topics and speak and write in English to convey the main points.	**Matters related to language activities and the functions of language** **Language activities:** A. Listening B. Reading C. Speaking (Interaction) D. Speaking (Presentation) E. Writing **Functions of language:** A. Examples of situations in which language is used. B. Examples of language functions
	Debate and Discussion I Debate and Discussion II	**Matters related to the characteristics and rules of English** Items related to logical structure, development, and expression. A. The structure and development of logic according to purpose, scene, situation, etc. B. Expressions that effectively convey information, ideas, etc.	**Items related to organizing information, forming thoughts, and expressing and communicating in English** A. Ability to organize the content to be communicated on every day and social topics, and to speak and write in English to clearly express the main points, intentions, and logical development of information and one's own thoughts.	**Matters related to language activities and the functions of language** **Language activities:** A. Speaking (Interaction) **Functions of language:** A. Examples of situations in which language is used. B. Examples of language functions
	Essay Writing I Essay Writing II	**Matters related to the characteristics and rules of English** Items related to logical structure, development, and expression. A. The structure and development of logic according to purpose, scene, situation, etc. B. Expressions that effectively convey information, ideas, etc.	**Items related to organizing information, forming thoughts, and expressing and communicating in English** A. To be able to use information and ideas gained from listening to and reading English on every day and social topics to write and express information and one's own.	**Matters related to language activities and the functions of language** **Language activities:** A. Writing **Functions of language:** A. Examples of situations in which language is used. B. Examples of language functions

Structure

DP language B is available at SL and HL, with the primary difference being the level of competency expected to be developed in the receptive, productive and interactive skills. Additionally, HL also requires the study of two literary works originally written in the target language. The JHSC offers six general subjects for Foreign Language: English Communication I, II, and III, and Logic and Expression I, II, and III. In addition, the JHSC offers six specialised subjects for English: Comprehensive English I, II, and III; Debate and Discussion I and II; and Essay Writing I and II. Therefore, both the JHSC and DP provide opportunities to specialise in language acquisition, with the JHSC offering progression in the elective subjects and the DP offering the HL course.

The JHSC offers greater flexibility in language acquisition than the DP. While English Communication I is compulsory, students can tailor their foreign language studies by selecting elective subjects. Similarly, students studying specialised courses can choose which English electives to study. In contrast, the DP requires students to choose one language acquisition subject, such as language B. Additionally, some JHSC elective subjects – such as Logic and Expression and Essay Writing allow students to focus on developing specific communication skills, whereas DP language B develops all communication skills within the single subject.

DP language B identifies three communication areas: receptive skills, productive skills and interactive skills. The JHSC further separates communication skills into Listening, Reading, Speaking (Interaction), Speaking (Presentation), and Writing. The DP language B content is structured around prescribed themes, conceptual understandings, texts, literature, and principles of course design. In contrast, the content of the JHSC general and specialised subjects is organised into: English characteristics and rules; organising information, forming thoughts, and expressing and communicating in English; and language activities and the functions of language.

Content Alignment

This section compares the content alignment of language acquisition subjects in the DP and JHSC. The following tables present a simplified summary of the content alignment that JHSC Foreign Language subjects and JHSC English subjects have with each aspect of the DP language B syllabus content.

Table 34: Summary of the content alignment that the JHSC Foreign Language subjects have with DP language B.

DP language B content	Presence in the JHSC Foreign Language subjects (general subjects)					
	English Communication I	English Communication II	English Communication III	Logic and Expression I	Logic and Expression II	Logic and Expression III
Communication						
Receptive skills SL						
Receptive skills HL						
Productive skills SL						
Productive skills HL						
Interactive skills SL						
Interactive skills HL						
Prescribed themes						
Identities						
Experiences						
Human ingenuity						
Social organisation						
Sharing the planet						
Texts						
Personal texts						
Professional texts						
Mass media texts						
Literature						
Literature						
Concepts						
Audience						
Context						
Purpose						
Meaning						
Variation						
Principles of course design						
Variety						
Integration						
Transparency						

Key:

	There is a strong presence of this area in the JHSC subject.		*There is a partial presence of this area in the JHSC subject.*		*There is little or no presence of this area in the JHSC subject.*

Table 35: Summary of the content alignment that the JHSC English subjects have with the DP language B.

DP language B content	Presence in JHSC English subjects (specialised subjects)						
	Comprehensive English I	Comprehensive English II	Comprehensive English III	Debate and Discussion I	Debate and Discussion II	Essay Writing I	Essay Writing II
Communication							
Receptive skills SL							
Receptive skills HL							
Productive skills SL							
Productive skills HL							
Interactive skills SL							
Interactive skills HL							
Prescribed themes							
Identities							
Experiences							
Human ingenuity							
Social organisation							
Sharing the planet							
Texts							
Personal texts							
Professional texts							
Mass media texts							
Literature							
Literature							
Concepts							
Audience							
Context							
Purpose							
Meaning							
Variation							
Principles of course design							
Variety							
Integration							
Transparency							

Key:

	There is a strong presence of this area in the JHSC subject.		*There is a partial presence of this area in the JHSC subject.*		*There is little or no presence of this area in the JHSC subject.*

The content alignment between DP language B and the JHSC subjects is presented below, structured around the components of the DP syllabus – prescribed themes, texts, literature, conceptual understanding, principles of course design, and communication skills.

Prescribed Themes

The JHSC subjects' content aligns well with the prescribed themes used in DP language B. The theme of *Identities* is demonstrated as the JHSC subjects cover food, clothing, shelter, exploring how to live as human beings, and developing a sense of self. Additionally, all JHSC subjects cover the prescribed theme of *Experiences,* as their subject content includes topics around Japanese and English traditional culture, history, customs, arts, daily life, and cultural diversity. Furthermore, the prescribed theme of *Human ingenuity* is present, as their content references topics such as arts, culture, natural and social sciences, and inventions and discoveries related to science and technology. *Sharing the planet* is also present across all JHSC subjects, as their content includes references to science, natural phenomena, geography, energy issues, population and food issues, housing and other urban issues, ecosystem balance, conservation, and the environment. *Social organisation* is partially present in the JHSC content, as it covers social topics, domestic and international events, the community, workplace activities, and social issues, but does not explicitly focus on organisational aspects. Overall, the prescribed themes are strongly present in the JHSC general and specialised subjects, except for the theme *Social organisation,* which is partially present. It should be noted that the prescribed themes in DP language B are addressed equally, whereas the JHSC does not specify any particular weightings for the themes it covers.

Texts

Personal texts are partially present in the JHSC subject content, as there are only a few references to letters, email exchanges to send invitations and seasonal greetings, and requests for information about social and everyday topics. Professional texts are more strongly present across all JHSC subjects, as students are required to listen, read or write interviews, speeches, lectures, essays, reports, and surveys on social topics. Furthermore, mass media texts are also strongly present in the content of JHSC subjects, as they involve reading books, magazines, newspapers, website articles, emails, pamphlets, and reports, as well as listening and watching videos, television shows, films, radio, interviews, speeches, presentations, and lectures on various every day and social topics. However, it should be noted that not all these texts will be studied within a single JHSC subject; different subjects focus on different texts.

Literature

DP language B encourages literature in both SL and HL courses but requires it only in HL through the study of two literary works. In contrast, JHSC subjects reference literature only in Logic and Expression III and Essay Writing II, where the focus is on using professional and academic literature as sources for research, rather than engaging with literary works like novels. The absence of literary works results in no alignment with DP language B.

Conceptual Understanding

The DP language B concepts of *audience*, *context*, and *purpose* are present in the JHSC general and specialised subjects. With regards to *audience*, the JHSC similarly requires students to consider the listener, reader, speaker, and writer, and to effectively convey and communicate information in a way that it is easy for the audience to understand. Additionally, consideration of *context* is clear in the JHSC subject content, as students are required to use

language appropriately in meaningful and authentic contexts, situations, and settings. Furthermore, students are required to use appropriate vocabulary, grammatical structures, and sentences according to the purpose of the communication, which aligns with the *purpose* concept. However, the concept of *meaning* is only partially present in the JHSC subjects, as considering how meaning is developed is not focused on. Furthermore, the concept of *variation* appears to have a limited presence in the JHSC subject content, which only states that teachers should be aware of international English variations. Consequently, there seems little emphasis on students developing an understanding of the differences that exist within a language and how it changes over time, across geographical locations, and among cultures.

Principles of Course Design

The principles of course design are largely present in the JHSC general and specialised subjects. Indeed, *variety* is demonstrated in the JHSC content through the different language activities students are required to participate in, which include paired work, group work, debates, discussions, and presentations. Additionally, *integration* is evident as JHSC content emphasises that activities should integrate the five skills of listening, reading, interacting, presenting, and writing. Furthermore, JHSC content also covers the use of language in a variety of contexts and for a variety of purposes, and the selection of a wide range of material to be studied, which also supports the presence of *integration*. While the concept of *transparency* is somewhat present in the JHSC content, it is not a primary focus. However, there are references to providing effective feedback to students and helping them understand which language materials best support the objectives in each competence area.

Communication Skills

- **English Communication I and Logic and Expression I:** Similar to DP language B SL, English Communication I and Logic and Expression I cover key communication areas across receptive, productive and interactive skills, including Listening, Reading, Speaking (Interaction), Speaking (Presentation) and Writing at a basic level. For example, regarding receptive skills, the content of English Communication I outlines the engagement of students in listening and reading activities so that they can understand the necessary information and grasp the speaker's and reader's intentions in everyday topics. In terms of productive skills, the content of English Communication I includes speaking and writing activities using words, phrases and sentences to communicate information, expressing ideas and feelings, providing reasons and evidence, and exchanging opinions and impressions. Additionally, the content of Logic and Expression I focuses on productive and interactive skills by covering activities where students speak and write paragraphs to communicate information, thoughts, and feelings on everyday topics. While similar skills to SL are developed in these JHSC subjects, their content specifies that students will receive a high-degree of support, thus a partial alignment to SL is concluded overall.

- **English and Communication II, Logic and Expression II, Comprehensive English I and II, Debate and Discussion I, and Essay Writing I:** The communication skills developed in these subjects align well with the SL competencies of DP language B. For example, in terms of receptive skills, English Communication II and Comprehensive English II require students to listen, read, and understand necessary information about everyday topics and grasp the main points and outline of what they have heard or read, which aligns with the DP language B SL content. Additionally,

students are required to understand the details of a conversation, follow the development of a conversation or a text, understand the speaker's or writer's intentions, and summarise and organise their thoughts, which demonstrate SL skills, as well as elements of DP language B HL content. In subjects which develop productive and interactive skills, these include speaking activities where students are required to talk in detail, exchange opinions and ideas, develop logical arguments, communicate information, thoughts and feelings about everyday topics, as well as to write multiple paragraphs. However, the content of English Communication II and Logic and Expression II specifies that students utilise some level of support and assistance during their studies. Therefore, although these JHSC general and specialised subjects demonstrate elements of HL, they more closely align with DP SL content due to the level of support they receive.

- **English Communication III, Logic and Expression III, Comprehensive English III, Debate and Discussion II, and Essay Writing II:** The communication skills developed in these subjects align with the HL competencies of DP language B. Similar to HL, these subjects target a higher competency of receptive, productive and interactive skills. Like DP language B, English Communication III and Comprehensive English III develop all communication skills, whereas Debate and Discussion II specifically develops interactive skills and Essay Writing II specifically develops writing skills. In terms of receptive skills, the content of English Communication III and Comprehensive English III indicates that students will listen to and read necessary information from multiple news reports, lectures and argumentative texts, organise and compare multiple viewpoints, and extract information to solve problems. This aligns with HL language B content, as it requires students to evaluate a wide range of written and spoken texts, analyse arguments, distinguish main points from relevant supporting details, and use a variety of strategies to deduce meaning. In terms of productive skills, the JHSC content indicates that students will speak and write in detail, make long speeches and presentations, write using multiple paragraphs, give detailed explanations, use multiple sources, organise and compare multiple viewpoints and arguments, provide solutions to problems, and give clear reasons and evidence. This leads to a strong alignment with HL language B skills. In terms of interactive skills, the content indicates that students will provide detailed information, thoughts and feelings on a variety of topics, develop conversations, organise and compare information, communicate solutions to problems, communicate in detail with clear reasons and evidence, use arguments to demonstrate the superiority of their own opinion and persuade the listener, and compare the differences and similarities in discussion points, which strongly aligns with HL language B content.

<u>Other Language Acquisition Content in the JHSC Subjects</u>

Although DP language B covers grammar, vocabulary and language functions, specific examples of these are not detailed in the syllabus. In contrast, the JHSC subjects include a section – *Matters related to the characteristics and rules of English* – which details the grammatical structures that students are expected to develop in general and specialised subjects.

Table 36: Language acquisition content in JHSC which is not covered in DP language B.

Significant content which is not included in DP language B
More prescribed requirements regarding the following: • Audio (stress in words, phrases, and sentences, intonation in sentences, divisions in sentences) • Punctuation (e.g. comma, colon, semicolon, dash) • Words • Collocations • Idiomatic expressions • Sentence structure and grammar points (e.g. frequently used sentence structures) • Grammar items (e.g. use of the infinitive, relative pronoun, relative adverbs, conjunctions, auxiliary verbs, prepositions, verb tense and aspect, conditionals)

Summary

The content of the JHSC Foreign languages/English subjects aligns closely with the content of the DP language B. The majority of the DP language B prescribed themes are evident in the content of the JHSC subjects, with the exception of the theme of *Social organisation* which is partially evident. The prescribed themes are equally balanced in the DP language B subject content, however the JHSC does not specify any weighting for the themes it covers.

Additionally, personal, professional and mass media texts are present in the content of the JHSC subjects. However, different JHSC subjects focus on different texts and therefore not all these texts will be studied within a single JHSC subject. Moreover, the study of literary works is not a requirement of any JHSC subjects, however, academic and professional literature is studied in a few.

The DP language B concepts including *audience*, *purpose*, *context,* and *meaning* are well-evidenced in the JHSC subjects. However, the concept of *variation* is not present in the JHSC subjects' content, as the content only mentions that teachers should be aware of English variations, without focusing on students' understanding of English variations, or why and how language changes over time and across geographical boundaries.

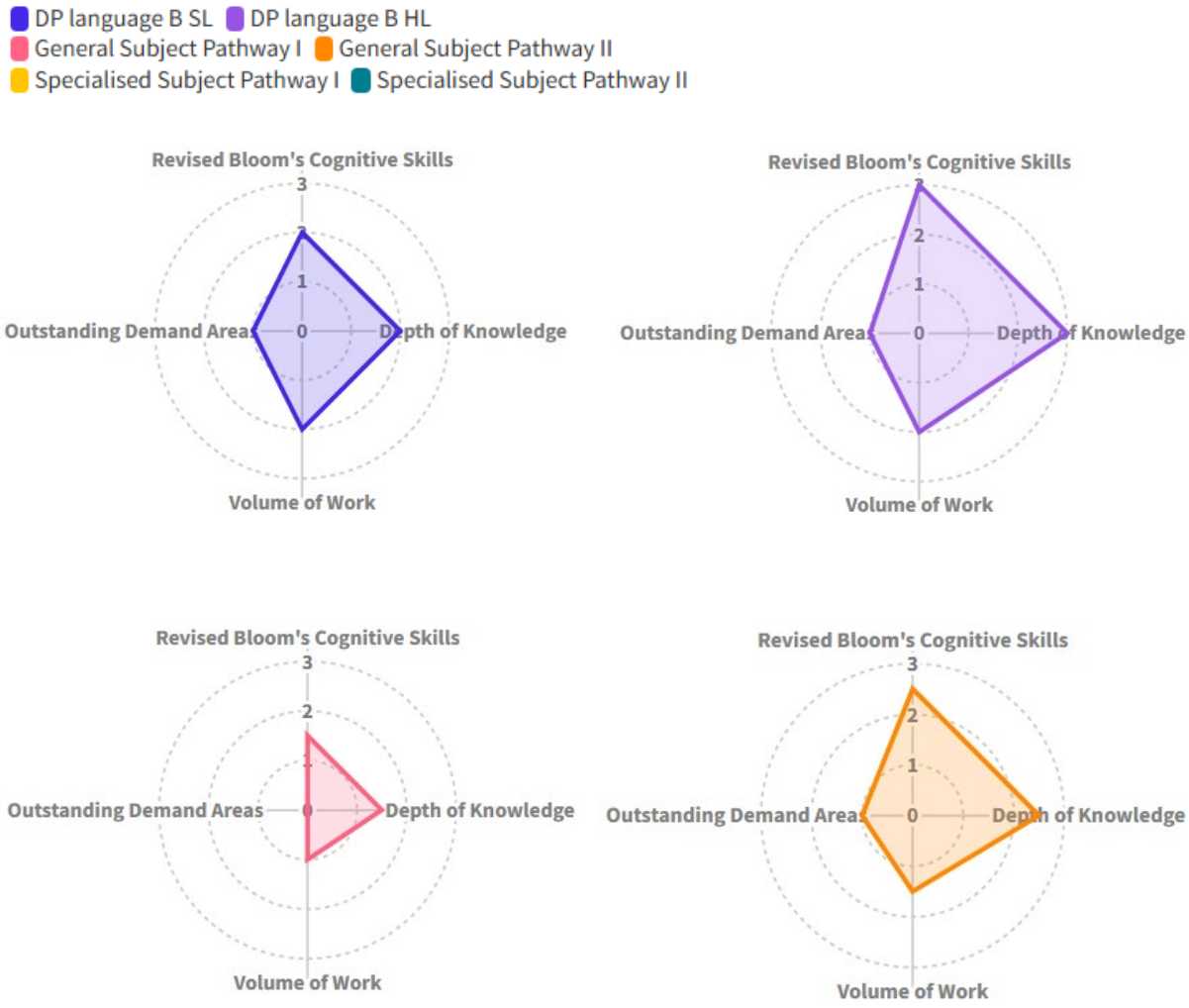
Furthermore, the DP language B principles of course design including *integration* and *variety* are well-evidenced in the JHSC content. However, the principle of *transparency* is somewhat present in the JHSC content, through the inclusion of references to providing feedback to students and supporting their understanding of the subjects' goals.

In terms of communication skills, both the DP language B and the JHSC content focus on developing students' receptive, productive, and interactive skills. The JHSC subjects English Communication I and Logic and Expression I only partially align with language B SL competencies, due to the level support that students receive in those subjects. English Communication II, Logic and Expression II, Comprehensive English I and II, Debate and Discussion I, and Essay Writing I strongly align with language B SL receptive, productive and interactive skills. Furthermore, the content of English Communication III, Logic and Expression III, Comprehensive English III, Debate and Discussion II, and Essay Writing II strongly align with HL language B receptive, productive and interactive skills. Therefore, the content of General Subjects Pathway I and Specialised Subjects Pathway I strongly aligns with SL language B content in terms of breadth and depth, whereas the content of General Subjects Pathway II and Specialised Subjects Pathway II strongly aligns with HL language B content in terms of breadth and depth.

5.4.3 Demand – Language Acquisition

This section considers the alignment between DP and JHSC language acquisition in terms of demand. The DP and JHSC subjects were analysed using the same demand tool in order to create a demand profile for DP language B (SL and HL), JHSC General Subjects Pathway I, JHSC General Subjects Pathway II, JHSC Specialised Subjects Pathway I, and JHSC Specialised Subjects Pathway II. These demand profiles are presented below in the form of radar diagrams, with superimposed diagrams at the end also being featured to enable immediate visual comparison.

Figure 27: Visual representations of subject and pathway demand.



The panel of experts carried out a detailed analysis of each course and reached a consensus on the scores shown in the profiles above. The following points were particularly important within the panel discussion:

- Regarding the scores for **Bloom's Cognitive Skills**:
  - DP language B SL was given a score of 2 on the basis that its learning outcomes evidenced critical and creative thinking, reflection, and inquiry skills. Although at SL there are elements of evaluation, these are not the predominant focus of the course. DP language B HL was given a score of 3 on the basis that its learning outcomes and communication skills emphasise analysis, evaluation, and synthesis.
  - For JHSC General Subjects Pathway I, the goals focused primarily on application, with some elements of analysis, particularly in English Communication II and Logic and Expression II. There is some evidence of the use of a variety of grammar and vocabulary in English Communication II and Logic and Expression II. However, across all subjects of General Subjects Pathway I the students receive a degree of support. Overall, this resulted in a score of 1.5. For JHSC General Subjects Pathway II, a score of 2.5 was deemed appropriate, as the goals indicated a focus on analysis with some elements of evaluation, such as through using multiple sources, proposing solutions to problems, persuading the listener, communicating effectively using reasons and evidence, explaining opinions and arguments, participating in debates and discussions, and engaging with academic and

professional literature and lectures. For JHSC Specialised Subjects Pathway I, a score of 2 was deemed appropriate, as the goals evidenced analytical thinking, such as through developing arguments and taking positions for and against, with limited support. For JHSC Specialised Subjects Pathway II, a score of 3 was deemed appropriate, as the goals indicated a strong focus on evaluation, synthesis and creation, such as through proposing solutions to problems, developing logical and consistent arguments, using multiple sources, taking positions for and against specific arguments, and engaging with academic and professional literature and lectures.

- Regarding the scores for **Depth of Knowledge**:
  - DP language B SL was judged to merit a score of 2, as it was found to provide many opportunities for strategic thinking. Moreover, the prescribed themes encourage conceptual thinking and reflection on the role of language in society and the world. For DP language B HL, the variety of strategies that students need to use when communicating in the target language, as well as the requirement to speak and write at length and for different purposes, was found to feature a significant component of extended thinking, resulting in a score of 3.
  - For JHSC General Subjects Pathway I, a score of 1.5 was deemed appropriate as, although there were elements of analysis and problem-solving, especially in productive skills, there was not enough evidence of strategic thinking, analysis and complex reasoning to warrant a 2. The JHSC General Subjects Pathway II was awarded a score of 2.5, as it was found to provide sufficient opportunities for learners to engage in not only strategic thinking, complex reasoning, and analysis, but also problem-solving skills, thus some extended thinking was evident in the JHSC General Subjects Pathway II. However, there was not enough evidence that extended thinking was consistently used, therefore a 2.5, rather than 3, was awarded. For JHSC Specialised Subjects Pathway I, a score of 2 was awarded, due to the opportunities for strategic and analytical thinking, such as in-depth arguments, debates, and the use of evidence. For JHSC Specialised Subjects Pathway II, a score of 3 was deemed appropriate, as it was found to provide several opportunities for learners to develop multiple arguments, compare multiple viewpoints, propose solutions to problems, persuade the listener, and express well-reasoned opinions.

- Regarding the scores for **Volume of Work**:
  - Both DP language B SL and HL were judged to comprise a moderate-heavy workload, warranting a score of 2. The content covers a high number of themes, of which students spend equal amounts of time on, as well as encouraging the study of a broad range of texts. Additionally, the content of SL and HL also requires learners to spend a significant proportion of their time on issues beyond basic conceptual depth, including exploring links with other disciplinary areas in the DP and with the TOK course.
  - For both JHSC General Subjects Pathway I and JHSC Specialised Subjects Pathway I, a score of 1 was deemed appropriate. This score recognised that, while time was spent on some themes beyond basic conceptual depth, there was a generous amount of time allocated, overall reflecting a moderate workload. For JHSC General Subjects Pathway II and JHSC Specialised Subjects Pathway II, a

score of 1.5 was considered appropriate. While more time is spent on complex skills and themes, a higher number of teaching hours was given to accommodate this, thus a 1.5, rather than a 2 was given.

- Regarding the scores for **Outstanding Areas of Subject Demand**:
  - A score of 1 was given to both DP language B SL and HL for the complex nature of the prescribed themes. Indeed, students are encouraged to consider complex ideas across a range of areas, including questions around ethics and the essence and role of language. These were deemed to constitute one area of outstanding demand, resulting in a score of 1.
  - A score of 0 was given to JHSC General Subjects Pathway I, as the panel judged that there was no required area that had demand beyond the typical scope of an upper-secondary language acquisition course. A score of 1 was given to both General Subjects Pathway II and Specialised Subjects Pathway II, due to learners' engagement with academic and professional literature, as well as lectures, which are key components of higher education. Similarly, a score of 1 was also given to JHSC Specialised Subjects Pathway I, due to learners' engagement with lectures and speeches.

5.5 History

Below is the list of subjects used in the history subject comparison analysis.

DP history[138]
History is a subject option within the Individuals and societies subject group in the DP. History is available at SL and HL, with HL also requiring an in-depth study of three sections from one of the HL regional options and an additional exam based on this content. This subject aims to look at various perspectives and types of history (political, economic, social and cultural) to develop students' understanding of the past, in turn deepening their understanding of society and the world today.

JHSC Modern and Contemporary History[139]
In the JHSC, Modern and Contemporary History is a compulsory subject situated within the Geography and History subject area, being typically worth two credits. The subject aims to enable students to learn how to study history using various materials and to develop an understanding of modern historical changes from a broad, interconnected perspective, considering both the world and Japan's role within it. Additionally, the subject explores the relationship between global events and the emergence of contemporary issues.

JHSC Advanced Japanese History[140]
In the JHSC, Advanced Japanese History is an elective subject which can be studied following Modern and Contemporary History, being typically three credits. The subject aims to enable students to explore various events related to Japan's historical development, considering both geographical conditions and global history. Furthermore, the subject seeks to provide a comprehensive understanding of the meaning and significance of historical events, traditions, and cultural characteristics, while also encouraging students to examine contemporary issues facing Japan through a historical lens.

JHSC Advanced World History[141]
In the JHSC, Advanced World History is an elective subject which can be studied following Modern and Contemporary History, being typically worth three credits. Through this subject, students gain an understanding of the major frameworks and developments of world history in relation to geographical conditions and Japanese history. They consider the meaning, significance, and characteristics of these events in order to develop a deeper historical perspective and explore global issues through a historical lens.

5.5.1 Learning Outcomes – History

This section compares and contrasts the learning outcomes of curricula falling within the category of history. For DP history, Ecctis extracted learning outcome themes from its aims and assessment objectives. The JHSC history subjects' learning outcomes were drawn from the objectives articulated for the History and Geography subject area, as well as the objectives outlined for each individual history subject. The following summary table demonstrates the

[138] International Baccalaureate. (2015). *History guide*.
[139] MEXT. (2018). *High School Course of Study. Modern and Contemporary History*. p. 56-63. Available from: 高等学校学習指導要領（平成 30 年告示）
[140] Ibid, *Advanced Japanese History*. p. 63-69.
[141] Ibid, *Advanced World History*. p. 69-77.

learning outcome themes that were extracted from DP history and indicates if and where they were judged to have presence within the learning outcomes of JHSC history subjects.

Table 37: Presence of DP history learning outcome themes in JHSC history.

Themes extracted from DP history learning outcomes	Presence in JHSC history	
1. Develop knowledge and understanding of wide-ranging historical contexts		This theme is present, particularly in the first objective of the subject area and individual subjects.
2. Critical study or evaluation of diverse sources		This theme is somewhat present, as the emphasis on critical thinking and evaluation is less present.
3. Engage with multiple perspectives and interpretations		This theme is present and is particularly supported by the second objective, which explicitly refers to multiple perspectives.
4. Metacognition and understanding of the self and the present day		This theme is presented and particularly supported by the third objective, which refers to students developing self-awareness.
5. Formulate arguments through synthesis, analysis, and application		This theme is present, as the objectives indicate analysis, evaluation and synthesis will be used in explaining and discussing ideas.
6. Reflect on the nature of history, including methods and theories		This theme is not present in the objectives.

Key:

	This theme is well-evidenced in the learning outcomes of JHSC history.		*This theme is partially evidenced in the learning outcomes of JHSC history.*		*This theme is not evident in the learning outcomes of JHSC history.*

Presence of the DP's Learning Outcome Themes

There is a reasonable degree of alignment between DP and JHSC history learning outcomes, with over half of the DP's themes being well-evidenced in the JHSC objectives. The presence of each DP theme is discussed below in more detail.

1. Develop knowledge and understanding of wide-ranging historical contexts

This DP theme is strongly evidenced in JHSC history learning outcomes. The first objective focuses on the knowledge and skills students should acquire, which includes the modern history of Japan and the world, the various changes in history, and understanding of how history has impacted the formation of contemporary issues. The breadth of historical contexts will increase should students' study one, or both, of the elective subjects in addition to the compulsory subject.

2. Critical study or evaluation of diverse sources

This DP theme is partially present in the JHSC history learning outcomes. Students are expected to research and compile historical information from multiple sources effectively. Additionally, by selecting and using sources, students are to gain exposure to different perspectives. However, evaluating sources is not explicitly required in the objectives.

3. Engage with multiple perspectives and interpretations

This DP theme has a strong presence in the JHSC history learning outcomes, with the objectives of the latter consistently emphasising engagement with multiple perspectives. Students are expected to consider diverse opinions and positions on both historical and contemporary issues, as well as various interpretations of the meaning, significance, characteristics, and interrelationships of historical events.

4. Metacognition and understanding of the self and the present day

This DP theme is present in the JHSC history learning outcomes. Students are to use historical contexts to understand the present, both in Japan and globally. Additionally, the third objective focuses on students developing self-awareness as Japanese citizens, aligning with the theme of understanding the self.

5. Formulate arguments through synthesis, analysis, and application

This DP history theme is present in the JHSC history learning outcomes. The further elaboration of the second objective makes it clear that students are expected to formulate arguments. They should be able to effectively explain and discuss their ideas on the meaning and significance of historical events, which demonstrates the requirement to use analysis. Additionally, students are to consider the arguments of others and produce discussion, which implies the use of evaluation and synthesis. Therefore, there is an implicit requirement for students to engage with evaluation, analysis, and synthesis. Lastly, a few explicit references to analysis appear in the subjects' content, particularly in inquiry activities where students form questions and hypotheses.

6. Reflect on the nature of history, including methods and theories

This DP history theme is not explicitly found within the learning outcomes of JHSC history. While understanding and utilising methods in the study of history is present in all subjects, there is nothing explicit to indicate that methods and theories will be reflected on.

Other Themes in the JHSC History Learning Outcomes

There is a higher emphasis on using historical knowledge and skills for problem-solving in the JHSC objectives compared to the DP learning outcomes. Problem-solving is particularly present in the third objective for the history subject area, which expects students to proactively pursue problems and develop a problem-solving attitude.

Summary

Overall, there is a reasonable level of alignment between DP and JHSC history with regard to learning outcomes. Both emphasise understanding historical contexts, studying diverse sources, engaging with multiple perspectives and opinions, and using history to understand the self and present day. Students are also required to formulate arguments, although it is more explicit in the DP learning outcomes that analysis, evaluation and synthesis should be used. Lastly, the DP theme of reflecting on the nature of history is not present in the JHSC outcomes, which instead have a stronger focus on problem-solving.

5.5.2 Content – History

This section compares the history content of the DP and JHSC subjects. To support the visual comparison at-a-glance, their content is presented in the following diagrams.

Figure 28: DP history content visualiser.

Prescribed subjects		World history topics		HL options: Depth studies		Investigation
1. Military leaders	Genghis Khan (c1200-1227) Richard I of England (1173-1199) Leadership Campaigns Impact	1. Society and economy (750-1400) - Content and Context	Society and economy Cultural and intellectual developments Religion and society	**1. History of Africa and the Middle East**	18 topics ranging from 750-2005 across a range of concepts and themes	A historical investigation into a topic of choice
		2. Causes and effects of wars (750-1500) - content and context	Types and causes of conflicts Course, practices and outcomes Effects			
2. Conquest and its impact	The final stages of Muslim rule in Spain The conquest of Mexico and Peru (1519-1551) Conflict and motives Key events and actors Impact	3. Dynasties and rulers (750–1500) - content and context	Dynasties and rulers Law, governing institutions and administration Challenges	**2. History of the Americas**	18 topics ranging from 750-2005 across a range of concepts and themes	
		4. Societies in transition (1400–1700) - content and context	Social and economic change Cultural and intellectual change Religious change			
3. The move to global war	Japanese expansion in East Asia (1931-1941) German and Italian expansion (1933-1940) Causes of expansion Events Responses	5. Early Modern states (1450–1789) - content and context	Nature of power and rule Expansion Conflicts and challenges	**3. History of Asia and Oceania**	18 topics ranging from 750-2005 across a range of concepts and themes	
		6. Causes and effects of Early Modern wars (1500–1750) – content and context	Causes of conflicts Practices and impact on outcome effects			
4. Rights and protest	Civil rights movement in the United States (1954-1965) Apartheid South Africa (1948-1964) Nature and characteristics of discrimination Protests and action The role and significance of key actors/groups	7. Origins, development and impact of industrialization (1750–2005) - content and context	The origins of industrialization The impact and significance of key developments The social and political impact of industrialization	**4. History of Europe**	18 topics ranging from 1066-2000 across a range of concepts and themes	
		8. Independence movements (1800–2000) - content and context	Origins and rise of independence movements, up to the point of independence Methods used and reasons for success Challenges faced in the first 10 years, and responses to the challenges			
5. Conflict and intervention	Rwanda (1990-1998) Kosovo (1989-2002) Causes of the conflict Course and interventions Impact	9. Emergence and development of democratic states (1848–2000) - content and context	Emergence of democratic states The development of democratic states Aims and results of policies			
		10. Authoritarian states (20th century) - content and context	Emergence of authoritarian states Consolidation and maintenance of power Aims and results of policies			
		11. Causes and effects of 20th-century wars - content and context	Causes of war Practices of war and their impact on the outcome Effects of war			
		12. The Cold War: Superpower tensions and rivalries (20th century) - content and context	Rivalry, mistrust, and accord Leaders and nations Cold War crises			

Figure 29: JHSC history content visualiser.

Modern and Contemporary History	A. The Doors of History	(1) History and Us	(2) Characteristics and Sources of History		
	B. Modernisation and Us	(1) Questioning Modernisation	(2) A Connected World and the Opening of Japan	(3) The Nation-State and the Meiji Restoration	(4) Modernisation and Contemporary Issues
	C. Changes in the International Order, Popularisation, and Us	(1) Questions about Changes in the International Order and Popularisation	(2) World War I and Popular Society	(3) Economic Crisis and World War II	(4) Changes in the International Order, Popularisation, and Contemporary Issues
	D. Globalisation and Us	(1) Questions about Globalisation	(2) The Cold War and the World Economy	(3) Japan and the Changing Order	(4) Formation and Outlook for Contemporary Issues
Advanced Japanese History	A. Primitive and Ancient Japan and East Asia	(1) The Early Japanese Archipelago and its Historical Environment	(2) Historical Materials and the Perspective of Primitive and Ancient Times	(3) The Development and Milestones of Ancient States and Societies	
	B. Medieval Japan and the World	(1) The Transition to the Middle Ages and the Historical Environment	(2) Historical Materials and Perspectives on the Middle Ages	(3) Development and Turning Points of the Medieval State and Society	
	C. Early Modern Japan and the World	(1) The Transition to the Early Modern Period and the Historical Environment	(2) Historical Materials and the Outlook for the Early Modern Period	(3) Development and Turning Points of the State and society in the Early Modern Period	
	D. Modern and Contemporary Regions: Japan and the World	(1) The Transition to Modernity and the Historical Environment	(2) Historical Materials and Modern Outlook	(3) Modern and Contemporary Regions, Milestones and Structures of Japan and the World	(4) Exploring Contemporary Japanese Issues
Advanced World History	A. A Perspective on World History	(1) Human History from the Perspective of the Global Environment	(2) To Consider and Express the Position of Human History in the History of the World and the Characteristics of Humankind.		
	B. The Formation of Historical Characteristics of Various Regions	(1) Questioning the Historical Characteristics of Various Regions	(2) Historical Characteristics of Ancient Civilizations	(3) Historical Characteristics of Various Regions	
	C. Interaction and Reorganisation of Various Regions	(1) Questions Regarding Interaction and Reorganisation of Various Regions	(2) Connecting Eurasia and Other Regions	(3) Reorganisation of Asian Regions and Europe	
	D. Combination and Transformation of Various Regions	(1) Questions Regarding the Combination and Transformation of Various Regions	(2) The Formation of a Global Market and the Integration of Various Regions	(3) The Rise of Imperialism and Nationalism	(4) World War II and changes in Various Regions
	E. Global Issues	(1) The Formation of International Organisations and the Search for Peace	(2) Economic Globalisation and the Reduction of Disparities	(3) Advances in Science and Technology and a Knowledge-based Society	(4) Research into Global Issues

Structure

DP history SL is structured around prescribed subjects, world history topics, depth studies (HL only) and the internal investigation. Teachers select which options to offer students. SL students take one prescribed subject, two world history topics, and then choose any historical topic for their internal investigation. DP history HL is identical in structure to SL, except that students are required to also take one of the regional options from the HL depth studies, within which they study three of the 18 possible sections.

In contrast, all the content within JHSC history subjects is prescribed – teachers and students do not choose particular time periods and events to study. However, students can choose whether to focus on Japanese or global history, or both. If DP students were to focus on Japanese history, they would need to study HL and study Japan-focused topics within the History of Asia and Oceania.

The structure of the JHSC subjects' content is somewhat similar to the structure of world history topics in the DP, as the topics are organised according to time period. However, while DP world history topics offer different focuses within a time period, with 12 to choose from in total, the JHSC organises content into four main time periods, which altogether and individually, span a greater breadth of time. Each topic is organised into two to four subtopics, reflecting a similar number of topics as world history topics, though it is intended for students to study all of these, rather than only a few. Moreover, while the examples to study within these time periods are flexible in the DP, the events are prescribed in JHSC history, and may not be from more than one region, particularly in the case of Advanced Japanese History.

Content Alignment

It can be complex to compare the history curricula of two different programmes, as the levels of optionality available mean that what may appear as significant divergence on paper could be considerably less divergent in practice, depending on the options selected by students/teachers. As a result, Ecctis' analysis of subject alignment considered both the specific historical content of subtopics, such as time and place, and the conceptual aspect of topics – what are the themes that emerge and what historical approaches are deployed? This dual perspective gives a more accurate overall picture of subject content alignment.

To complement the analysis, the following tables present a simplified summary of the extent of content alignment that the JHSC history subjects have at the topic level with DP history.

Table 38: Summary of the content alignment that JHSC history subjects have with the main topics in DP history.

DP history topics	Presence in Modern and Contemporary History	Presence in Advanced Japanese History	Presence in Advanced World History
Prescribed subjects			
Military leaders			
Conquest and its impact			
The move to global war			
Rights and protests			
Conflict and intervention			
World history topics			
Society and economy (750-1400)			
Causes and effects of wars (750-1500)			
Dynasties and rulers (750-1500)			
Societies in transition (1400-1700)			
Early Modern states (1450-1789)			
Causes and effects of Early Modern wars (1500-1750)			
Origins, development and impact of industrialization (1750-2005)			
Independence movements (1800-2000)			
Emergence and development of democratic states (1848-2000)			
Authoritarian states (20th century)			
Causes and effects of 20th-century wars			
The Cold War: Superpower tensions and rivalries (20th century)			
HL depth studies			
History of Africa and the Middle East			
History of the Americas			
History of Asia and Oceania			
History of Europe			
Internal investigation			

Key:

	Strong presence of this topic in the JHSC history subject		*Partial presence of this topic in the JHSC history subject*		*Little or no presence of this topic in the JHSC history subject*

NB: Any alignments found in the content of the compulsory subject (i.e. Modern and Contemporary History) are carried over into the elective subjects, to demonstrate the cumulative content studied.

The presence of DP history prescribed subjects, world history topics and HL depth studies in JHSC history subjects is discussed below.

Prescribed subjects

With the occasional exception, the case studies of the prescribed subjects are not covered in JHSC history subjects, thus limiting the degree of alignment. The only case studies covered are *Japanese Expansion to East Asia (1931-1941)* (all subjects) and, to a lesser extent, *Muslim Rule in Spain* (Advanced World History only). With regard to these events, the JHSC subjects cover causes, events and responses, resulting in a partial alignment with *The Move to Global War* for Modern and Contemporary History and Advanced Japanese History, and strong alignment for Advanced World History.

While the case studies may not be covered, the JHSC subjects may cover similar themes related to other events. For example, while the case studies from *Military Leaders* are not covered, the JHSC history subjects include military campaigns and the impacts of military events, which have similarities to the prescribed subject.

World history topics

Modern and Contemporary History does not cover anything before the 18th century; hence, the content of the first four world history topics is not present. The JHSC subject includes aspects of the Early Modern topics, though not enough to establish partial alignment. There is partial alignment with a few other world history topics, as certain events from these periods are covered; however, the DP's prescribed content is not strongly represented.

Advanced Japanese History and Advanced World History cover a broader range of historical periods. When these historical periods overlap with a DP world history topic, there is usually a strong presence of the prescribed content, as well as some of the events given as suggested examples, leading to a conclusion of strong alignment. However, DP world history topics require examples from at least two regions, whereas Advanced Japanese History focuses on events in Japan. Advanced World History includes events from multiple regions, making it more similar to DP history in nature. Lastly, partial alignment with world history topics is noted when only some prescribed content for a given period or theme is present in the JHSC subject.

HL depth studies

Advanced Japanese History content overlaps with the content of multiple topics in the *History of Asia and Oceania* option for depth studies, particularly those with a focus on Japan such as *2: Japan in the Age of the Samurai (1180–1333)*. Similarly, Advanced World History content overlaps with content in multiple topics in the History of Europe, as well as, to a lesser degree, other regions. However, the topics in the depth studies will not necessarily be covered to the same depth by the JHSC subjects, as they prioritise breadth.

Investigation

Inquiry is a key focus of history study in the JHSC. In each subject, students are expected to develop questions, create hypotheses, explore topics and themes using a wide range of sources, and apply their knowledge to consider solutions to contemporary issues. Additionally, Advanced Japanese History and Advanced World History include a topic emphasising further research and exploration, which aligns well with the historical investigation in the DP, even if the extent of similarity in the final output is unclear.

Other JHSC History Content

The following table summarises the JHSC history content that differs from what is found in the DP. As noted previously, the elective JHSC history subjects cover a broader range of historical periods, including ancient civilizations, which are not the focus of the prescribed subjects, world history topics, or depth studies in DP history. Additionally, each JHSC subject includes a subtopic which considers how contemporary issues have been formed by historical backgrounds, whereas no similar topic is dedicated to this in DP history.

Table 39: History content in the JHSC which is not covered in DP history.

Significant content which is not included in DP history
• Modern and Contemporary History: Globalization and Us – coverage of oil crises, economic development in East Asia, market openness and economic liberalization, information and communications, resource/energy-economy and global environmental issues. • Modern and Contemporary History: Globalization and Us – Formation and Outlook for Contemporary Issues. • Advanced Japanese History: Primitive and Ancient Japan and East Asia – Transition from Palaeolithic culture to Jomon culture, and establishment of Yayoi culture, formation of Kofun culture, and the Heian period. • Advanced Japanese History: Modern and Contemporary Regions: Japan and the World – Exploring Contemporary Japanese Issues. • Advanced World History: Perspective on World History – the start of humankind and global dispersion and migration, and the formation of civilization. • Advanced World History: Historical Characteristics of Ancient Civilizations – Oriental, Indus, and Chinese civilizations. • Advanced World History: Historical Characteristics of Various Regions – Qin and Han dynasties. • Advanced World History: Global Issues – the formation of international organisations and the search for peace, economic globalisation and the correction of socio-economic disparities, and advances in science and technology and a knowledge-based society. • Advanced World History: Global Issues – Research into Global Issues.

Summary

Overall, the JHSC history subjects do not offer as much optionality as DP history, resulting in several prescribed subjects, world history topics, and topics within the HL depth studies having little to no presence in JHSC history.

In practice, the breadth of Modern and Contemporary History may be similar to SL, as it has partial alignment with one prescribed subject and a few world history topics. However, the depth of study in the JHSC subject is less extensive than that of SL history.

Advanced Japanese History spans a broader time period than DP history, offering greater breadth in terms of Japanese history, but less breadth regarding the history of other regions. The content depth is primarily in Japanese history, rather than that of other countries and regions, which contrasts to DP history. This results in greater depth in Japanese history than SL and an overlap with HL depth studies content in *History of Asia and Oceania*.

Advanced World History also covers a broader range of historical periods than DP history, while maintaining similar breadth in the history of different regions. Despite this breadth, the subject maintains depth, demonstrated by its strong alignment with one prescribed subject and multiple world history topics. Additionally, it has some alignment with HL depth studies, particularly the *History of Europe*, which suggests that Advanced World History may cover particular periods and events in more depth than DP history SL.

5.5.3 Demand – History

This section considers the alignment between DP and JHSC history in terms of demand. Using the same demand tool for the analysis of each subject, a demand profile was created for DP history SL, DP history HL, JHSC Modern and Contemporary History, JHSC Advanced Japanese History, and JHSC Advanced World History.

These demand profiles are presented below in the form of radar diagrams, with a superimposed diagram featured to enable the immediate visual comparison of all profiles.

Figure 30: Visual representations of subject demand.

The panel of experts carried out a detailed analysis of each course and reached a consensus on the scores shown in the profiles above. The following points were particularly important within the panel discussion:

- Regarding the scores for **Bloom's Cognitive Skills**:
  - DP history has the same learning outcomes for both SL and HL, meaning that these scores are the same. The DP history subjects were judged to show some presence of evaluation and synthesis, but the majority of learning outcomes focused on a combination of analysis, application, knowledge and understanding, thus a score of 2 was provided to both.
  - JHSC Modern and Contemporary History received a score of 2 due to its consistent comparative approach, which involves analysing trends across different regions. JHSC Advanced Japanese History and JHSC Advanced World History both received a score of 2.5. These subjects also employ a comparative approach and a consistent inquiry approach, which includes developing hypotheses, exploring themes, conducting research, and using information to consider contemporary issues. However, since evaluation is less emphasised, a score of 2.5, rather than 3 was deemed appropriate.

- Regarding the scores for **Depth of Knowledge**:
  - Both the DP history SL and HL were judged to merit a score of 2.5. Assessment Objectives 3 and 4, and history Aims 8, 10 and 12 were judged to show evidence that students would be required to develop joined up and strategic thinking around methods, sources and theories in many contexts. In terms of assessment, the Internal Investigation was judged to be the most important piece of evidence that students would carry out in augmentation, particularly through the requirement to design their own questions and reflect on their work.
  - JHSC Modern and Contemporary History received a score of 1.5. Although topics are not explored in-depth and the subject covers introductory content to studying history, the aspects of inquiry in the subject indicate thinking beyond basic recall and application. Therefore, a score of 1.5, rather than a 1, was given to recognise this. JHSC Advanced Japanese History and JHSC Advanced World History both received a score of 2.5. These subjects build on JHSC Modern and Contemporary History, each focusing on different areas but covering certain themes and topics in considerable detail. Moreover, the inquiry approach taken allows for extended thinking during the course.

- Regarding the scores for **Volume of Work**:
  - DP history SL was judged to comprise moderate-heavy workload (a score of 2) as students will be exposed to multiple types of history, across multiple regions, often going beyond basic conceptual depth in each topic, and carrying out an internal investigation. DP history HL was considered to have a heavy volume of work, resulting in a score of 3.
  - JHSC Modern and Contemporary History received a score of 1.5. While the majority of time is spent on themes of basic depth, the score reflects that a significant breath of content is covered in a limited amount of time. Both JHSC Advanced Japanese History and Advanced World History received a score of 3. These subjects span a great breadth of historical periods and cover considerable detail in certain topics, all within a limited amount of teaching time. Consequently, it was judged that these subjects comprised a heavy workload.

- Regarding the scores for **Outstanding Areas of Subject Demand**:
  - The internal investigation and the fact that students are exposed to so many forms of history were judged to comprise stretch components of DP history SL – resulting in a score of 1 – while the regional expertise developed through the HL regional options caused the HL score to exceed the SL on this measure – reaching a score of 2.
  - JHSC Modern and Contemporary History received a score of 1 due to its focus on using history to understand the formation of contemporary issues, which was perceived as a unique and demanding aspect. Both JHSC Advanced Japanese History and JHSC Advanced World History received a score of 2. These subjects also incorporate the aspect of understanding contemporary issues, in addition to placing an emphasis on research and using knowledge to consider solutions to problems.

6. Key Findings

This section summarises the alignment and main similarities and differences found between the DP and the Japanese High School Curriculum (JHSC), both at the programme-level and subject-level.

6.1 Programme Level

Philosophical Underpinnings

All the key themes extracted from the IB's learner profile, approaches to teaching and learning, and philosophy of international-mindedness are at least somewhat present in the objectives outlined for high school education and its curriculum in Japan. The themes of *International outlook, diversity and intercultural understanding*, *Independence/self-management, critical inquiry, and reasoning*, *Principled and community-oriented* and *Communicative and collaborative competency*, are highly evident, whereas there is comparatively less emphasis on the DP themes of *Grounded in real-world contexts* and *Conceptual thought and understanding*. The inclusion of multiple references to fostering students' values, qualities and sensitivities, as well as a healthy body, suggest that there are also some unique priorities underpinning the JHSC. Overall, however, students or teachers moving between the two would find a high level of consistency between the philosophical underpinnings of both curricula.

Programme Structure

The DP and JHSC differ in duration, with the former lasting two years and the latter three. Both programmes follow a baccalaureate-style structure, covering a broad range of subjects. While they have several subject areas in common, the JHSC organises some areas differently and includes additional areas. Both also incorporate cross-disciplinary subjects, though with different emphases. A key distinction is that the JHSC offers both general and specialised subjects, with its industry-focused subjects being more vocational than those in the DP.

The programme requirements also differ: the DP follows a subject-based approach, while the JHSC is credit-based. In the DP, subjects are offered at two levels – SL and HL – with specific requirements for the number of subjects at each level. In contrast, the JHSC includes compulsory and elective subjects, with an overall credit requirement.

Another difference lies in the number of subjects and study hours per subject. Some JHSC subject areas contain more subjects than the same subject areas in the DP. For instance, DP mathematics consists of two subjects, each available at two levels, whereas JHSC mathematics offers six distinct subjects. However, JHSC subjects are generally smaller in scope, with fewer teaching hours compared to those in the DP.

Requirements and Associated Outcomes

The IB encourages students and teachers to consult subject guides around expected prior learning but does not set fixed entry requirements. In contrast, entry to high school in Japan is dependent on the successful completion of entrance examinations.

Both the IB Diploma and High School Diploma are used for entry into higher education institutions. However, students in Japan will often also need their results from university admission tests, such as the Common Test for University Admissions.

Student Learning Pathways

The JHSC and DP both offer a broad curriculum with significant optionality, though their structural differences lead to different pathways being available. While JHSC students study a wide range of subjects, not all are necessarily pursued throughout high school as in the DP. Generally, JHSC electives allow for more flexibility and control over the breadth and depth of study. For example, several elective subjects can be studied within one single area, whereas the DP requires students to take one subject from each of six distinct areas. Another key difference is the level of specialisation available. In the DP this is consistently available across all subjects, whereas some subjects in the JHSC, such as maths, have more specialisation available, while others, such as geography, have less. However, the flexibility in the JHSC allows students to choose pathways similar to those in the DP, balancing specialisation with breadth across different subject areas.

Assessment Methods

Assessment for the High School Diploma in Japan is decentralised, with the JHSC allowing schools to determine how student learning is assessed. In contrast, the DP follows a standardised approach, with centrally defined assessment objectives, methods, and weightings. While some internal assessment is used, the DP grades are primarily informed by external exams, whereas the High School Diploma grades are informed by school-based internal assessments. However, Japanese high school students will still encounter external exams if they take the Common Test for University Admissions. A key difference is that continuous assessment, which is not a feature of the DP, may contribute to High School Diploma grades.

Despite these differences, some school-based assessments, such as written tests and projects, resemble those used in the DP. Furthermore, there are some similarities between the subject-specific assessment objectives of the DP and the JHSC subject objectives.

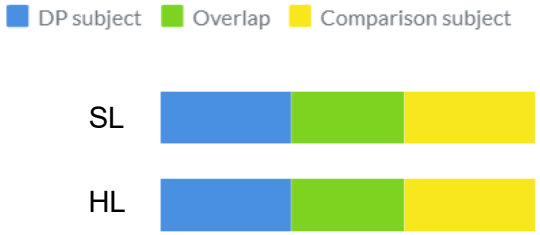
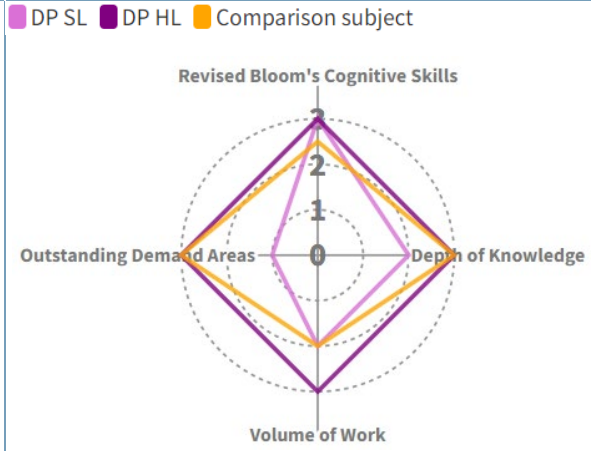
Summary

The most significant similarity between the DP and JHSC lies in their philosophical underpinnings. However, in most other aspects, they differ somewhat. Key differences include the availability of industry-focused subjects in the JHSC, the subject-based vs credit-based requirements, the level of optionality, the degree of specialisation offered in certain subjects, subject size, the prescriptiveness of entry requirements, and the extent of assessment centralisation. Nevertheless, the flexibility of the JHSC allows students to follow pathways similar to those in the DP, balancing specialisation with breadth across different subject areas.

6.2 Subject Level

This section provides visual summaries of the subject-level alignment between specific subjects within the DP and the respective comparison points in the JHSC. The summaries include key findings on learning outcomes alignment, content alignment and demand alignment, as per the key below:

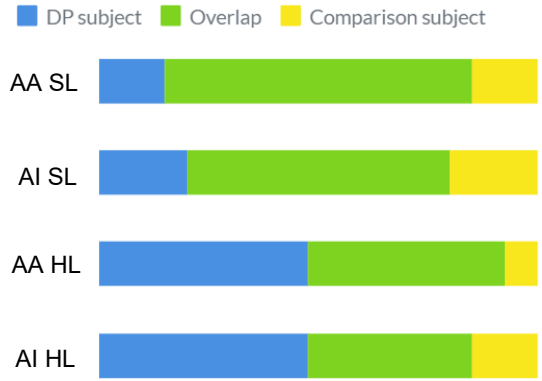
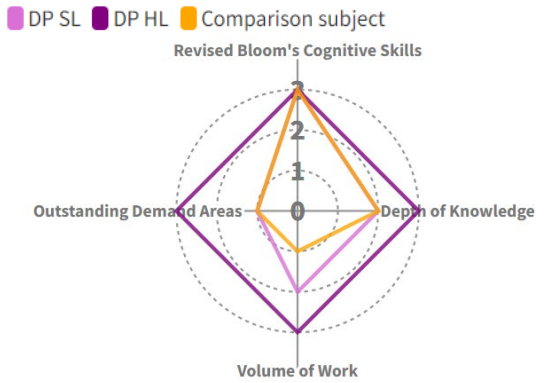
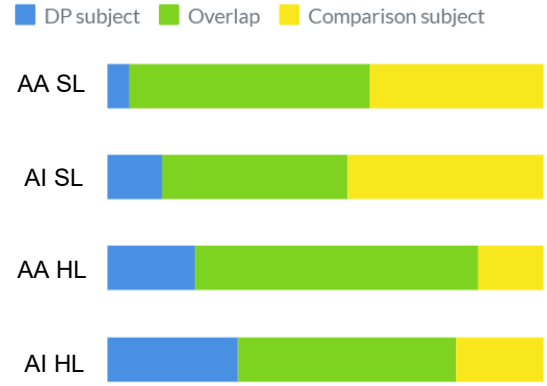
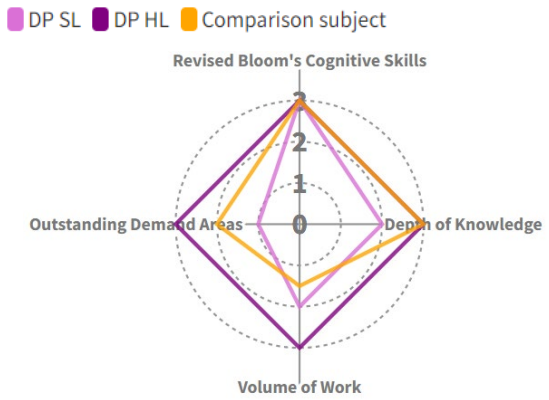
Key:

Comparison subject	Learning outcomes alignment	Content alignment	Demand alignment
Displays the name of the comparison subject	 This represents the learning outcome alignment between the DP subject and the comparison subject. A black border is placed around the selected judgement – 'Moderate' in this example.	 These bars represent the content alignment between the DP subject and the comparison subject. There is one bar showing alignment with SL content and another for HL content (inclusive of SL content). The **green** section of the bar represents the overlap of content between the subjects. The **blue** section represents content which was in the DP subject only. The **yellow** section represents content which was in the comparison subject only. Therefore, if, say, the blue section was longer than the yellow, this can be interpreted as the DP subject having more content unique to itself than the comparison subject. A large green bar would indicate that the two subjects share a substantial proportion of content.	 The radar diagram displays the demand judgement scores for the comparison subject and the DP subject – both at SL and HL.

6.2.1 Mathematics Alignment

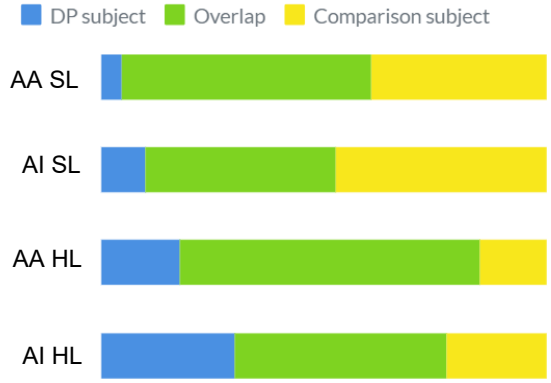
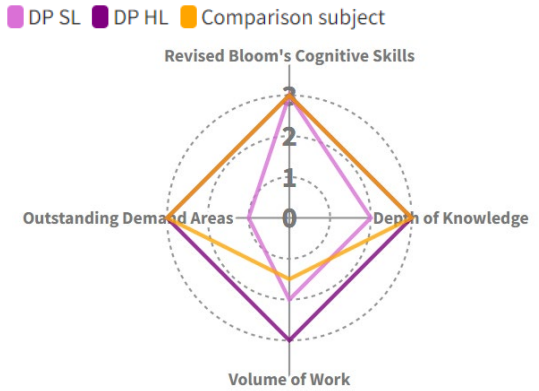
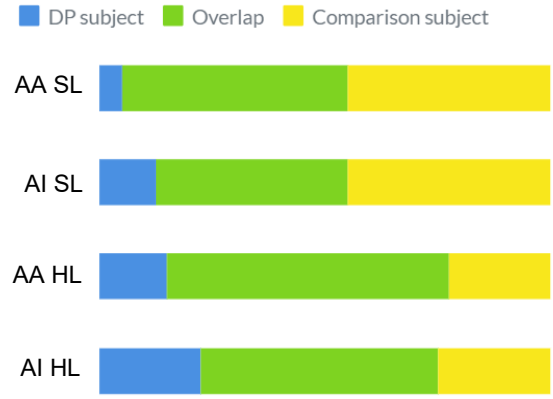
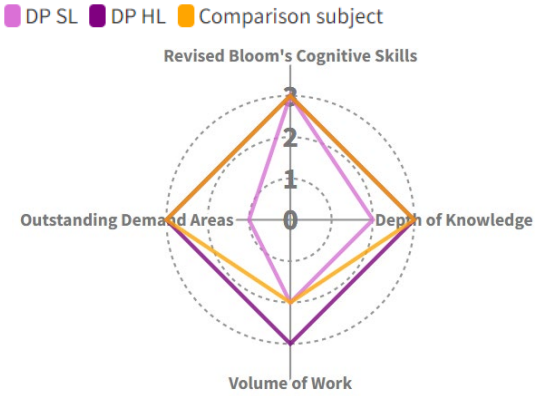
The subject level alignment between DP mathematics (AA and AI, SL and HL) and the JHSC mathematics pathways is represented below:

Figure 31: Visual representations of subject-level alignment (mathematics).

Comparison subject/pathway	Learning outcomes alignment	Content alignment	Demand alignment*
JHSC General Subjects Pathway I	Low Moderate **High**		
JHSC General Subjects Pathway II	Low Moderate **High**		

- **General Subjects Pathway I**: Mathematics I and II, Mathematics A and B, and Basic Inquiry.
- **General Subjects Pathway II**: Mathematics I, II, and III, Mathematics A, B and C, and Basic Inquiry and Inquiry.

*DP mathematics: analysis and approaches (AA) and mathematics: applications and interpretation (AI) score the same as each other for SL and the same as each other for HL.

Comparison subject/pathway	Learning outcomes alignment	Content alignment	Demand alignment*
JHSC Specialised Subjects Pathway I	Low Moderate **High**		
JHSC Specialised Subjects Pathway II	Low Moderate **High**		

- **Specialised Subjects Pathway I**: Mathematics I and II (SMC) and Inquiry subjects.
- **Specialised Subjects Pathway II**: Mathematics I and II (SMC), Advanced Mathematics (SMC), and Inquiry subjects.

*DP mathematics: analysis and approaches (AA) and mathematics: applications and interpretation (AI) score the same as each other for SL and the same as each other for HL.

- **Learning outcomes alignment**: There is a high level of alignment between the learning outcomes of DP and JHSC mathematics. Most DP learning outcome themes are strongly present in the JHSC objectives, with two partially present, and only one absent.

- **Content alignment**: General Subjects Pathway I has strong alignment with SL content and has comparable breadth and depth. In addition to strong alignment with SL content, the other pathways also have good alignment with the AHL content in certain topics, with Specialised Subjects Pathway II having the highest presence of AHL content overall. These pathways also cover different content to DP mathematics and overall have similar breadth and depth to DP HL subjects, if not slightly more in the case of Specialised Subjects Pathway II. It can be noted that all pathways align more with AA content than AI content.

- **Demand alignment**: General Subjects Pathway I strongly aligns with the demand scores given to DP mathematics subjects at SL. The other pathways align well with the demand scores given to DP mathematics subjects at HL, with Specialised Subjects Pathway II having the strongest alignment.

The **key similarities** identified were the following:

- **Similarities in learning outcomes**: Most DP themes are well-evidenced in the JHSC objectives, including understanding and application, communicating mathematically, developing learning skills, using critical thinking, and making links and generalisations.

- **Similarities in content**: General Subjects Pathway I aligns strongly with the SL content of most topics. There is strong alignment with AA SL content for all topics except *Calculus*, which it partially aligns with. Additionally, there is strong alignment with the AI SL content of most topics, with partial alignment for *Number and algebra* and *Functions*. With regards to AA content, the other JHSC pathways have strong alignment with the SL content in every topic, as well as the AHL content in *Number and algebra*. General Subjects Pathway II also has partial alignment with the AHL content of *Geometry and trigonometry* and *Calculus*. Both Specialised Subject pathways have strong alignment with the AHL content of *Calculus* and Specialised Subjects Pathway II also has partial alignment with the AHL content in *Geometry and trigonometry*. Regarding AI content, the other pathways' alignment with SL content remains the same as General Subjects Pathway I. However, the pathways have good alignment with the AHL content *in Number and algebra* and partial alignment with *Calculus*. The second general and specialised pathways also have partial alignment with the AHL content in *Geometry and trigonometry*. Lastly, the inclusion of inquiry-based subjects in the pathways leads to alignment with the DP mathematics exploration.

- **Similarities in demand**: General Subjects Pathway I scores the same as DP subjects at SL for all demand categories, except volume of work where it scores slightly less. The other pathways score the same as DP subjects at HL for both Bloom's cognitive skills and depth of knowledge, with the Specialised Subjects pathways also scoring the same for outstanding demand areas.

The **key differences** identified were the following:

- **Differences in learning outcomes**: The DP themes of engaging with mathematics in a wider context and inquiry approaches are only partially present in the JHSC objectives. Most JHSC subjects do not emphasise broader contexts such as global issues and inquiry approaches are limited to non-compulsory inquiry-based subjects. Furthermore, the JHSC objectives place significantly less emphasis on the use of technology compared to the DP learning outcomes. While no significantly different themes emerge from the JHSC objectives, the inquiry-based and specialised subjects place greater emphasis on making connections between science and mathematics.

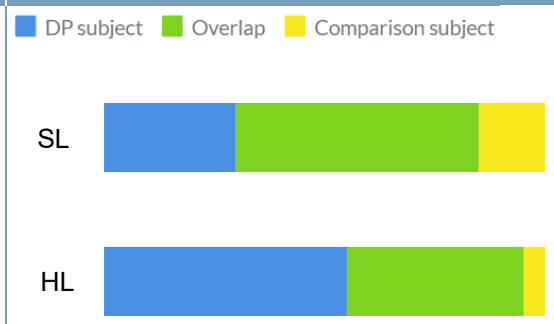
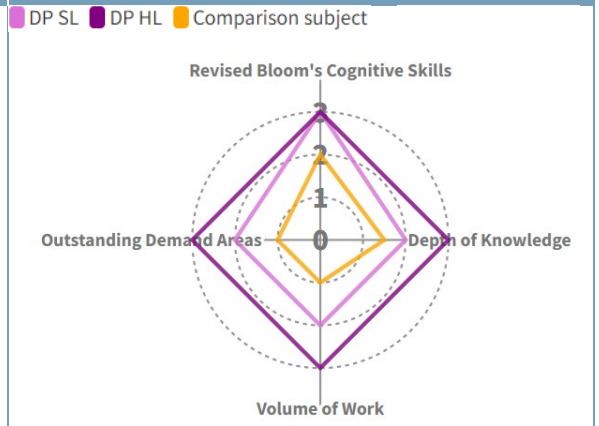
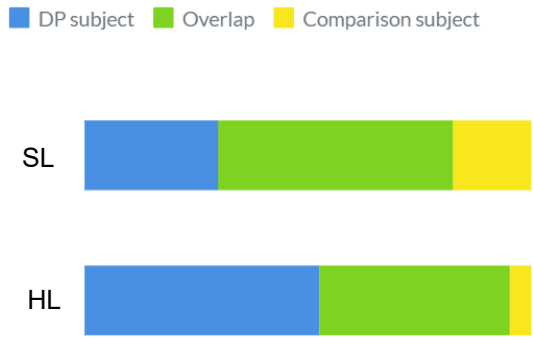
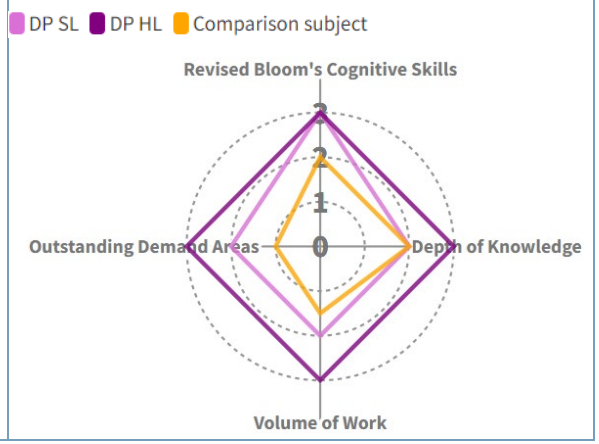
- **Differences in content**: As noted, the JHSC pathways align more closely with AA content than AI content. All pathways only partially alignment with the AI SL content in *Number and algebra* and *Functions*, as there is less presence of financial applications and modelling. In terms of AHL content, the JHSC pathways do not align with the *Functions* contain of either AA or AI. In addition, there is at most only partial alignment with *Geometry and trigonometry* AHL content, as key subtopics such as reciprocal trigonometric ratios (AA), graph theory (AI), and decision maths (AI) are not covered. Furthermore, none of the JHSC pathways align with AI AHL content from *Statistics and probability*. Instead, the pathways cover different content to one or both DP subjects. This includes different geometry content (e.g. conics), limits of sequences, and topics which focus on linking mathematics to the everyday world.

- **Differences in demand**: JHSC pathways generally score less for volume of work compared to DP subjects. For this category, only Specialised Subjects Pathway II scores the same as DP subjects at SL, and no pathways score similarly to DP subjects at HL. Moreover, it can be noted that General Subjects Pathway II, while aligning generally well to DP subjects at HL, scores less for outstanding demand areas.

6.2.2 Physics Alignment

The subject level alignment between DP physics (SL and HL) and JHSC physics subjects is represented below:

Figure 32: Visual representations of subject-level alignment (physics).

Comparison subject	Learning outcomes alignment	Content alignment	Demand alignment
JHSC Advanced Physics	Low **Moderate** High		
JHSC Physics for the Science and Mathematics Course (SMC)*	Low **Moderate** High		

*The JHSC states that content may be expanded as appropriate in specialised science subjects, such as Physics (SMC). Therefore, in practice, the subject content and demand may differ slightly to what is represented here.

- **Learning outcomes alignment**: There is a moderate level of alignment between the DP and JHSC science learning outcomes. The DP learning outcome themes tend to only be partially present in the JHSC objectives and two themes have little to no presence.

- **Content alignment**: Both Advanced Physics and Physics (SMC) have a moderate content alignment with SL physics content and limited alignment with AHL physics content. Advanced Physics covers a similar breadth of content to DP physis at SL, though with less depth in certain topics. Physics (SMC) covers the same content as Advanced Physics, while allowing opportunity for expansion. Hence, there is scope for the specialised subject to offer greater breadth and depth in practice.

- **Demand alignment**: The JHSC physics subjects have moderate alignment with the demand scores of DP physics at SL and limited alignment with the demand scores of DP physics at HL. However, Physics (SMC) allows for expansion, hence there is scope for the demand to be greater in practice.

The **key similarities** identified were the following:

- **Similarities in learning outcomes**: The most significant similarity between DP and JHSC science learning outcomes is the emphasis on developing skills for scientific investigation. Indeed, the JHSC objectives expect students to formulate and verify predictions and hypotheses using observations and experiments throughout the subjects. The JHSC objectives also partially align with the DP themes of conceptual understanding, use and application of methods, tools, and techniques, and awareness of global and local issues and the impact of science.

- **Similarities in content**: JHSC physics content has strong or partial alignment with the SL content of most topics across the five themes in DP physics. Hence, the breadth of study of DP physics at SL and Advanced Physics/Physics (SMC) is similar. The topics which JHSC physics aligns the strongest with are *A.1 Kinematics*, *A2. Force and momentum*, *B.3 Gas laws*, *C.1 Simple harmonic motion*, *C.2 Wave model*, *E.1 Structure of the atom*, and *E.3 Radioactive decay*. In addition, the emphasis in the JHSC on scientific investigation results in a strong alignment with the DP's experimental programme.

- **Similarities in demand**: Both JHSC subjects score somewhat similarly to DP physics at SL for all demand categories and particularly for depth of knowledge. Physics (SMC) has slightly greater alignment with DP physics at SL than Advanced Physics, as it scores the same or very similarly for volume of work and depth of knowledge.

The **key differences** identified were the following:

- **Differences in learning outcomes:** The DP science learning outcome themes of communication and collaboration and developing technological skills are not present in the JHSC objectives. Furthermore, the objectives place less emphasis on conceptual understanding, use and application of methods, techniques and tools, critical thinking skills, and awareness of issues and the impact of science.

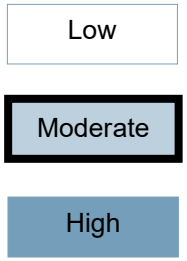
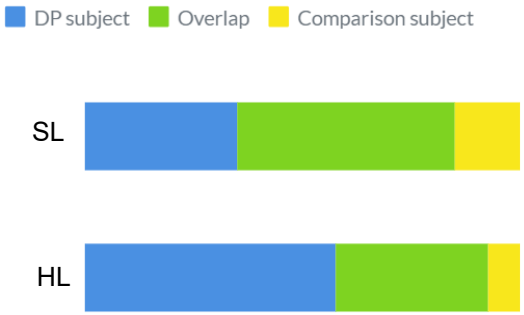
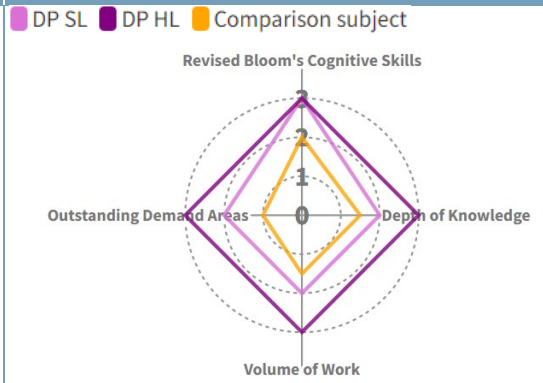
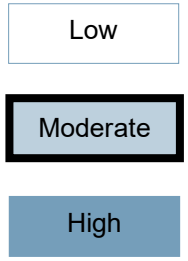
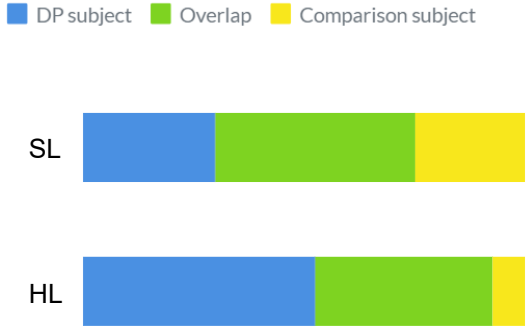
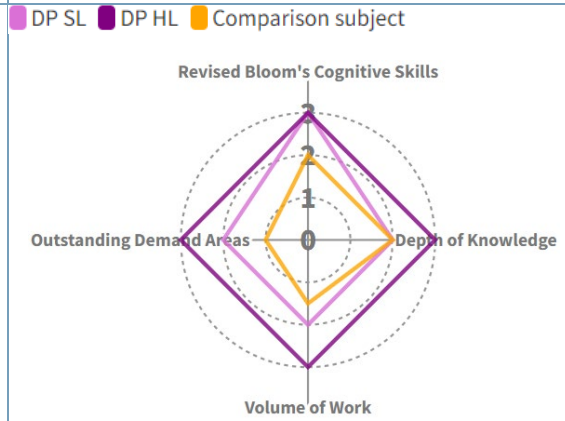
- **Differences in content:** Most alignments that JHSC physics subjects have with SL content are partial, rather than strong. This is due to the JHSC not necessarily covering these topics in as much depth and detail as SL. Furthermore, JHSC physics content has very little alignment with the AHL content in DP physics. That said, Physics (SMC) allows for content to be expanded, thus there is scope for students to cover more content which may align with AHL content. Lastly, JHSC physics covers a topic on the future of physics, exploring how it applies to a wide range of fields. Although DP physics encourages links to real-world contexts, this is not an isolated topic.

- **Differences in demand:** The JHSC subjects, particularly Advanced Physics, tend to score lower than DP physics subjects. Both JHSC physics subjects overall score considerably less than DP physics at HL.

6.2.3 Chemistry Alignment

The subject level alignment between DP chemistry (SL and HL) and JHSC chemistry subjects is represented below:

Figure 33: Visual representations of subject-level alignment (chemistry).

Comparison subject	Learning outcomes alignment	Content alignment	Demand alignment
JHSC Advanced Chemistry			
JHSC Chemistry for the Science and Mathematics Course (SMC)*			

*The JHSC states that content may be expanded as appropriate in specialised science subjects, such as Chemistry (SMC). Therefore, in practice, the subject content and demand may differ slightly to what is represented here.

- **Learning outcomes alignment**: There is a moderate level of alignment between the DP and JHSC science learning outcomes. The DP learning outcome themes tend to only be partially present in the JHSC objectives and two themes have little to no presence.

- **Content alignment**: Both Advanced Chemistry and Chemistry (SMC) have moderate content alignment with SL chemistry content and limited alignment with AHL chemistry content. Advanced Chemistry covers a similar breadth of content to DP chemistry at SL, though with less depth in certain topics. Chemistry (SMC) covers the same content as Advanced Chemistry, while allowing opportunity for expansion. Hence, there is scope for the specialised subject to offer greater breadth and depth in practice.

- **Demand alignment**: The JHSC chemistry subjects have moderate alignment with the demand scores of DP chemistry at SL and limited alignment with the demand scores of DP chemistry at HL. However, the specialised subject Chemistry (SMC) allows for expansion, hence there is scope for the demand to be greater in practice.

The **key similarities** identified were the following:

- **Similarities in learning outcomes**: The most significant similarity between DP and JHSC science learning outcomes is the emphasis on developing skills for scientific investigation. Indeed, the JHSC objectives expect students to verify their predictions and hypotheses using observations and experiments throughout the subjects. The JHSC objectives also partially align with the DP themes of conceptual understanding, use and application of methods, tools, and techniques, and awareness of global and local issues and the impact of science.

- **Similarities in content**: The SL content from all DP chemistry topics is at least partially present in JHSC chemistry, with the strongest alignment being with the topics of *Structure 1. Models of the particulate nature of matter* and *Structure 2. Models of bonding and structure*. Furthermore, the examples of expanded content given for Chemistry (SMC) show some partial alignment with the AHL content of a few subtopics such as *Reactivity 1.4 – Entropy and spontaneity*. In addition, the emphasis in the JHSC on scientific investigation results in a strong alignment with the DP's experimental programme.

- **Similarities in demand**: JHSC subjects score similarly to DP chemistry at SL for all demand categories, particularly for depth of knowledge. Chemistry (SMC) has slightly greater alignment with DP chemistry at SL, scoring the same or very similarly for volume of work and depth of knowledge.

The **key differences** identified were the following:

- **Differences in learning outcomes:** The DP themes of communication and collaboration and developing technological skills are not present in the JHSC objectives. Furthermore, the objectives place less emphasis on conceptual understanding, use and application of methods, techniques and tools, critical thinking skills, and awareness of issues and the impact of science.

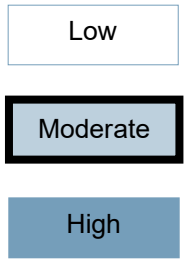
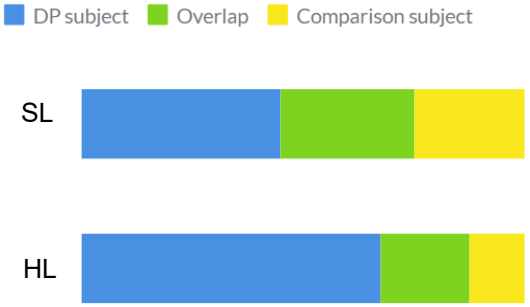
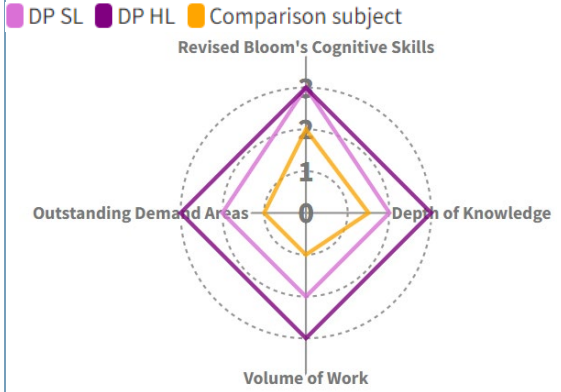
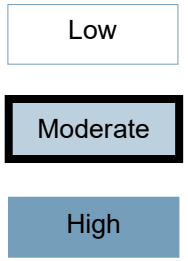
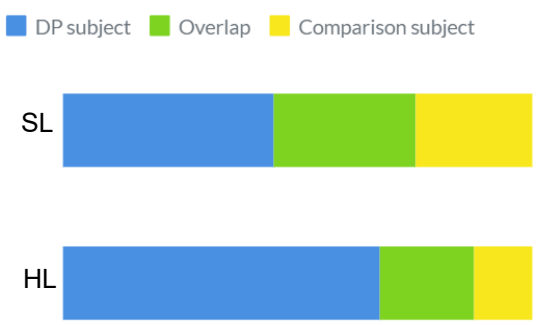
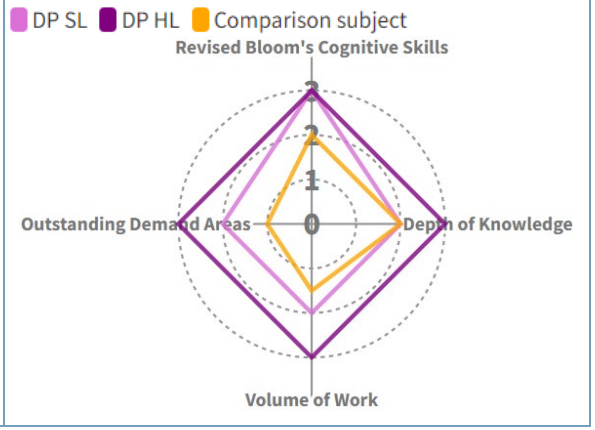
- **Differences in content:** JHSC chemistry content has varying degrees of alignment with the SL content across topics, with the weakest alignment being with *Reactivity 3. What are the mechanisms of chemical change?.* Moreover, most alignments that JHSC chemistry has with SL content are partial, rather than strong. This is due to JHSC chemistry not necessarily covering all the SL concepts in these topics and subtopics. Moreover, JHSC chemistry subjects generally have little to no alignment with AHL content in DP chemistry. However, content can be developed and expanded in the specialised subject, Chemistry (SMC). Therefore, there is scope for Chemistry (SMC) to offer greater breadth and depth than Advanced Chemistry and align more closely with DP chemistry content. Lastly, the JHSC subjects cover a few different areas to DP chemistry, such as some content regarding colloidal solutions and a distinct topic on the role of chemistry in the world.

- **Differences in demand:** JHSC subjects, particularly Advanced Chemistry, tend to score lower than DP chemistry subjects. Both JHSC chemistry subjects overall score considerably less than DP chemistry at HL.

6.2.4 Biology Alignment

The subject level alignment between DP biology (SL and HL) and JHSC biology subjects is represented below.

Figure 34: Visual representations of subject-level alignment (biology).

Comparison subject	Learning outcomes alignment	Content alignment*	Demand alignment
JHSC Advanced Biology			
JHSC Biology for the Science and Mathematics Course (SMC)*			

*The JHSC states that content may be expanded as appropriate in specialised science subjects such as Biology (SMC). Therefore, in practice, the subject content and demand may differ slightly to what is represented here.

- **Learning outcomes alignment**: There is a moderate level of alignment between the DP and JHSC science learning outcomes. The DP learning outcome themes tend to only be partially present in the JHSC objectives and two themes have little to no presence.

- **Content alignment**: JHSC biology subjects have low-moderate content alignment with DP SL biology content and limited alignment with AHL content. Advanced Biology covers less breadth than DP biology and less depth in some areas compared to SL. Biology (SMC) covers the same content, while allowing opportunity for expansion. Hence, the specialised subject may offer greater breadth and depth of content in practice.

- **Demand alignment**: JHSC biology subjects have moderate alignment with the demand scores of DP biology at SL and limited alignment with the demand scores of DP biology at HL. However, the specialised subject Biology (SMC) allows for expansion, hence there is scope for the demand to be greater in practice.

The **key similarities** identified were the following:

- **Similarities in learning outcomes**: The most significant similarity between DP and JHSC science learning outcomes is the emphasis on developing skills for scientific investigation. Indeed, the JHSC objectives expect students to formulate and verify predictions and hypotheses using observations and experiments throughout the subjects. The JHSC objectives also partially align with the DP themes of conceptual understanding, use and application of methods, tools, and techniques, and awareness of global and local issues and the impact of science.

- **Similarities in content**: JHSC biology subjects show the strongest alignment with DP biology theme *C. Interaction and independence.* The SL content from each level is at least partially covered, and the AHL content in *C3. Organisms* is also partially present. Additionally, there is partial coverage of the SL content in most levels of *A. Unity and diversity*, as well as some partial alignment with the AHL content in *A2. Cells*. Furthermore, the emphasis on scientific investigation in the JHSC results in a strong alignment with the DP's experimental programme.

- **Similarities in demand**: JHSC subjects score somewhat similarly to DP biology at SL for all demand categories, particularly for depth of knowledge. Biology (SMC) has slightly greater alignment with DP biology at SL, scoring the same or very closely for volume of work and depth of knowledge.

The **key differences** identified were the following:

- **Differences in learning outcomes:** The DP themes of communication and collaboration and developing technological skills are not present in the JHSC objectives. Furthermore, the objectives place less emphasis on conceptual understanding, use and application of methods, techniques and tools, critical thinking skills, and awareness of issues and the impact of science.

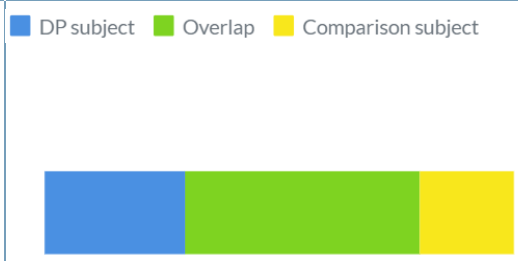
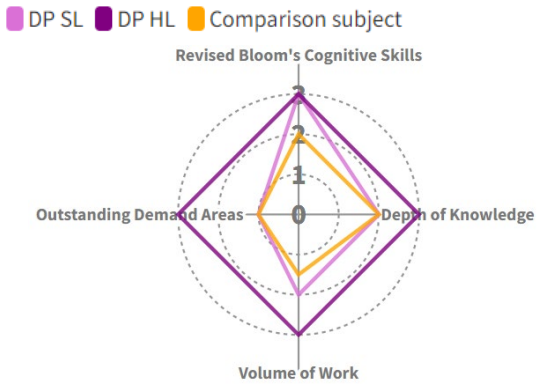
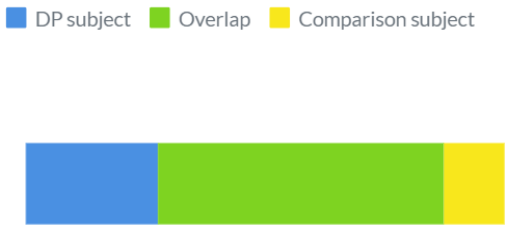
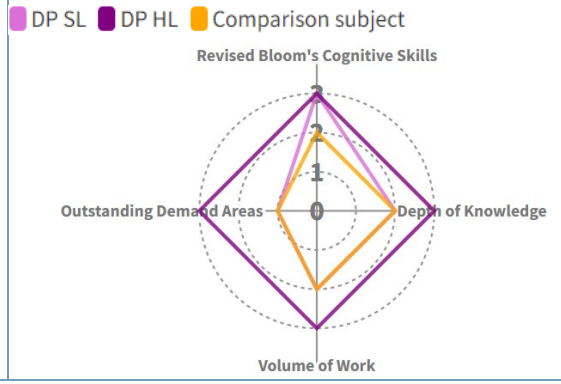
- **Differences in content:** There is very little presence of content from the DP biology theme *B. Form and function* in the JHSC biology subjects. Furthermore, alignment is also limited with *D. Continuity and change*, as there is very little presence of content from the cells, organisms and ecosystem levels. In addition, other alignments with SL and AHL content are mostly partial, as often only some of the same understandings are covered.

- **Differences in demand:** JHSC subjects, particularly Advanced Biology, tend to score lower than DP biology subjects, particularly in comparison to HL.

6.2.5 Literature Alignment

The subject level alignment between DP language A: literature (SL and HL) and JHSC literature subjects is represented below:

Figure 35: Visual representations of subject-level alignment (literature).

Comparison subject	Learning outcomes alignment	Content alignment*	Demand alignment**
JHSC Japanese Literature	Low **Moderate** High		
JHSC Advanced Classics	Low **Moderate** High		

*Each bar represents the areas and conceptual questions that may be considered, rather than the number of texts studied, as this is not specified in JHSC subjects. As the areas of exploration and conceptual questions are the same for language A: literature SL and HL, only one bar is presented.
**Volume of work scores for DP language A: literature were based on the subject guide for first assessment from 2021. For teaching from 2024, it can be noted that the number of works to be studied reduces for both SL and HL.

- **Learning outcomes alignment**: Overall, there is a moderate level of alignment between the literature learning outcomes of the DP and JHSC. Some of the DP's learning outcome themes for language A: literature are well-evidenced in the JHSC objectives; however, most are only partially present.

- **Content alignment**: There is moderate content alignment between DP language A: literature and JHSC literature subjects. The JHSC literature subjects align to varying degrees with all three areas of exploration in DP language A: literature. Notably, Advanced Classics has stronger alignment with these areas than Japanese Literature, though not in the types of literary works studied. JHSC subjects are less prescriptive regarding the number and type of texts studied, making direct comparisons with DP language A: literature SL and HL challenging. However, Japanese Literature and Advanced Classics are each allocated approximately 116 teaching hours, which implies that the breadth and depth of study would be more comparable to DP language A: literature at SL than HL.

- **Demand alignment**: JHSC literature subjects generally align with the demand scores given to DP language A: literature at SL, with Advanced Classics having slightly greater alignment than Japanese Literature. Neither subject aligns strongly with the demand scores of HL.

The **key similarities** identified were the following:

- **Similarities in learning outcomes**: Both DP and JHSC literature learning outcomes place a similar emphasis on interpreting literary works, formulating and expressing ideas, and exploring identity through the study of language and literature. Additionally, other DP themes are partially reflected in the JHSC learning outcomes. For instance, the relationship between context and text is emphasised more in Advanced Classics, while exposure to a wide range of literary texts would be achieved if students studied both literature subjects. Intertextuality is also a feature of JHSC outcomes. Lastly, the DP theme of understanding the writer's craft is somewhat present, as students consider the characteristics and techniques used in literary works.

- **Similarities in content**: While DP language A: literature promotes more metacognitive thinking through its conceptual guiding questions, JHSC literature subjects show alignment with the overarching areas of exploration and concepts. They particularly align with the *Readers, writers and texts* area of exploration, as they also consider the nature of literature, text structures and styles, and the construction, expression and interpretation of meaning. Furthermore, both JHSC subjects show some alignment with aspects of *Time and space* and *Intertextuality*, as they also explore the context of text production and reception, as well as identifying similarities between literary texts and comparing multiple perspectives. Advanced Classics aligns slightly more with these areas by emphasising different time periods, their impact on literature, as well as how texts and meaning change over time.

- **Similarities in demand**: The JHSC subjects score similarly to DP language A: literature at SL for most demand categories, particularly depth of knowledge, volume of work and outstanding demand areas.

The **key differences** identified were the following:

- **Differences in learning outcomes**: The JHSC learning outcomes place less emphasis on understanding the writer's craft, as the analysis and evaluation of techniques are not as explicitly required. Furthermore, the relationship between context and text is less emphasised in Japanese Literature objectives. Furthermore, interdisciplinarity is not featured in the JHSC learning outcomes. Instead, the JHSC learning outcomes prioritise expanding vocabulary, developing imagination, and writing literary compositions more so than DP language A: literature.

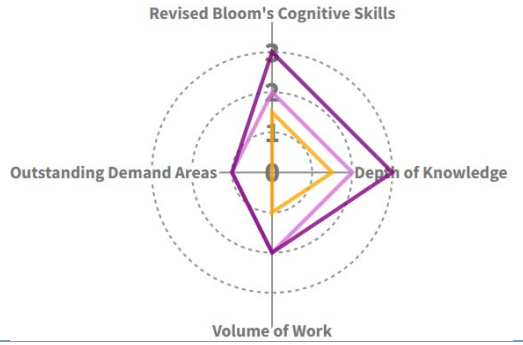
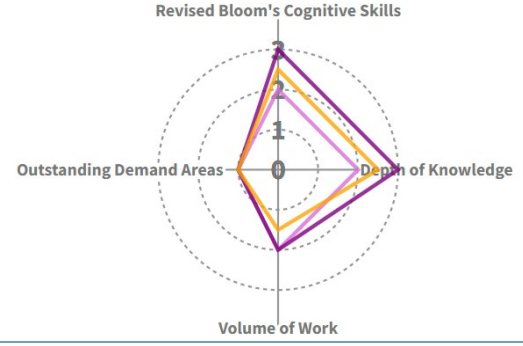
- **Differences in content**: There are notable differences between the content of JHSC subjects and DP language A: literature. Naturally, Advanced Classics differs by focusing on literature from the classical period, whereas DP language A: literature includes classical works on its prescribed reading list, but they are not the primary focus. Additionally, both JHSC subjects – particularly Advanced Classics – place a stronger emphasis on expanding vocabulary. Also, JHSC subjects emphasise an understanding of Japanese culture and its development, while DP language A: literature focuses more on understanding cultures different to one's own. In addition, Japanese Literature has a more explicit requirement for students to produce their own literary compositions, which may result in less emphasis on critical text analysis, which is a key focus of DP language A: literature. Lastly, while the subjects align with the areas of exploration, the JHSC does not specify how much emphasis should be placed on aspects such as intertextuality. In contrast, the DP requires each area to be addressed equally.

- **Differences in demand**: The JHSC subjects score less than DP language A: literature subjects for Bloom’s cognitive skills, due to evaluation and synthesis being less consistently evidenced. Furthermore, the JHSC subjects score less than DP language A: literature at HL in all demand categories, as they are smaller subjects and do not explore literature to the same degree of breadth and depth.

6.2.6 Language Acquisition Alignment

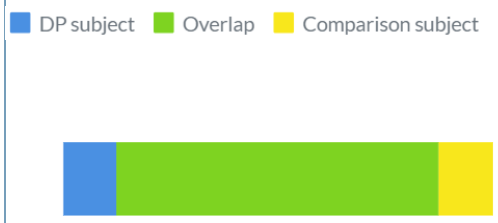
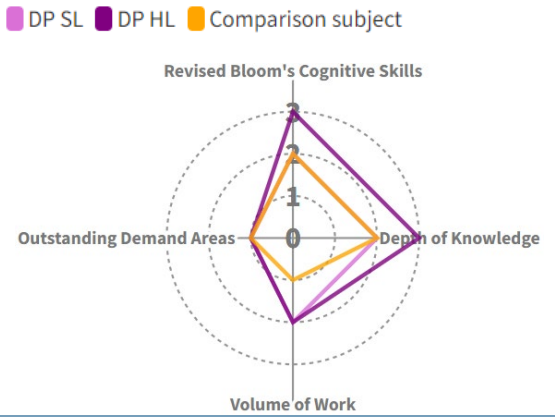
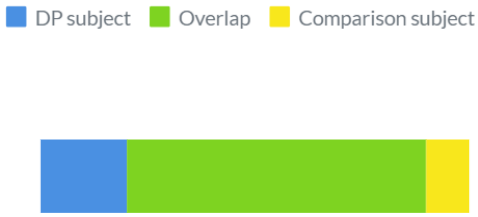
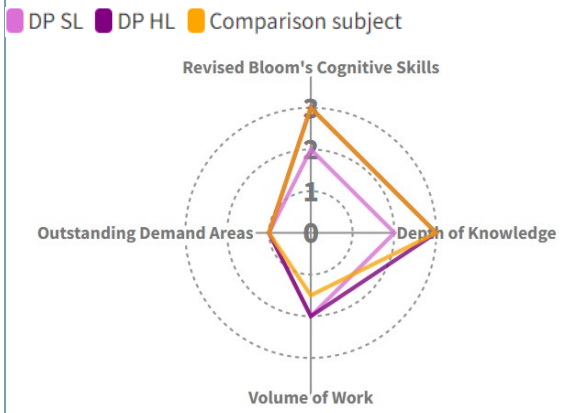
The subject level alignment between DP language B (SL and HL) and JHSC Foreign Language/English subject pathways.

Figure 36: Visual representations of subject-level alignment (language acquisition).

Comparison subject/pathway	Learning outcomes alignment	Content alignment*	Demand alignment
JHSC General Subjects Pathway I	Low Moderate **High**	DP subject Overlap Comparison subject  The pathway aligns with **SL** receptive, productive, and interactive skills.	DP SL DP HL Comparison subject 
JHSC General Subjects Pathway II	Low Moderate **High**	DP subject Overlap Comparison subject  The pathway aligns with **HL** receptive, productive, and interactive skills.	DP SL DP HL Comparison subject 

- **General Subjects Pathway I**: English Communication I and II and Logic and Expression I and II.
- **General Subjects Pathway II**: English Communication I, II, and III and Logic and Expression I, II, and III.

*Each bar represents the extent to which the JHSC pathway overlaps with the components of the DP language B syllabus, including its prescribed themes, text types, conceptual understandings, and principles of course design. Additionally, a statement below each bar specifies whether the JHSC pathway aligns with SL or HL communication competencies.

Comparison subject/pathway	Learning outcomes alignment	Content alignment	Demand alignment
JHSC Specialised Subjects Pathway I	Low Moderate **High**	 The pathway aligns with **SL** receptive, productive, and interactive skills.	
JHSC Specialised Subjects Pathway II	Low Moderate **High**	 The pathway aligns with **HL** receptive, productive, and interactive skills.	

- **Specialised Subjects Pathway I**: Comprehensive English I and II, Debate and Discussion I, and Essay Writing I.
- **Specialised Subjects Pathway II**: Comprehensive English I, II, and III, Debate and Discussion I and II, and Essay Writing I and II.

- **Learning outcomes alignment**: There is a high level of alignment between the language acquisition learning outcomes of the DP and the JHSC. Indeed, all DP language B learning outcome themes are at least partially present in JHSC Foreign Language/English objectives, with nearly all being well-evidenced.

- **Content alignment**: The content alignment between the JHSC language acquisition pathways and DP language B is moderate to high. All JHSC pathways have strong alignment with the prescribed themes, texts, conceptual understandings and principles of course design of DP language B. In terms of communication skills, the content of General Subjects Pathway I and Specialised Subjects Pathway I closely align with DP language B at SL. Meanwhile, General Subjects Pathway II and Specialised Subjects Pathway II align more with the communication skills required for DP language B at HL.

- **Demand alignment**: The degree of alignment between the JHSC and DP language B varies for each individual pathway. General Subjects Pathway I aligns moderately with the demand scores given to DP language B at SL, as it scores less in all categories. Specialised Subjects pathway I aligns more strongly with DP language B at SL, scoring the same in most categories. Generalised Subjects Pathway II and Specialised Subjects Pathway II align well with the demand scores given for DP language B at HL, with the specialised pathway having slightly stronger alignment.

The **key similarities** identified were the following:

- **Similarities in learning outcomes**: Most of the learning outcome themes extracted from DP language B are strongly evidenced in the JHSC Foreign Language/English objectives. Similarly to the DP, the JHSC emphasises communicating effectively and accurately, understanding and using appropriate language structures, clearly and coherently organising and presenting ideas, and preparing students for further study, work and leisure in a foreign language. In addition, the DP theme of using critical-and-creative thinking and inquiry approaches is partially evident in the JHSC objectives.

- **Similarities in content**: The content of the JHSC pathways reflects strong similarities with DP language B content. Most of the prescribed themes in DP language B have a strong presence in the JHSC subjects, with only *Social organisation* being partially present. Professional and mass media texts are strongly featured in the JHSC subjects, while personal texts are partially present. The DP concepts of *audience*, *context* and *purpose* are strongly evidenced in the JHSC subjects, with the concept of *meaning* being partially present. Additionally, the DP principles of course design of *variety* and *integration* are strongly present in the JHSC subjects, with the principle of *transparency* being partially present. Regarding communication skills, General Subjects Pathway I and Specialised Subjects Pathway I align closely with the receptive, productive, and interactive skills required for DP language B at SL. Likewise, General Subjects Pathway II and Specialised Subjects Pathway II strongly align with the skills expected at HL.

- **Similarities in demand**: General Subjects Pathway I and DP language B score similarly for Bloom's cognitive skills and depth of knowledge, as both provide

opportunities for analysis and strategic thinking. Specialised Subjects Pathway I scores the same as DP language B at SL for Bloom's cognitive skills, depth of knowledge and outstanding demand areas, offering opportunities for strategic and analytical thinking such as in-depth arguments, debates, and evidence-based reasoning. General Subjects Pathway II and DP language B at HL score the same or similarly for all demand categories, providing similar opportunities for higher order and extended thinking. Likewise, Specialised Subjects Pathway II and DP language B at HL score the same for most demand categories and similarly for volume of work. Most pathways score the same as DP language B subjects for outstanding demand areas. The outstanding demand areas are the prescribed themes for DP language B, the engagement with lectures for Specialised Subjects Pathway I and the engagement with academic and professional literature and lectures for Specialised Subjects Pathway II.

The **key differences** identified were the following:

- **Differences in learning outcomes:** While there are no significant differences in the language acquisition learning outcomes of the DP and JHSC, it can be noted that the latter has less emphasis on the use of critical-and-creative thinking and inquiry approaches.

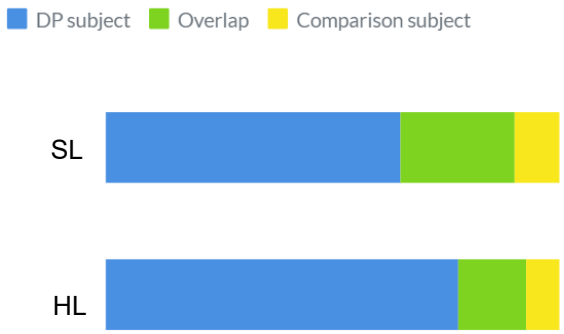
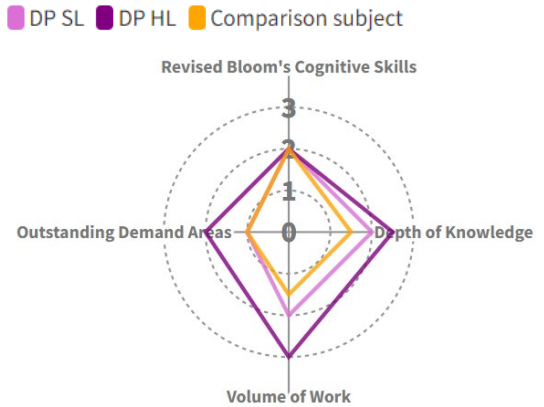
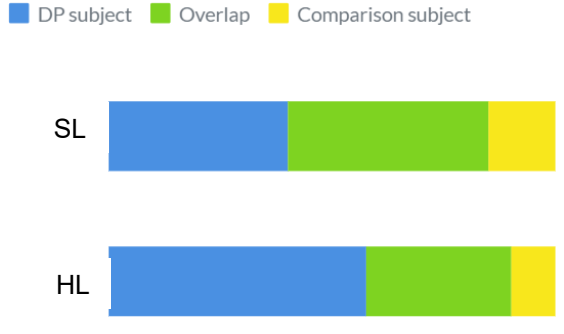
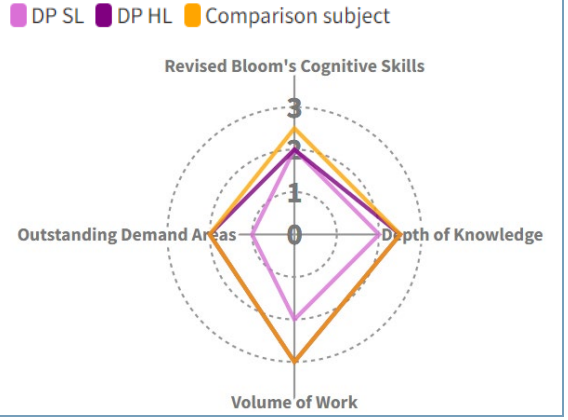
- **Differences in content:** Both DP language B and the JHSC pathways cover grammar, vocabulary and language functions. However, while specific examples of these are not given for DP language B, the JHSC includes a section – *Matters related to the characteristics and rules of English* – which details the grammatical structures that students are expected to be developed across general and specialised subjects. These include specific requirements for audio, punctuation, words, collocations, idiomatic expressions, sentence structure and grammar points, as well as grammar items. Additionally, it can be noted that the prescribed themes in DP language B are addressed equally, whereas the JHSC does not specify any particular weighting for the themes it covers. Additionally, in contrast with DP language B at HL, the subjects of the JHSC pathways do not require the study of literary works, however some JHSC subjects include academic and professional literature. Finally, the DP concept of *variation* has limited presence in the JHSC pathways.

- **Differences in demand:** General Subjects Pathway I scores somewhat lower than DP language B at SL for all categories, particularly volume of work and outstanding demand areas. Furthermore, General Subjects Pathway II scores slightly less than DP language B at HL for Bloom's cognitive skills, depth of knowledge, and volume of work. Additionally, Specialised Subjects Pathways I and II score lower than DP language B for volume of work, though only slightly in the case of Specialised Subject Pathway II.

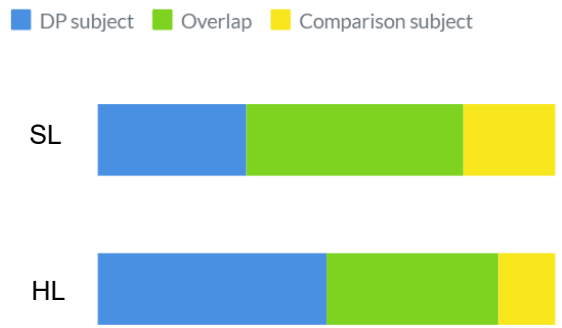
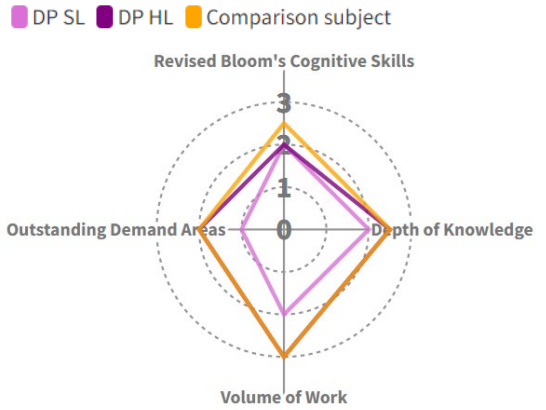
6.2.7 History Alignment

The subject level alignment between DP history (SL and HL) and JHSC history subjects is represented below:

Figure 37: Visual representations of subject-level alignment (history).

Comparison subject	Learning outcomes alignment	Content alignment*	Demand alignment
JHSC Modern and Contemporary History	Low Moderate **High**		
JHSC Advanced Japanese History	Low Moderate **High**		

*Each bar represents the content overlap between the JHSC subject and all DP history topics available at SL or HL. In practice, DP students only study a selection of these topics.

Comparison subject	Learning outcomes alignment	Content alignment*	Demand alignment
JHSC Advanced Classics	Low Moderate **High**		

*Each bar represents the content overlap between the JHSC subject and all DP history topics available at SL or HL. In practice, DP students only study a selection of these topics.

- **Learning outcomes alignment**: Overall, there is a high level of alignment between DP and JHSC history regarding learning outcomes. Most of the DP learning outcome themes are strongly present in the JHSC objectives.

- **Content alignment**: Modern and Contemporary History, as a smaller subject, has low content alignment with DP history, whereas the elective subjects – Advanced Japanese History and Advanced World History – have moderate content alignment. Content alignment is not strong for any subject, as the JHSC subjects do not offer optional topics. In practice, Modern Contemporary History has similar breadth, but less depth than DP history at SL. The elective subjects have greater breadth than DP history subjects with regards to the time periods covered, although Advanced Japanese History has less breadth with regards to the regions covered. The elective subjects align with some prescribed subjects and world history topics, as well as having partial alignment with some HL depth studies; thus their depth somewhat surpasses that of SL.

- **Demand alignment**: Modern and Contemporary History scores similarly to DP history at SL, though slightly less in certain categories. The scores for Advanced Japanese History and Advanced World History align with DP history at HL.

The **key similarities** identified were the following:

- **Similarities in learning outcomes:** Both DP an JHSC history learning outcomes emphasise understanding historical contexts, studying diverse sources, engaging with multiple perspectives and opinions, and using history to understand the self and present day. Students are also required to formulate arguments, although it is more explicit in the DP learning outcomes that evaluation and synthesis should be used.

- **Similarities in content:** All JHSC subjects partially align with some of the prescribed subjects in DP history, as they cover similar themes. All JHSC subjects, though in particular Advanced Japanese History and Advanced World History, align with some of the world history topics. Furthermore, Advanced Japanese History has partial alignment with the *History of Asia and Oceania* HL depth study, covering similar areas to topics such as *2: Japan in the Age of the Samurai (1180–1333)* and *9: Early modernisation and imperial decline in East Asia (1860–1912).* Advanced World History has partial alignment with the *History of Europe* HL depth study, as it covers similar areas to topics such as *2: Muslims and Jews in medieval Europe (1095–1492)*. Furthermore, all JHSC history subjects align with the exploration component of DP history, with the strongest alignment found in the elective subjects, which emphasise research and exploration.

- **Similarities in demand:** Modern and Contemporary History scores similarly to DP history at SL, particularly for Bloom's cognitive skills and outstanding demand areas. Advanced Japanese History and Advanced World History align strongly with the demand scores for DP history at HL for all demand categories. Indeed, the JHSC elective subjects similarly span considerable breadth while maintaining depth.

The **key differences** identified were the following:

- **Differences in learning outcomes:** The DP theme of reflecting on the nature of history and its methods and theories has limited presence in the JHSC learning outcomes. Instead, the JHSC history learning outcomes have a higher emphasis on problem-solving.

- **Differences in content:** A key difference between JHSC and DP history is that the former does not offer optional topics, all content is prescribed. Furthermore, while aligning with the themes of some of the prescribed subjects in DP history, the JHSC subjects tend not to cover their case studies, such as Genghis Khan. While Advanced Japanese History aligns well with multiple world history topics, it does not necessarily consider examples from more than one region, as is required for DP history. Advanced Japanese History generally differs to DP history with its focus on the national history. Furthermore, none of the JHSC subjects have any notable alignment with the HL depth studies of *History of Africa and the Middle East* or *History of the Americas*. With regards to content that is different to the DP, the JHSC elective subjects cover a broader range of historical periods, including ancient civilizations, which are not covered in DP history. Additionally, each JHSC subject includes a topic which considers how contemporary issues have been formed by historical backgrounds, whereas no similar topic is dedicated to this in DP history.

- **Differences in demand:** There are no significant differences in demand, with Modern and Contemporary History aligning closely with DP history at SL and Advanced Japanese History and Advanced World History aligning closely with DP history at HL. However, it can be noted that Modern and Contemporary History scores slightly less than SL for depth of knowledge and volume of work, and the elective subjects score slightly more than HL for Bloom’s cognitive skills.

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Appendix A

This Appendix provides further detail on the criteria utilised by Ecctis' experts and external panel members with subject expertise to measure demand for each of the subjects analysed in this study.

Demand Profile – Subject-level Judgement

- **Revised Bloom's Cognitive Skills** score (0-3): this is an overall score of course demand, based entirely on a review of learning outcomes. Levels have been defined based on increasing emphasis on Bloom's Higher Order Thinking Skills.

    - Level 0 – remembering and understanding: learning outcomes (as well as assessment and content) are primarily focused on recall and understanding, with limited or no evidence of higher order thinking skills.
    - Level 1 – applying: learning outcomes (as well as assessment and content) comprise a mix of recall-, understanding- and application-focused objectives, with only limited presence of higher order thinking skills.
    - Level 2 – analysing: learning outcomes (as well as assessment and content) comprise a mix of recall-, understanding and application-focused goals but also feature a substantial focus on analysis. Learning outcomes can also potentially feature some (though limited) evidence of evaluation and creation-focused goals.
    - Level 3 – evaluating and creating (or synthesising): learning outcomes (as well as assessment and content) feature a predominant focus on analysis-, evaluation- and creation/synthesis.

- **Depth of Knowledge** (adapted from Webb's) score (0-3): this is an overall score evaluating the depth of knowledge or complexity of knowledge required by curriculum standards and expectations. The score is focused on subject content and learning outcomes, complemented by assessment where relevant/possible. Levels have been defined based on the level of detail studied per topic, as well as the levels of thinking described in Webb's depth of knowledge framework.

    - Level 0 – All or most topics are studied in limited detail (pre-upper secondary level). Only basic pre-requisite knowledge is required in order to grasp ideas. The level of cognitive complexity of the information students are expected to know is low (e.g. many tasks may require recall and reproduction of information such as facts, definitions, terms, or simpler procedures – acquired knowledge).
    - Level 1 – Some topics are studied in considerable detail. Moderate levels of pre-requisite knowledge are required in order to grasp ideas in some topics. The level of cognitive complexity of the information students are expected to know is low to moderate (e.g. many tasks may require engagement of some mental processing beyond habitual responses, including comparison and basic reasoning – knowledge application).

  - Level 2 – Most topics are studied in considerable detail. Considerable pre-requisite knowledge is required in order to grasp ideas in some topics. The level of cognitive complexity of the information students are expected to know is average to high (e.g. some tasks require complex reasoning, planning, using evidence, and a higher level of thinking than the previous two levels. The cognitive demands are often complex and abstract – analysis).
  - Level 3 – All or most topics are studied in very high detail. Considerable pre-requisite knowledge is required in order to grasp ideas in most topics. The level of cognitive complexity of information students are expected to know is mostly high (e.g. many tasks may require complex reasoning, planning, developing, information synthesis, interpretation of data for problem solving, and thinking most likely over an extended period – extended thinking).

- **Volume of Work** score (0-3): this is a trifactor score, considering breadth of content and depth of content, evaluated against the programme's specified timeframe. The three factors – breadth, depth, and time – were all considered in defining the levels.

  - Level 0 – light: small number of themes and sub-themes covered; a significant majority of time is spent on straightforward or basic themes; generous time allocation per theme.
  - Level 1 – moderate: typical number of themes and sub-themes covered; more time spent on conceptually complex themes compared to Level 1 (though majority of time still spent on themes of basic depth); standard time allocation per theme.
  - Level 2 – moderate heavy: typical to high number of themes and sub-themes covered; a significant proportion of time spent on issues beyond basic conceptual depth; standard to short time allocation per theme.
  - Level 3 – heavy: high number of themes and sub-themes covered; a large proportion of time spent on issues beyond basic conceptual depth; short time allocation per theme.

- **Outstanding Areas of Subject Demand** score (0-3): this score reflects the number of content areas typically viewed as more challenging and/or conducive to intellectual stretching of learners. Levels have been defined on a scale of increasing presence of 'stretch areas'.

  - Level 0 – no stretch areas (0)
  - Level 1 – few stretch areas (1-2)
  - Level 2 – a significant number of stretch areas (3-4)
  - Level 3 – a high number of stretch areas (>4)

Appendix B

Learner profile	Approaches to learning	Approaches to teaching	International-mindedness
Inquirers: We nurture our curiosity, developing skills for inquiry and research. We know how to learn independently and with others. We learn with enthusiasm and sustain our love of learning throughout life. **Knowledgeable**: We develop and use conceptual understanding, exploring knowledge across a range of disciplines. We engage with issues and ideas that have local and global significance. **Thinkers**: We use critical and creative thinking skills to analyse and take responsible action on complex problems. We exercise initiative in making reasoned, ethical decisions. **Communicators**: We express ourselves confidently and creatively in more than one language and in many ways. We collaborate effectively, listening carefully to the perspectives of other individuals and groups. **Principled**: We act with integrity and honesty, with a strong sense of fairness and justice, and with respect for the dignity and rights of people everywhere. We take responsibility for our actions and their consequences. **Open Minded**: We critically appreciate our own cultures and personal histories, as well as the values and traditions of others. We seek and evaluate a range of points of view, and we are willing to grow from the experience.	In all IB programmes, there are five categories of skills including: **Thinking skills:** including areas such as critical thinking, creative thinking, and ethical thinking **Research skills:** including skills such as comparing, contrasting, validating, and prioritizing information **Communication skills:** including skills such as written and oral communication, effective listening, and formulating arguments **Social skills:** including areas such as forming and maintaining positive relationships, listening	In all IB programmes, teaching is: **Based on inquiry:** A strong emphasis is placed on students finding their own information and constructing their own understandings. **Focused on conceptual understanding:** Concepts are explored in order to both deepen disciplinary understanding and to help students make connections and transfer learning to new contexts. **Developed in local and global contexts:** Teaching uses real-life contexts and examples, and students are encouraged to process new information by connecting it to their own experiences and to the world around them. **Focused on effective teamwork and collaboration:** This includes promoting teamwork and collaboration between students, but also refers to the collaborative relationship between teachers and students.	The aim of all IB programmes is to develop internationally minded people who recognize their common humanity and shared guardianship of the planet. Central to this aim is international-mindedness. International-mindedness is a multifaceted concept that captures a way of thinking, being and acting characterised by an openness to the world and a recognition of our deep interconnectedness to others. To be open to the world, we need to understand it. IB programmes therefore provide students with opportunities for sustained inquiry into a range of local and global issues and ideas. This willingness to see beyond immediate situations and boundaries is essential as globalization and emerging technologies continue to blur traditional distinctions between the local, national and international. An IB education fosters international-mindedness by helping students reflect on their own perspective, culture and identities, as well as those of others. By engaging with diverse beliefs, values and experiences, and by learning to think and collaborate across cultures and disciplines, IB learners gain the understanding necessary to make progress towards a more peaceful world.

Caring: We show empathy, compassion, and respect. We have a commitment to service, and we act to make a positive difference in the lives of others and in the world around us. **Risk-Takers**: We approach uncertainty with forethought and determination; we work independently and cooperatively to explore new ideas and innovative strategies. We are resourceful and resilient in the face of challenges and change. **Balanced**: We understand the importance of balancing different aspects of our lives – intellectual, physical, and emotional – to achieve well-being for ourselves and others. We recognize our interdependence with other people and with the world in which we live. **Reflective**: We thoughtfully consider the world and our own ideas and experience. We work to understand our strengths and weaknesses in order to support our learning and personal development.	skills, and conflict resolution **Self-management skills:** including both organizational skills, such as managing time and tasks, and affective skills, such as managing state of mind and motivation.	**Designed to remove barriers to learning:** Teaching is inclusive and values diversity. It affirms students' identities, and aims to create learning opportunities that enable every student to develop and pursue appropriate personal goals. **Informed by assessment:** Assessment plays a crucial role in supporting, as well as measuring, learning. This approach also recognizes the crucial role of providing students with effective feedback.	An IB education further enhances the development of international-mindedness through multilingualism. All IB programmes require students to study, or study in, more than one language. This is because we believe that communicating in more than one language helps students to appreciate that his or her own language, culture and world view are just one of many. In this way, it provides excellent opportunities to develop intercultural understanding and respect. International-mindedness is also encouraged through a focus on global engagement and meaningful service with the community. These elements challenge students to critically consider power and privilege, and to recognize that they hold this planet and its resources in trust for future generations. They also highlight the focus on action in all IB programmes: a focus on moving beyond awareness and understanding to engagement, action and bringing about meaningful change to make a more peaceful and sustainable world for everyone.

Appendix C

Task brief – Expert Demand Panel – [Subject]

For each subject, highlight in yellow the descriptor(s) deemed to best fit each demand category, using the following criteria (please refer to the demand tables for descriptors of the levels):

- **Revised Bloom's Cognitive Skills** score (0-3): this is an overall score of course demand, based entirely on a review of learning outcomes. Levels have been defined based on increasing emphasis on Bloom's Higher Order Thinking Skills.

- **Depth of Knowledge** (adapted from Webb's) score (0-3): this is an overall score evaluating the depth of knowledge or complexity of knowledge required by curriculum standards and expectations. The score is focused on subject content and learning outcomes, complemented by assessment where relevant/possible. Levels have been defined based on the level of detail studied per topic, as well as the levels of thinking described in Webb's depth of knowledge framework.

- **Volume of Work** score (0-3): this is a trifactor score, considering breadth of content and depth of content, evaluated against the programme's specified timeframe. The three factors – breadth, depth and time – were all taken into account in defining the levels.

- **Outstanding Areas of Subject Demand** score (0-3): this score reflects the number of content areas typically viewed as more challenging and/or conducive to intellectual stretching of learners. Levels have been defined on a scale of increasing presence of 'stretch areas'.

Demand Judgements – [Subject]

Table 40: [Subject]

Demand Judgement	Score Descriptors (highlight the best-fit descriptor)	Judgement and Key Evidence
Revised Bloom's Cognitive Skills[142]	Level 0 – remembering and understanding: learning outcomes are primarily focused on recall and understanding, with limited or no evidence of higher order thinking skills.	
	Level 1 – applying: learning outcomes (as well as assessment and content) comprise a mix of recall-, understanding- and application-focused objectives, with only limited presence of higher order thinking skills.	
	Level 2 – analysing: learning outcomes (as well as assessment and content) comprise a mix of recall-, understanding and application-focused goals but also feature a substantial focus on analysis. Learning outcomes can also potentially feature some (though limited) evidence of evaluation and creation-focused goals.	
	Level 3 – evaluating and creating (or synthesising): learning outcomes feature a predominant focus on analysis-, evaluation- and creation/synthesis.	
Depth of Knowledge[143]	Level 0 – All or most topics are studied in limited detail (pre-upper secondary level). Only basic pre-requisite knowledge is required in order to grasp ideas. The level of cognitive complexity of the information students are expected to know is low (e.g. many tasks may require recall and reproduction of information such as facts, definitions, terms, or simpler procedures – acquired knowledge).	
	Level 1 – Some topics are studied in considerable detail. Moderate levels of pre-requisite knowledge are required in order to grasp ideas in some topics. The level of cognitive complexity of the information students are expected to know is low to moderate (e.g. many tasks may require engagement of some mental processing beyond habitual	

[142] Evidence pool: Learning outcomes
[143] Evidence pool: Learning outcomes, subject content, assessment types

Demand Judgement	Score Descriptors (highlight the best-fit descriptor)	Judgement and Key Evidence
	responses, including comparison and basic reasoning – knowledge application).	
	Level 2 – Most topics are studied in considerable detail. Considerable pre-requisite knowledge is required in order to grasp ideas in some topics. The level of cognitive complexity of the information students are expected to know is average to high (e.g. some tasks require complex reasoning, planning, using evidence, and a higher level of thinking than the previous two levels. The cognitive demands are often complex and abstract – analysis).	
	Level 3 – All or most topics are studied in very high detail. Considerable pre-requisite knowledge is required in order to grasp ideas in most topics. The level of cognitive complexity of information students are expected to know is mostly high (e.g. many tasks may require complex reasoning, planning, developing, information synthesis, interpretation of data for problem solving, and thinking most likely over an extended period of time – extended thinking).	
Volume of Work[144]	Level 0 – light: small number of themes and sub-themes covered; a significant majority of time is spent on straightforward or basic themes; generous time allocation per theme.	
	Level 1 – moderate: typical number of themes and sub-themes covered; more time spent on conceptually complex themes compared to Level 1 (though majority of time still spent on themes of basic depth); standard time allocation per theme.	
	Level 2 – moderate heavy: typical to high number of themes and sub-themes covered; a significant proportion of time spent on issues beyond basic conceptual depth; standard to short time allocation per theme.	
	Level 3 – heavy: high number of themes and sub-themes covered; a large proportion of time spent on issues	

[144] Evidence pool: Subject content; assessment types and number; course duration; time allocated per topic/subtopic (where available).

Demand Judgement	Score Descriptors (highlight the best-fit descriptor)	Judgement and Key Evidence
	beyond basic conceptual depth; short time allocation per theme.	
Outstanding Areas of Subject Demand[145]	Level 0 – no stretch areas (0)	
	Level 1 – few stretch areas (1-2)	
	Level 2 – a significant number of stretch areas (3-4)	
	Level 3 – a high number of stretch areas (>4)	

[145] Evidence pool: Subject content.

Appendix D

Table 41: Industry-related specialised subjects of the JHSC.[146]

Subject area	Subject	
Agriculture	Agriculture and Environment	Food Production
	Project Study	Food Chemistry
	Comprehensive Practice	Food Microbiology
	Agriculture and Information Technology	Food Distribution
	Crops Production and Management	Plant Biotechnology
	Vegetables Production and Management	Forest Science
	Fruits Production and Management	Forest Management
	Flowering Plants Production and Management	Utilization of Forest Products
	Animal Husbandry Production and Management	Agricultural Civil Engineering Design
	Cultivation and Environment	Agricultural Civil Engineering Work Execution
	Domestication and Environment	Earth's Water Circulation
	Management of Agriculture	Landscape Gardening Planning
	Agricultural Machinery	Landscape Gardening Construction Management
	Utilization of Plants/Animals for Health Promotion	Landscape Gardening Planting
	Utilization of Regional Resources	Surveying
Industry	Fundamentals of Industrial Technology	Architectural Structure
	Project Study	Architectural Planning
	Practice	Architectural Structure Design
	Drawing	Execution of Architectural Works
	Information Technology and Mathematical Science in Industry	Architectural Laws and Regulations
	Industrial Material Technology	Equipment and Facility Planning
	English for Industrial Technology	Air Conditioning Equipment
	Industrial Management Technology	Sanitary and Disaster-prevention Equipment and Facility
	Industrial Environmental Technology	Surveying
	Machine Engineering and Construction	Civil Foundation Mechanics
	Machine Design	Civil Engineering Structure Design
	Prime Movers	Civil Engineering Work
	Basic Mechatronics	Social Infrastructure Engineering
	Technology of Production	Industrial Chemistry
	Automobile Engineering	Chemical Engineering
	Automobile Maintenance	Geo-environmental Chemistry
	Marine Engineering	Material Manufacturing Technology
	Electric Circuit	Industrial Materials Engineering
	Electrical Appliances	Material Processing
	Electric Energy Technology	Ceramic Chemistry
	Electronic Technology	Ceramic Technology
	Electronic Circuit	Ceramic Industry
	Electronic Measurement and Control	Textile Products
	Communication Technology	Textile and Dyeing Technology
	Programming Technology	Textile Design
	Hardware Technology	Interior Planning
	Software Technology	Interior Processing
	Computer System Technology	Interior Elements Production
	Design Materials	Design Theory and Techniques
	History of Design	
Business	Business Fundamentals	Financial Accounting Ⅰ
	Project Study	Financial Accounting Ⅱ

[146] MEXT. (n.d.). *Industry-Related Specialised Subjects.* Available from: https://www.mext.go.jp/content/20230303-mxt_kyoiku02_100014466_002.pdf

Subject area	Subject	
	Comprehensive Practice	Cost Accounting
	Business Communication	Management Accounting
	Marketing	Information Processing
	Product Development and Distribution	Software Application
	Tourism Business	Programming
	Business Management	Network Application
	Global Economics	Network Management
	Business Laws and Regulations	Bookkeeping
Fisheries	Basis of Fisheries and Oceans	Electrical Theory
	Project Study	Mobile Communication Engineering
	Comprehensive Practice	Ocean Communication Technology
	Ocean Information Technology	Fishery Stock Enhancement
	Fisheries and Ocean Science	Ocean Life
	Fishing Industry activity	Ocean Environment
	Navigation and Nautical Instrument	Small Boats
	Ship Operations	Food Manufacture
	Marine Engine	Food Management
	Machinery Design and Engineering	Fishery Marketing
	Marine Sports	Diving
Home Economics	Fundamentals of Living-related Industries	Base of Fashion and Clothes Making
	Project Study	Fashion and Clothes Making
	Information of Living-related Industries	Fashion Design
	Consumers Life	Clothes Handicraft
	Basic Childcare	Food Design
	Practical Childcare	Food Culture
	Life and Welfare	Cooking
	Housing and Interior Design	Nutrition
	Culture of Clothing	Foodstuff
	Public Health	Foods Sanitation
	Practical Cooking	
Nursing	Basic Nursing	Pediatric Nursing
	Human Body Structure and Function	Maternal Nursing
	Promotion of Disease Formation and Recovery	Psychiatry Nursing
	Health Support and Social Security System	Home Care Nursing
	Adult Nursing	Integration and Practice of Nursing
	Gerontological Nursing	Nursing Clinical Practice
	Nursing Information	
Informatics	Information Industry and Society	Network System
	Project Study	Database
	Expression and Manage Information	Information Design
	Information Technology	Contents Creation and Delivery
	Information Security	Media and Services
	Programming of Information Systems	Information Practice
Welfare	Fundamentals of Social Welfare	Care Process
	Fundamentals of Social Care	Case Study of Social Care
	Skills for Communication	Care Practice
	Skills for Lifestyle Support	Understanding Mental and Physical
	Welfare and Information Technology	