

The International Baccalaureate® Diploma Programme, for students aged 16 to 19, is an academically challenging and balanced programme of education that prepares students for success at university and life beyond. Students take courses in six different subject groups, maintaining both breadth and depth of study. Language A: literature higher level is in group 1, studies in language and literature. In addition, three core elements—the extended essay, theory of knowledge and creativity, action, service—are compulsory and central to the philosophy of the programme.

**About the IB:** For over 40 years the IB has built a reputation for high-quality, challenging programmes of education that develop internationally minded young people who are well prepared for the challenges of life in the 21st century and able to contribute to creating a better, more peaceful world.

The IB subject briefs illustrate key course components in the IB Diploma Programme.

I. Course description and aims

III. Assessment model

II. Curriculum model overview

## Overview of the language A: literature higher level course and curriculum model

### I. Course description and aims

The IB Diploma Programme language A: literature course develops understanding of the techniques involved in literary criticism and promotes the ability to form independent literary judgments. In language A: literature, the formal analysis of texts and wide coverage of a variety of literature—both in the language of the subject and in translated texts from other cultural domains—is combined with a study of the way literary conventions shape responses to texts.

Students completing this course will have a thorough knowledge of a range of texts and an understanding of other cultural perspectives. They will also have developed skills of analysis and the ability to support an argument in clearly expressed writing, sometimes at significant length. This course will enable them to succeed in a wide range of university courses, particularly in literature but also in subjects such as philosophy, law and language.

Texts studied are chosen from the prescribed literature in translation (PLT) list and the prescribed list of authors (PLA) or elsewhere. The PLT list is a wide-ranging list of works in translation, from a variety of languages, allowing teachers to select works in a language different from the language of the examination. The PLA lists authors from the language of the examination. The authors on the list are appropriate for students aged 16 to 19.

All group 1 courses are suitable for students experienced in using a language in an academic context. It is also recognized that students have language backgrounds that vary significantly. For one student the target language may be his or her only proficient language; another student may have a complex language profile and competence in more than one language. While students in the group 1 courses will undergo significant development in their ability to use language for a range of purposes, these are not language-acquisition courses. In group 1, it is assumed that students are highly competent in the target language, whether or not it is their mother tongue.

The aims of the language A: literature course at both higher and standard levels are to:

- encourage a personal appreciation of literature and develop an understanding of the techniques involved in literary criticism
- develop the students' powers of expression, both in oral and written communication, and provide the opportunity of practising and developing the skills involved in writing and speaking in a variety of styles and situations
- introduce students to a range of literary works of different periods, genres, styles and contexts
- broaden the students' perspective through the study of works from other cultures and languages
- introduce students to ways of approaching and studying literature, leading to the development of an understanding and appreciation of the relationships between different works
- develop the ability to engage in close, detailed analysis of written text
- promote in students an enjoyment of, and lifelong interest in, literature.

### II. Curriculum model overview

#### Language A: literature higher level

Components		
<i>Works in translation</i>	Study of three works All works are chosen from the titles in the prescribed literature in translation list.	65 hours
<i>Detailed study</i>	Study of three works All works are chosen from the prescribed list of authors for the language being studied, each from a different genre.	65 hours
<i>Literary genres</i>	Study of four works All works are chosen from the prescribed list of authors for the language being studied, chosen from the same genre.	65 hours
<i>Options</i>	Study of three works Works are freely chosen in any combination.	45 hours
<b>Total teaching hours</b>		<b>240 hours</b>

### III. Assessment model

#### Assessment for language A: literature higher level

The IB assesses student work as direct evidence of achievement against the stated goals of the Diploma Programme courses, which are to provide students with:

- a broad and balanced, yet academically demanding, programme of study
- the development of critical-thinking and reflective skills
- the development of research skills
- the development of independent learning skills
- the development of intercultural understanding
- a globally recognized university entrance qualification.

Students' success in the language A: literature higher level course is measured by combining their grades on external and internal assessment.

Students must demonstrate their ability to provide literary commentary about prose and poetry, both in written form and orally.

#### Assessment at a glance

Type of assessment	Format of assessment	Time (hours)	Weighting of final grade (%)
<b>External</b>			<b>70</b>
<i>Paper 1</i>	Literary commentary and analysis of one unseen text	2	20
<i>Paper 2</i>	Essay on at least two works studied	2	25
<i>Written assignment</i>	Reflective statement and literary essay on one work studied		25
<b>Internal</b>			<b>30</b>
<i>Oral work</i>	Formal oral commentary and interview (20 minutes)		15
	Individual oral presentation (10-15 minutes)		15



[www.ibo.org](http://www.ibo.org)

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# International Baccalaureate Diploma Programme Subject Brief

## Language B

First assessment 2020

The Diploma Programme (DP) is a rigorous pre-university course of study designed for students in the 16 to 19 age range. It is a broad-based two-year course that aims to encourage students to be knowledgeable and inquiring, but also caring and compassionate. There is a strong emphasis on encouraging students to develop intercultural understanding, open-mindedness, and the attitudes necessary for them to respect and evaluate a range of points of view.

The course is presented as six academic areas enclosing a central core. Students study two modern languages (or a modern language and a classical language), a humanities or social science subject, an experimental science, mathematics and one of the creative arts. Instead of an arts subject, students can choose two subjects from another area. It is this comprehensive range of subjects that makes the Diploma Programme a demanding course of study designed to prepare students effectively for university entrance. In each of the academic areas students have flexibility in making their choices, which means they can choose subjects that particularly interest them and that they may wish to study further at university.

Normally, three subjects (and not more than four) are taken at higher level (HL), and the others are taken at standard level (SL). The IB recommends 240 teaching hours for HL subjects and 150 hours for SL. Subjects at HL are studied in greater depth and breadth than at SL.

In addition, three core elements—the extended essay, theory of knowledge and creativity, activity, service—are compulsory and central to the philosophy of the programme.

This IB DP subject brief has four key components:

I. Course description and aims

II. Curriculum model overview

III. Assessment model

IV. Content outline



## I. Course description and aims

Language acquisition consists of two modern language courses—language ab initio and language B—designed to provide students with the necessary skills and intercultural understanding to enable them to communicate successfully in an environment where the language studied is spoken.

Language B is a language acquisition course designed for students with some previous experience of the target language. Students further develop their ability to communicate through the study of language, themes and texts. There are five prescribed themes: identities, experiences, human ingenuity, social organization and sharing the planet.

Both language B SL and HL students learn to communicate in the target language in familiar and unfamiliar contexts. The distinction between language B SL and HL can be seen in the level of competency the student is expected to develop in receptive, productive and interactive skills.

At HL the study of two literary works originally written in the target language is required and students are expected to extend the range and complexity of the language they use and understand in order to communicate. Students continue to develop their knowledge of

vocabulary and grammar, as well as their conceptual understanding of how language works, in order to construct, analyse and evaluate arguments on a variety of topics relating to course content and the target language culture(s).

The following language acquisition aims are common to both language ab initio and language B.

- Develop international-mindedness through the study of languages, cultures, and ideas and issues of global significance.
- Enable students to communicate in the language they have studied in a range of contexts and for a variety of purposes.
- Encourage, through the study of texts and through social interaction, an awareness and appreciation of a variety of perspectives of people from diverse cultures.
- Develop students' understanding of the relationship between the languages and cultures with which they are familiar.
- Develop students' awareness of the importance of language in relation to other areas of knowledge.
- Provide students, through language learning and the process of inquiry, with opportunities for intellectual engagement and the development of critical- and creative-thinking skills.

- Provide students with a basis for further study, work and leisure through the use of an additional language.
- Foster curiosity, creativity and a lifelong enjoyment of language learning.

## II. Curriculum model overview

The curriculum is organized around five prescribed themes with which the students engage through written, audio, visual and audio-visual texts.

Students develop into successful, effective communicators by considering the conceptual understandings of context, audience, purpose, meaning and variation.

Communication is evidenced through receptive, productive and interactive skills.

## III. Assessment model

The language acquisition assessment objectives are common to both language ab initio and language B.

- Communicate clearly and effectively in a range of contexts and for a variety of purposes.
- Understand and use language appropriate to a range of interpersonal and/or intercultural contexts and audiences.
- Understand and use language to express and respond to a range of ideas with fluency and accuracy.
- Identify, organize and present ideas on a range of topics.
- Understand, analyse and reflect upon a range of written, audio, visual and audio-visual texts.

## Assessment at a glance

Language B SL and HL assessment outline		Weighting
External 75%	<b>Paper 1</b> (productive skills) One writing task from a choice of three  Writing—30 marks	25%
	<b>Paper 2</b> (receptive skills) Separate sections for listening and reading  Listening—25 marks Reading—40 marks	25% 25%
Internal 25%	<b>Individual oral assessment</b>  30 marks	25%

The assessment outlines for language B SL and HL are identical; it is the nature of the assessment that differs and this is what distinguishes SL assessments from those of HL.

For language B HL paper 1, the tasks set will require more complex language and structures and demand higher-order thinking skills. Additionally for HL, a higher word range has been provided in order to accommodate the more complex responses required.

For the individual oral internal assessment, the stimulus at language B SL is a visual image that is clearly relevant to one (or more) of the themes of the course. The stimulus at language B HL is an excerpt from one of the two literary works studied.

## IV. Content outline

Theme	Guiding principle	Optional recommended topics		Possible questions
<b>Identities</b>	Explore the nature of the self and what it is to be human.	<ul style="list-style-type: none"> <li>• Lifestyles</li> <li>• Health and well-being</li> <li>• Beliefs and values</li> </ul>	<ul style="list-style-type: none"> <li>• Subcultures</li> <li>• Language and identity</li> </ul>	<ul style="list-style-type: none"> <li>• What constitutes an identity?</li> <li>• How do language and culture contribute to form our identity?</li> </ul>
<b>Experiences</b>	Explore and tell the stories of the events, experiences and journeys that shape our lives.	<ul style="list-style-type: none"> <li>• Leisure activities</li> <li>• Holidays and travel</li> <li>• Life stories</li> </ul>	<ul style="list-style-type: none"> <li>• Rites of passage</li> <li>• Customs and traditions</li> <li>• Migration</li> </ul>	<ul style="list-style-type: none"> <li>• How does our past shape our present and our future?</li> <li>• How and why do different cultures mark important moments in life?</li> </ul>
<b>Human ingenuity</b>	Explore the ways in which human creativity and innovation affect our world.	<ul style="list-style-type: none"> <li>• Entertainment</li> <li>• Artistic expressions</li> <li>• Communication and media</li> </ul>	<ul style="list-style-type: none"> <li>• Technology</li> <li>• Scientific innovation</li> </ul>	<ul style="list-style-type: none"> <li>• What can we learn about a culture through its artistic expression?</li> <li>• How do the media change the way we relate to each other?</li> </ul>
<b>Social organization</b>	Explore the ways in which groups of people organize themselves, or are organized, through common systems or interests.	<ul style="list-style-type: none"> <li>• Social relationships</li> <li>• Community</li> <li>• Social engagement</li> </ul>	<ul style="list-style-type: none"> <li>• Education</li> <li>• The working world</li> <li>• Law and order</li> </ul>	<ul style="list-style-type: none"> <li>• What is the individual's role in the community?</li> <li>• What role do rules and regulations play in the formation of a society?</li> </ul>
<b>Sharing the planet</b>	Explore the challenges and opportunities faced by individuals and communities in the modern world.	<ul style="list-style-type: none"> <li>• The environment</li> <li>• Human rights</li> <li>• Peace and conflict</li> <li>• Equality</li> </ul>	<ul style="list-style-type: none"> <li>• Globalization</li> <li>• Ethics</li> <li>• Urban and rural environment</li> </ul>	<ul style="list-style-type: none"> <li>• What environmental and social issues present challenges to the world, and how can these challenges be overcome?</li> <li>• What challenges and benefits does globalization bring?</li> </ul>

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# International Baccalaureate Diploma Programme Subject Brief

## Individuals and societies: History—higher level

First assessments 2017—last assessments 2025

The Diploma Programme (DP) is a rigorous pre-university course of study designed for students in the 16 to 19 age range. It is a broad-based two-year course that aims to encourage students to be knowledgeable and inquiring, but also caring and compassionate. There is a strong emphasis on encouraging students to develop intercultural understanding, open-mindedness, and the attitudes necessary for them to respect and evaluate a range of points of view.

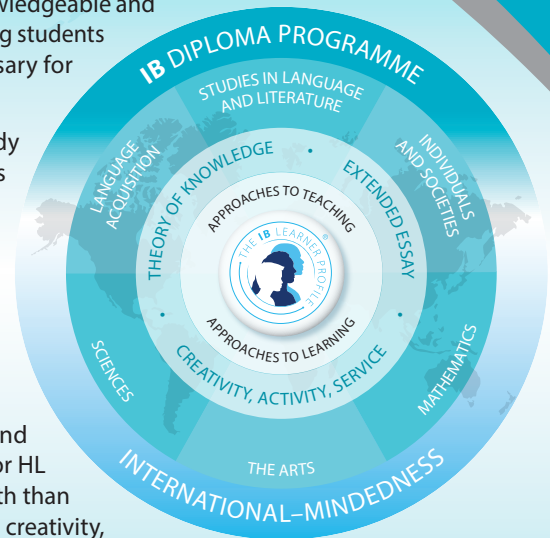
The course is presented as six academic areas enclosing a central core. Students study two modern languages (or a modern language and a classical language), a humanities or social science subject, an experimental science, mathematics and one of the creative arts. Instead of an arts subject, students can choose two subjects from another area. It is this comprehensive range of subjects that makes the Diploma Programme a demanding course of study designed to prepare students effectively for university entrance. In each of the academic areas students have flexibility in making their choices, which means they can choose subjects that particularly interest them and that they may wish to study further at university.

Normally, three subjects (and not more than four) are taken at higher level (HL), and the others are taken at standard level (SL). The IB recommends 240 teaching hours for HL subjects and 150 hours for SL. Subjects at HL are studied in greater depth and breadth than at SL. In addition, three core elements—the extended essay, theory of knowledge and creativity, activity, service—are compulsory and central to the philosophy of the programme.

These DP subject briefs illustrate four key course components.

- I. Course description and aims
- II. Curriculum model overview

- III. Assessment model
- IV. Sample questions



## I. Course description and aims

The DP history course is a world history course based on a comparative and multi-perspective approach to history. It involves the study of a variety of types of history, including political, economic, social and cultural, and provides a balance of structure and flexibility.

The course emphasizes the importance of encouraging students to think historically and to develop historical skills as well as gaining factual knowledge. It puts a premium on developing the skills of critical thinking, and on developing an understanding of multiple interpretations of history. In this way, the course involves a challenging and demanding critical exploration of the past. Teachers explicitly teach thinking and re-search skills such as comprehension, text analysis, transfer, and use of primary sources.

There are six key concepts that have particular prominence throughout the DP history course: change, continuity, causation, consequence, significance and perspectives.

The aims of the DP history course are to enable students to:

- develop an understanding of, and continuing interest in, the past
- encourage students to engage with multiple perspectives and to appreciate the complex nature of historical concepts, issues, events and developments
- promote international-mindedness through the study of history from more than one region of the world

- develop an understanding of history as a discipline and to develop historical consciousness including a sense of chronology and context, and an understanding of different historical perspectives
- develop key historical skills, including engaging effectively with sources
- increase students' understanding of themselves and of contemporary society by encouraging reflection on the past.

## II. Curriculum model overview

Component	Recommended teaching hours
<b>Prescribed subjects</b> <i>One of the following, using two case studies, each taken from a different region of the world:</i> <ol style="list-style-type: none"> <li>1. Military leaders</li> <li>2. Conquest and its impact</li> <li>3. The move to global war</li> <li>4. Rights and protest</li> <li>5. Conflict and intervention</li> </ol>	40

<b>World history topics</b> <i>Two of the following, using topic examples from more than one region of the world:</i> <ol style="list-style-type: none"> <li>Society and economy (750–1400)</li> <li>Causes and effects of wars (750–1500)</li> <li>Dynasties and rulers (750–1500)</li> <li>Societies in transition (1400–1700)</li> <li>Early Modern states (1450–1789)</li> <li>Causes and effects of Early Modern wars (1500–1750)</li> <li>Origins, development and impact of industrialization (1750–2005)</li> <li>Independence movements (1800–2000)</li> <li>Emergence and development of democratic states (1848–2000)</li> <li>Authoritarian states (20th century)</li> <li>Causes and effects of 20th-century wars</li> <li>The Cold War: Superpower tensions and rivalries (20th century)</li> </ol>	90
<b>HL options: Depth studies</b> <i>One of the following:</i> <ol style="list-style-type: none"> <li>History of Africa and the Middle East</li> <li>History of the Americas</li> <li>History of Asia and Oceania</li> <li>History of Europe</li> </ol>	90
<b>Internal assessment</b> Historical investigation	20

### III. Assessment model

There are four assessment objectives for the DP history course. Having followed the course at higher level (HL), students will be expected to meet the following objectives.

#### Assessment objective 1: Knowledge and understanding

- Demonstrate detailed, relevant and accurate historical knowledge.
- Demonstrate understanding of historical concepts and context.
- Demonstrate understanding of historical sources.

#### Assessment objective 2: Application and analysis

- Formulate clear and coherent arguments.
- Use relevant historical knowledge to effectively support analysis.
- Analyse and interpret a variety of sources.

#### Assessment objective 3: Synthesis and evaluation

- Integrate evidence and analysis to produce a coherent response.
- Evaluate different perspectives on historical issues and events, and integrate this evaluation effectively into a response.
- Evaluate sources as historical evidence, recognizing their value and limitations.
- Synthesize information from a selection of relevant sources.

#### Assessment objective 4: Use and application of appropriate skills

- Structure and develop focused essays that respond effectively to the demands of a question.
- Reflect on the methods used by, and challenges facing, the historian.
- Formulate an appropriate, focused question to guide a historical inquiry.
- Demonstrate evidence of research skills, organization, reference and selection of appropriate sources.

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### Assessment at a glance

Type of assessment	Format of assessment	Time (hours)	Weighting of final grade (%)
<b>External</b>		5	80
Paper 1	Source-based paper based on the five prescribed subjects	1	20
Paper 2	Essay paper based on the 12 world history topics	1.5	25
Paper 3	Essay paper based on one of the four regional options	2.5	35
<b>Internal</b>			
Historical investigation	A historical investigation into a topic of the student's choice.	20	20

### IV. Sample questions

#### Paper 1

When presented with five sources related to the enforcements of the provisions of the treaties, disarmament and London Naval Conference (1930), students will:

- explain the significance of the Conference
- compare and contrast the views of the Conference presented in different sources
- assess the value and limitations of sources
- use the sources and their own knowledge to discuss the extent to which they agree with the view that the London Naval Conference was unsuccessful.

# International Baccalaureate Diploma Programme Subject Brief

## Individuals and societies: Psychology

First assessment 2019

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The course is presented as six academic areas enclosing a central core. Students study two modern languages (or a modern language and a classical language), a humanities or social science subject, an experimental science, mathematics and one of the creative arts. Instead of an arts subject, students can choose two subjects from another area. It is this comprehensive range of subjects that makes the Diploma Programme a demanding course of study designed to prepare students effectively for university entrance. In each of the academic areas students have flexibility in making their choices, which means they can choose subjects that particularly interest them and that they may wish to study further at university.

Normally, three subjects (and not more than four) are taken at higher level (HL), and the others are taken at standard level (SL). The IB recommends 240 teaching hours for HL subjects and 150 hours for SL. Subjects at HL are studied in greater depth and breadth than at SL.

In addition, three core elements—the extended essay, theory of knowledge and creativity, activity, service—are compulsory and central to the philosophy of the programme.

This IB DP subject brief has four key components:

- I. Course description and aims
- II. Curriculum model overview
- III. Assessment model
- IV. Sample questions



### I. Course description and aims

At the core of the DP psychology course is an introduction to three different approaches to understanding behaviour: the biological, cognitive and sociocultural approaches. Students study and critically evaluate the knowledge, concepts, theories and research that have developed the understanding in these fields.

The interaction of these approaches to studying psychology forms the basis of a holistic and integrated approach to understanding mental processes and behaviour as a complex, dynamic phenomenon, allowing students to appreciate the diversity as well as the commonality between their own behaviour and that of others.

The contribution and the interaction of the three approaches is understood through the four options in the course, focusing on areas of applied psychology: abnormal psychology, developmental psychology, health psychology, and the psychology of relationships. The options provide an opportunity to take what is learned from the study of the approaches to psychology and apply it to specific lines of inquiry.

Psychologists employ a range of research methods, both qualitative and quantitative, to test their observations and hypotheses. DP psychology promotes an understanding of the various approaches to research and how they are used to critically reflect on the evidence as well as assist in the design, implementation, analysis and evaluation of the students'

own investigations. Surrounding the approaches and the options are the overarching themes of research and ethics. A consideration of both is paramount to the nature of the subject.

The aims of the psychology course at SL and at HL are to:

- develop an understanding of the biological, cognitive and socio-cultural factors affecting mental processes and behaviour
- apply an understanding of the biological, cognitive and sociocultural factors affecting mental processes and behaviour to at least one applied area of study
- understand diverse methods of inquiry
- understand the importance of ethical practice in psychological research in general and observe ethical practice in their own inquiries
- ensure that ethical practices are upheld in all psychological inquiry and discussion
- develop an awareness of how psychological research can be applied to address real-world problems and promote positive change
- provide students with a basis for further study, work and leisure through the use of an additional language
- foster curiosity, creativity and a lifelong enjoyment of language learning.

## II. Curriculum model overview

Syllabus component	Teaching hours	
	SL	HL
<b>Core</b> <ul style="list-style-type: none"> <li>Biological approach to understanding behaviour</li> <li>Cognitive approach to understanding behaviour</li> <li>Sociocultural approach to understanding behaviour</li> <li>Approaches to researching behaviour</li> </ul>	90	120
<b>Options</b> <ul style="list-style-type: none"> <li>Abnormal psychology</li> <li>Developmental psychology</li> <li>Health psychology</li> <li>Psychology of human relationships</li> </ul>	20	40
<b>Internal assessment</b> Experimental study	20	20
<b>Total teaching hours</b>	150	240

## III. Assessment model

By the end of the psychology course at SL or at HL, students will be expected to demonstrate the following.

- Knowledge and comprehension of specified content
  - Demonstrate knowledge and comprehension of:
    - key terms and concepts in psychology
    - a range of psychological theories and studies
    - the biological, cognitive and sociocultural approaches to mental processes and behaviour
    - research methods used in psychology.
- Application and analysis
  - Demonstrate an ability to use examples of psychological research and psychological concepts to formulate an argument in response to a specific question.
  - Demonstrate application and analysis of:
    - a range of psychological theories and research studies
    - the knowledge relevant to areas of applied psychology.
  - At HL only, analyse qualitative and quantitative research in psychology.
- Synthesis and evaluation
  - Evaluate the contribution of:
    - psychological theories to understanding human psychology
    - research to understanding human psychology
    - the theories and research in areas of applied psychology.
  - At HL only, evaluate research scenarios from a methodological and ethical perspective.

- Selection and use of skills appropriate to psychology
  - Demonstrate the acquisition of skills required for experimental design, data collection and presentation, data analysis and the evaluation of a simple experiment while demonstrating ethical practice.
  - Work in a group to design a method for a simple experimental investigation, organize the investigation and record the required data for a simple experiment.
  - Write a report of a simple experiment.

## Assessment at a glance

Type of assessment	Format of assessment	Time (hours)		Weighting of final grade (%)	
		SL	HL	SL	HL
External		3	5	75	80
Paper 1	Three short answer questions on the core. One essay from a choice of three on the biological, cognitive and sociocultural approaches. <b>HL only:</b> essays will reference additional HL topic.	2	2	50	40
Paper 2	<b>SL:</b> one question from a choice of three on one option. <b>HL:</b> two questions; one each from a choice of three on two options.	1	2	25	20
Paper 3	Three short answer questions on approaches to research.		1		20
Internal		20	20	25	20
Experimental study	A report on an experimental study undertaken by the student.	20	20	25	20

## IV. Sample questions

- Outline one study investigating schema.
- Discuss ethical considerations linked to genetic research into human behaviour.
- (HL only)** Discuss how the use of technology affects one cognitive process.

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# International Baccalaureate Diploma Programme Subject Brief

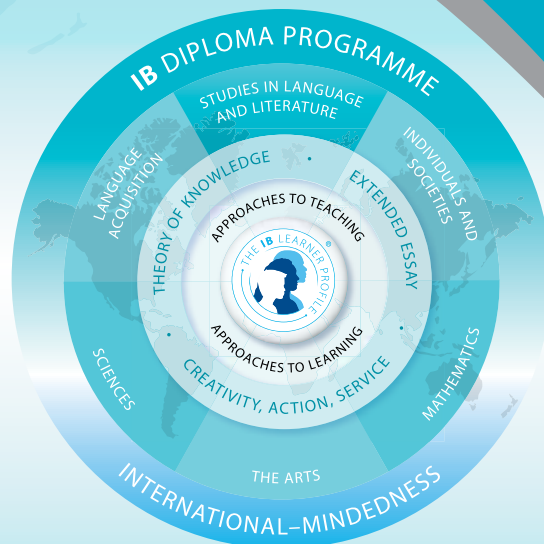
Sciences:

Biology—Higher level

First assessments 2016 – Last assessments 2022

The IB Diploma Programme (DP) is a rigorous, academically challenging and balanced programme of education designed to prepare students aged 16 to 19 for success at university and life beyond. The DP aims to encourage students to be knowledgeable, inquiring, caring and compassionate, and to develop intercultural understanding, open-mindedness and the attitudes necessary to respect and evaluate a range of viewpoints. Approaches to teaching and learning (ATL) within the DP are deliberate strategies, skills and attitudes that permeate the teaching and learning environment. In the DP students develop skills from five ATL categories: thinking, research, social, self-management and communication.

To ensure both breadth and depth of knowledge and understanding, students must choose at least one subject from five groups: 1) their best language, 2) additional language(s), 3) social sciences, 4) experimental sciences, and 5) mathematics. Students may choose either an arts subject from group 6, or a second subject from groups 1 to 5. At least three and not more than four subjects are taken at higher level (240 recommended teaching hours), while the remaining are taken at standard level (150 recommended teaching hours). In addition, three core elements—the extended essay, theory of knowledge and creativity, action, service—are compulsory and central to the philosophy of the programme.



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- II. Curriculum model overview

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- IV. Sample questions

## I. Course description and aims

Biology is the study of life. The vast diversity of species makes biology both an endless source of fascination and a considerable challenge. Biologists attempt to understand the living world at all levels from the micro to the macro using many different approaches and techniques. Biology is still a young science and great progress is expected in the 21st century. This progress is important at a time of growing pressure on the human population and the environment.

By studying biology in the DP students should become aware of how scientists work and communicate with each other. While the scientific method may take on a wide variety of forms, it is the emphasis on a practical approach through experimental work that characterizes the sciences. Teachers provide students with opportunities to design investigations, collect data, develop manipulative skills, analyse results, collaborate with peers and evaluate and communicate their findings.

Through the overarching theme of the nature of science, the aims of the DP biology course are to enable students to:

1. appreciate scientific study and creativity within a global context through stimulating and challenging opportunities
2. acquire a body of knowledge, methods and techniques that characterize science and technology
3. apply and use a body of knowledge, methods and techniques that characterize science and technology
4. develop an ability to analyse, evaluate and synthesize scientific information
5. develop a critical awareness of the need for, and the value of, effective collaboration and communication during scientific activities

6. develop experimental and investigative scientific skills including the use of current technologies
7. develop and apply 21st century communication skills in the study of science
8. become critically aware, as global citizens, of the ethical implications of using science and technology
9. develop an appreciation of the possibilities and limitations of science and technology
10. develop an understanding of the relationships between scientific disciplines and their influence on other areas of knowledge.

## II. Curriculum model overview

Component	Recommended teaching hours
<b>Core</b>	<b>95</b>
1. Cell biology	15
2. Molecular biology	21
3. Genetics	15
4. Ecology	12
5. Evolution and biodiversity	12
6. Human physiology	20
<b>Additional higher level</b>	<b>60</b>
7. Nucleic acids	9
8. Metabolism, cell respiration and photosynthesis	14
9. Plant biology	13
10. Genetics and evolution	8
11. Animal physiology	16

<b>Option (Choice of one out of four)</b>	<b>25</b>
A. Neurobiology and behaviour	25
B. Biotechnology and bioinformatics	25
C. Ecology and conservation	25
D. Human physiology	25
<b>Practical scheme of work</b>	<b>60</b>
Prescribed and other practical activities	40
Individual investigation	10
Group 4 project	10

## The group 4 project

The group 4 project is a collaborative activity where students from different group 4 subjects, within or between schools, work together. It allows for concepts and perceptions from across disciplines to be shared while appreciating the environmental, social and ethical implications of science and technology. It can be practically or theoretically based and aims to develop an understanding of the relationships between scientific disciplines and their influence on other areas. The emphasis is on interdisciplinary cooperation and the scientific processes

## III. Assessment model

It is the intention of this course that students are able to fulfill the following assessment objectives:

- Demonstrate knowledge and understanding of:
  - facts, concepts, and terminology
  - methodologies and techniques
  - communicating scientific information.
- Apply:
  - facts, concepts, and terminology
  - methodologies and techniques
  - methods of communicating scientific information.
- Formulate, analyse and evaluate:
  - hypotheses, research questions and predictions
  - methodologies and techniques
  - primary and secondary data
  - scientific explanations.
- Demonstrate the appropriate research, experimental, and personal skills necessary to carry out insightful and ethical investigations.

## Assessment at a glance

Type of assessment	Format of assessment	Time (hours)	Weighting of final grade (%)
External		4.5	80
Paper 1	40 multiple-choice questions	1	20
Paper 2	Data-based, short answer and extended response questions	2.25	36
Paper 3	Data-based, short answer and extended response questions	1.25	24
Internal		10	20
Individual investigation	Investigation and write-up of 6 to 12 pages	10	20

## IV. Sample questions

- Membrane proteins of mice cells were marked with green and membrane proteins of human cells were marked with red. The cells were fused together. What would be seen after two hours? (Paper 1)
- The species is the basis for naming and classifying organism.
  - Explain how new species can emerge by
    - directional selection
    - disruptive selection
    - polyploidy.
  - Outline the advantages to scientists of the binomial system for naming species.
  - Describe the use of dichotomous keys for the identification of specimens. (Paper 2)
- Brain death is a clinical diagnosis based on the absence of neurological function, with a known irreversible cause of coma.
  - Explain a named method to assess brain damage.
  - Distinguish between a reflex arc and other responses by the nervous system.
  - Describe the events that occur in the nervous system when something very hot is touched. (Paper 3)

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# International Baccalaureate Diploma Programme Subject Brief

Sciences:

Chemistry—Higher level

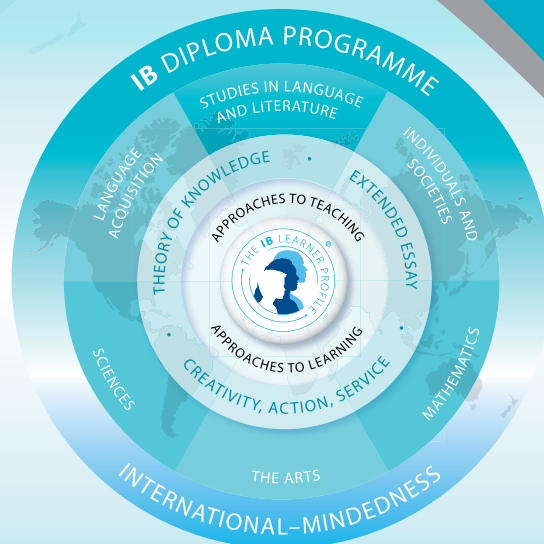
First assessments 2016 – Last assessments 2022

The IB Diploma Programme (DP) is a rigorous, academically challenging and balanced programme of education designed to prepare students aged 16 to 19 for success at university and life beyond. The DP aims to encourage students to be knowledgeable, inquiring, caring and compassionate, and to develop intercultural understanding, open-mindedness and the attitudes necessary to respect and evaluate a range of viewpoints. Approaches to teaching and learning (ATL) within the DP are deliberate strategies, skills and attitudes that permeate the teaching and learning environment. In the DP students develop skills from five ATL categories: thinking, research, social, self-management and communication.

To ensure both breadth and depth of knowledge and understanding, students must choose at least one subject from five groups: 1) their best language, 2) additional language(s), 3) social sciences, 4) experimental sciences, and 5) mathematics. Students may choose either an arts subject from group 6, or a second subject from groups 1 to 5. At least three and not more than four subjects are taken at higher level (240 recommended teaching hours), while the remaining are taken at standard level (150 recommended teaching hours). In addition, three core elements—the extended essay, theory of knowledge and creativity, action, service—are compulsory and central to the philosophy of the programme.

These IB DP subject briefs illustrate four key course components.

- I. Course description and aims
- II. Curriculum model overview



- III. Assessment model
- IV. Sample questions

## I. Course description and aims

Chemistry is an experimental science that combines academic study with the acquisition of practical and investigational skills. Chemical principles underpin both the physical environment in which we live and all biological systems. Chemistry is often a prerequisite for many other courses in higher education, such as medicine, biological science and environmental science.

Both theory and practical work should be undertaken by all students as they complement one another naturally, both in school and in the wider scientific community. The DP chemistry course allows students to develop a wide range of practical skills and to increase facility in the use of mathematics. It also allows students to develop interpersonal and information technology skills, which are essential to life in the 21st century.

By studying chemistry students should become aware of how scientists work and communicate with each other. While the scientific method may take on a wide variety of forms, it is the emphasis on a practical approach through experimental work that characterizes the subject.

Teachers provide students with opportunities to develop manipulative skills, design investigations, collect data, analyse results and evaluate and communicate their findings.

Through the overarching theme of the nature of science, the aims of the DP chemistry course are to enable students to:

1. appreciate scientific study and creativity within a global context through stimulating and challenging opportunities
2. acquire a body of knowledge, methods and techniques that characterize science and technology
3. apply and use a body of knowledge, methods and techniques that

characterize science and technology

4. develop an ability to analyse, evaluate and synthesize scientific information
5. develop a critical awareness of the need for, and the value of, effective collaboration and communication during scientific activities
6. develop experimental and investigative scientific skills including the use of current technologies
7. develop and apply 21st century communication skills in the study of science
8. become critically aware, as global citizens, of the ethical implications of using science and technology
9. develop an appreciation of the possibilities and limitations of science and technology
10. develop an understanding of the relationships between scientific disciplines and their influence on other areas of knowledge.

## II. Curriculum model overview

Component	Recommended teaching hours
<b>Core</b>	<b>95</b>
1. Stoichiometric relationships	13.5
2. Atomic structure	6
3. Periodicity	6
4. Chemical bonding and structure	13.5
5. Energetics/thermochemistry	9
6. Chemical kinetics	7
7. Equilibrium	4.5
8. Acids and bases	6.5
9. Redox processes	8
10. Organic chemistry	11
11. Measurement and data processing	10

<b>Additional higher level (AHL)</b>	<b>60</b>
12. Atomic structure	2
13. The periodic table—the transition metals	4
14. Chemical bonding and structure	7
15. Energetics/thermochemistry	7
16. Chemical kinetics	6
17. Equilibrium	4
18. Acids and bases	10
19. Redox processes	6
20. Organic chemistry	12
21. Measurement and analysis	2
<b>Option (Choice of one out of four)</b>	<b>25</b>
A. Materials	25
B. Biochemistry	25
C. Energy	25
D. Medicinal chemistry	25
<b>Practical scheme of work</b>	<b>60</b>
Prescribed and other practical activities	40
Individual investigation (internally assessed)	10
Group 4 project	10

## The group 4 project

The group 4 project is a collaborative activity where students from different group 4 subjects, within or between schools, work together. It allows for concepts and perceptions from across disciplines to be shared while appreciating the environmental, social and ethical implications of science and technology. It can be practically or theoretically based and aims to develop an understanding of the relationships between scientific disciplines and their influence on other areas of knowledge. The emphasis is on interdisciplinary cooperation and the scientific processes.

## III. Assessment model

Studying this course, students should be able to fulfill the following assessment objectives:

- Demonstrate knowledge and understanding of:
  - facts, concepts, and terminology
  - methodologies and techniques
  - communicating scientific information.
- Apply:
  - facts, concepts, and terminology
  - methodologies and techniques
  - methods of communicating scientific information.
- Formulate, analyse and evaluate:
  - hypotheses, research questions and predictions
  - methodologies and techniques
  - primary and secondary data
  - scientific explanations.

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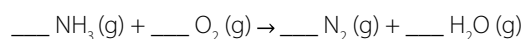
- Demonstrate the appropriate research, experimental, and personal skills necessary to carry out insightful and ethical investigations.

## Assessment at a glance

Type of assessment	Format of assessment	Time (hours)	Weighting of final grade (%)
External		4.5	80
Paper 1	40 multiple-choice questions (Core and AHL)	1	20
Paper 2	Short answer and extended response questions (Core and AHL)	2.25	36
Paper 3	Data- and practical –based questions, plus short answer and extended response questions on the option	1.25	24
Internal		10	20
Individual investigation	Investigation and write-up of 6 to 12 pages	10	20

## IV. Sample questions

- What is the sum of the coefficients when the equation for the combustion of ammonia is balanced using the smallest possible whole numbers?



- 6
- 12
- 14
- 15 (Paper 1)

- The two isomers of  $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$  are crystalline. One of the isomers is widely used in the treatment of cancer.
  - Draw both isomers of the complex,
  - Explain the polarity of each isomer using a diagram of each isomer to support your answer,
  - State a suitable method (other than looking at dipole moments) to distinguish between the two isomers
  - Compare and contrast the bonding types formed by nitrogen in  $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$  (Paper 2)

# International Baccalaureate Diploma Programme Subject Brief

Sciences:

## Computer science – Higher level

First assessments 2014 – Last assessments 2020

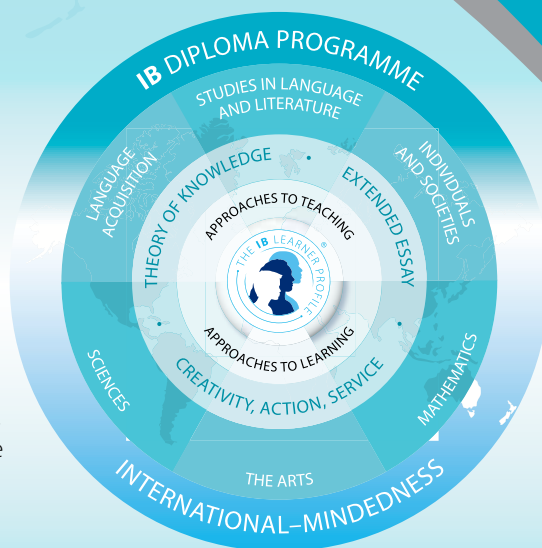
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To ensure both breadth and depth of knowledge and understanding, students must choose at least one subject from five groups: 1) their best language, 2) additional language(s), 3) social sciences, 4) experimental sciences, and 5) mathematics. Students may choose either an arts subject from group 6, or a second subject from groups 1 to 5. At least three and not more than four subjects are taken at higher level (240 recommended teaching hours), while the remaining are taken at standard level (150 recommended teaching hours). In addition, three core elements—the extended essay, theory of knowledge and creativity, action, service—are compulsory and central to the philosophy of the programme.

These IB DP subject briefs illustrate four key course components.

- I. Course description and aims
- II. Curriculum model overview

- III. Assessment model
- IV. Sample questions



## I. Course description and aims

The IB DP computer science HL course requires an understanding of the fundamental concepts of computational thinking as well as knowledge of how computers and other digital devices operate. The course, underpinned by conceptual thinking, draws on a wide spectrum of knowledge, and enables and empowers innovation, exploration and the acquisition of further knowledge. Students study how computer science interacts with and influences cultures, society and how individuals and societies behave, and the ethical issues involved. During the course the student will develop computational solutions. This will involve the ability to:

- identify a problem or unanswered question
- design, prototype and test a proposed solution
- liaise with clients to evaluate the success of the proposed solution and make recommendations for future developments.

The aims of the computer science HL courses are to:

- provide opportunities for study and creativity within a global context that will stimulate and challenge students developing the skills necessary for independent and lifelong learning
- provide a body of knowledge, methods and techniques that characterize computer science
- enable students to apply and use a body of knowledge, methods and techniques that characterize computer science
- demonstrate initiative in applying thinking skills critically to identify and resolve complex problems
- engender an awareness of the need for, and the value of, effective collaboration and communication in resolving complex problems

- develop logical and critical thinking as well as experimental, investigative and problem-solving skills
- develop and apply the students' information and communication technology skills in the study of computer science to communicate information confidently and effectively
- raise awareness of the moral, ethical, social, economic and environmental implications of using science and technology
- develop an appreciation of the possibilities and limitations associated with continued developments in IT systems and computer science
- encourage an understanding of the relationships between scientific disciplines and the overarching nature of the scientific method.

## II. Curriculum model overview

Component	Recommended teaching hours
<b>Core syllabus content</b>	
<b>SL/HL core</b>	80
<ul style="list-style-type: none"> <li>• Topic 1: System fundamentals</li> <li>• Topic 2: Computer organization</li> <li>• Topic 3: Networks</li> <li>• Topic 4: Computational thinking, problem-solving and programming</li> </ul>	
<b>HL extension</b>	45
<ul style="list-style-type: none"> <li>• Topic 5: Abstract data structures</li> <li>• Topic 6: Resource management</li> <li>• Topic 7: Control</li> </ul>	
<b>Case study</b>	30
Additional subject content introduced by the annually issued case study	

<b>Option</b>	
<b>SL/HL core</b>	30
<b>HL extension</b>	15
Students study one of the following options:	
<ul style="list-style-type: none"> <li>• Option A: Databases</li> <li>• Option B: Modelling and simulation</li> <li>• Option C: Web science</li> <li>• Option D: Object-oriented programming (OOP)</li> </ul>	
<b>Internal assessment</b>	
<b>Solution</b>	30
Practical application of skills through the development of a product and associated documentation	
<b>Group 4 project</b>	10

### III. Assessment model

Having followed the computer science higher level course, students will be expected to:

Know and understand:

- relevant facts and concepts
- appropriate methods and techniques
- computer science terminology
- methods of presenting information.

Apply and use:

- relevant facts and concepts
- relevant design methods and techniques
- terminology to communicate effectively
- appropriate communication methods to present information.

Construct, analyse, evaluate and formulate:

- success criteria, solution specifications including task outlines, designs and test plans
- appropriate techniques within a specified solution.

Demonstrate the personal skills of cooperation and perseverance as well as appropriate technical skills for effective problem-solving in developing a specified product.

### Assessment at a glance

Type of assessment	Format of assessment	Time (hours)	Weighting of final grade (%)
External			80
Paper 1	<ul style="list-style-type: none"> <li>• Section A consists of several compulsory short answer questions.</li> <li>• Section B consists of five compulsory structured questions.</li> </ul>	2 hours, 10 min.	40
Paper 2	An examination paper of between three and seven compulsory question; linked to the option studied.	1 hour, 20 min.	20
Paper 3	An examination paper consisting of four compulsory questions based on a pre-seen case study.	1 hour	20
Internal			20
Written commentary	A report of The development of a computational solution. Students must produce: <ul style="list-style-type: none"> <li>• a cover page that follows the prescribed format</li> <li>• a product</li> <li>• supporting documentation (word limit 2,000 words).</li> </ul>	30 hours	25
<b>Group 4 project</b>	To be assessed using the criterion Personal skills.	10 hours	

### IV. Sample questions

- Draw the representation of the binary search tree if the following data were inserted in this order:
  - FALCON, CANARY, PIGEON, TURKEY, OSPREY.
- Discuss the methods used by criminals to hide or disguise certain files. For each method, identify the countermeasures that can be taken by a computer forensic scientist.

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# International Baccalaureate Diploma Programme Subject Brief

Sciences:

Physics—Higher level

First assessments 2016 – Last assessments 2022

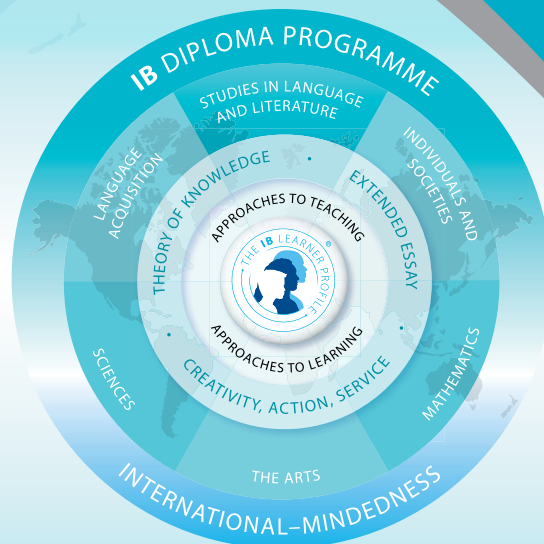
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To ensure both breadth and depth of knowledge and understanding, students must choose at least one subject from five groups: 1) their best language, 2) additional language(s), 3) social sciences, 4) experimental sciences, and 5) mathematics. Students may choose either an arts subject from group 6, or a second subject from groups 1 to 5. At least three and not more than four subjects are taken at higher level (240 recommended teaching hours), while the remaining are taken at standard level (150 recommended teaching hours). In addition, three core elements—the extended essay, theory of knowledge and creativity, action, service—are compulsory and central to the philosophy of the programme.

These IB DP subject briefs illustrate four key course components.

- I. Course description and aims
- II. Curriculum model overview

- III. Assessment model
- IV. Sample questions



## I. Course description and aims

Physics is the most fundamental of the experimental sciences, as it seeks to explain the universe itself, from the very smallest particles to the vast distances between galaxies. Despite the exciting and extraordinary development of ideas throughout the history of physics, observations remain essential to the very core of the subject. Models are developed to try to understand observations, and these themselves can become theories that attempt to explain the observations.

Besides helping us better understand the natural world, physics gives us the ability to alter our environments. This raises the issue of the impact of physics on society, the moral and ethical dilemmas, and the social, economic and environmental implications of the work of physicists.

By studying physics students should become aware of how scientists work and communicate with each other. While the scientific method may take on a wide variety of forms, it is the emphasis on a practical approach through experimental work that characterizes the subject. Teachers provide students with opportunities to develop manipulative skills, design investigations, collect data, analyse results and evaluate and communicate their findings.

Through the overarching theme of the nature of science, the aims of the DP physics course are to enable students to:

1. appreciate scientific study and creativity within a global context through stimulating and challenging opportunities
2. acquire a body of knowledge, methods and techniques that characterize science and technology
3. apply and use a body of knowledge, methods and techniques that characterize science and technology

4. develop an ability to analyse, evaluate and synthesize scientific information
5. develop a critical awareness of the need for, and the value of, effective collaboration and communication during scientific activities
6. develop experimental and investigative scientific skills including the use of current technologies
7. develop and apply 21st century communication skills in the study of science
8. become critically aware, as global citizens, of the ethical implications of using science and technology
9. develop an appreciation of the possibilities and limitations of science and technology
10. develop an understanding of the relationships between scientific disciplines and their influence on other areas of knowledge.

## II. Curriculum model overview

Component	Recommended teaching hours
<b>Core</b>	<b>95</b>
1. Measurements and uncertainties	5
2. Mechanics	22
3. Thermal physics	11
4. Waves	15
5. Electricity and magnetism	15
6. Circular motion and gravitation	5
7. Atomic, nuclear and particle physics	14
8. Energy production	8

<b>Additional higher level</b>	<b>60</b>
9. Wave phenomena	17
10. Fields	11
11. Electromagnetic induction	16
12. Quantum and nuclear physics	16
<b>Option (Choice of one out of four)</b>	<b>25</b>
A. Relativity	25
B. Engineering physics	25
C. Imaging	25
D. Astrophysics	25
<b>Practical scheme of work</b>	<b>60</b>
Prescribed and other practical activities	40
Individual investigation (internally assessed)	10
Group 4 project	10

### The group 4 project

The group 4 project is a collaborative activity where students from different group 4 subjects, within or between schools, work together. It allows for concepts and perceptions from across disciplines to be shared while appreciating the environmental, social and ethical implications of science and technology. It can be practically or theoretically based and aims to develop an understanding of the relationships between scientific disciplines and their influence on other areas of knowledge. The emphasis is on interdisciplinary cooperation and the scientific processes.

### III. Assessment model

It is the intention of this course that students are able to fulfill the following assessment objectives:

- Demonstrate knowledge and understanding of:
  - facts, concepts, and terminology
  - methodologies and techniques
  - communicating scientific information.
- Apply:
  - facts, concepts, and terminology
  - methodologies and techniques
  - methods of communicating scientific information.
- Formulate, analyse and evaluate:
  - hypotheses, research questions and predictions
  - methodologies and techniques
  - primary and secondary data
  - scientific explanations.
- Demonstrate the appropriate research, experimental, and personal skills necessary to carry out insightful and ethical investigations.

### Assessment at a glance

Type of assessment	Format of assessment	Time (hours)	Weighting of final grade (%)
External		4.5	80
Paper 1	40 multiple-choice questions	1	20
Paper 2	Short answer and extended response questions (Core and AHL)	2.25	36
Paper 3	Data- and practical-based questions plus, short answer and extended response questions on the option	1.25	24
Internal		10	20
Individual investigation	Investigation and write-up of 6 to 12 pages	10	20

### IV. Sample questions

- Why is wave-particle duality used in describing the properties of light?
  - Light is both a wave and a particle
  - Both wave and particle models can explain all the properties of light
  - Different properties of light can be more clearly explained by using one of the wave or particle models
  - Scientists feel more confident when using more than one model to explain a phenomenon (Paper 1)
- The tower is 120m high with an internal diameter of 3.5m. When most of the air has been removed, the pressure in the tower is 0.96 Pa. Determine the number of molecules of air in the tower when the temperature of the air is 300 K. (Paper 2)
- The streamlines above the airfoil are closer to each other than the streamlines below the airfoil. Suggest why this implies that the speed of the air above the airfoil is greater than the speed of air below the airfoil. (Paper 3)

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# International Baccalaureate Diploma Programme Subject Brief

## Mathematics: analysis and approaches

First assessments for SL and HL—2021

The Diploma Programme (DP) is a rigorous pre-university course of study designed for students in the 16 to 19 age range. It is a broad-based two-year course that aims to encourage students to be knowledgeable and inquiring, but also caring and compassionate. There is a strong emphasis on encouraging students to develop intercultural understanding, open-mindedness, and the attitudes necessary for them to respect and evaluate a range of points of view.

The course is presented as six academic areas enclosing a central core. Students study two modern languages (or a modern language and a classical language), a humanities or social science subject, an experimental science, mathematics and one of the creative arts. Instead of an arts subject, students can choose two subjects from another area. It is this comprehensive range of subjects that makes the Diploma Programme a demanding course of study designed to prepare students effectively for university entrance. In each of the academic areas students have flexibility in making their choices, which means they can choose subjects that particularly interest them and that they may wish to study further at university.

Normally, three subjects (and not more than four) are taken at higher level (HL), and the others are taken at standard level (SL). The IB recommends 240 teaching hours for HL subjects and 150 hours for SL. Subjects at HL are studied in greater depth and breadth than at SL. In addition, three core elements—the extended essay, theory of knowledge and creativity, activity, service—are compulsory and central to the philosophy of the programme.

This IB DP subject brief has three key components:

- I. Course description and aims
- II. Curriculum model overview
- III. Assessment model



## I. Course description and aims

Individual students have different needs, aspirations, interests and abilities. For this reason there are two different DP subjects in mathematics, Mathematics: analysis and approaches and Mathematics: applications and interpretation. Each course is designed to meet the needs of a particular group of students. Both courses are offered at SL and HL.

The IB DP Mathematics: analysis and approaches course recognizes the need for analytical expertise in a world where innovation is increasingly dependent on a deep understanding of mathematics. The focus is on developing important mathematical concepts in a comprehensible, coherent and rigorous way, achieved by a carefully balanced approach. Students are encouraged to apply their mathematical knowledge to solve abstract problems as well as those set in a variety of meaningful contexts. Mathematics: analysis and approaches has a strong emphasis on the ability to construct, communicate and justify correct mathematical arguments. Students should expect to develop insight into mathematical form and structure, and should be intellectually equipped to appreciate the links between concepts in different topic areas. Students are also encouraged to develop the skills needed to continue their mathematical growth in other learning environments. The internally assessed exploration allows students to develop independence in mathematical learning. Throughout the course students are encouraged to take a considered approach to various mathematical activities and to explore different mathematical ideas.

The aims of all DP mathematics courses are to enable students to:

- develop a curiosity and enjoyment of mathematics, and appreciate its elegance and power
- develop an understanding of the concepts, principles and nature of mathematics
- communicate mathematics clearly, concisely and confidently in a variety of contexts
- develop logical and creative thinking, and patience and persistence in problem solving to instil confidence in using mathematics
- employ and refine their powers of abstraction and generalization
- take action to apply and transfer skills to alternative situations, to other areas of knowledge and to future developments in their local and global communities
- appreciate how developments in technology and mathematics influence each other
- appreciate the moral, social and ethical questions arising from the work of mathematicians and the applications of mathematics
- appreciate the universality of mathematics and its multicultural, international and historical perspectives
- appreciate the contribution of mathematics to other disciplines, and as a particular “area of knowledge” in the TOK course
- develop the ability to reflect critically upon their own work and the work of others
- independently and collaboratively extend their understanding of mathematics.

## II. Curriculum model overview

Mathematics: analysis and approaches and Mathematics: applications and interpretation share 60 hours of common SL content.

Syllabus component	Recommended teaching hours	
	SL	HL
<ul style="list-style-type: none"> <li>Number and algebra</li> <li>Functions</li> <li>Geometry and trigonometry</li> <li>Statistics and probability</li> <li>Calculus</li> </ul>	19	39
Development of investigational, problem-solving and modelling skills and the exploration of an area of mathematics	30	30
<b>Total teaching hours</b>	150	240

## III. Assessment model

Problem-solving is central to learning mathematics and involves the acquisition of mathematical skills and concepts in a wide range of situations, including non-routine, open-ended and real-world problems.

The assessment objectives are common to Mathematics: analysis and approaches and to Mathematics: applications and interpretation.

- **Knowledge and understanding:** Recall, select and use their knowledge of mathematical facts, concepts and techniques in a variety of familiar and unfamiliar contexts.
- **Problem solving:** Recall, select and use their knowledge of mathematical skills, results and models in both abstract and real-world contexts to solve problems.
- **Communication and interpretation:** Transform common realistic contexts into mathematics; comment on the context; sketch or draw mathematical diagrams, graphs or constructions both on paper and using technology; record methods, solutions and conclusions using standardized notation; use appropriate notation and terminology.
- **Technology:** Use technology accurately, appropriately and efficiently both to explore new ideas and to solve problems.
- **Reasoning:** Construct mathematical arguments through use of precise statements, logical deduction and inference and by the manipulation of mathematical expressions.
- **Inquiry approaches:** Investigate unfamiliar situations, both abstract and from the real world, involving organizing and analyzing information, making conjectures, drawing conclusions, and testing their validity.

The exploration is an integral part of the course and its assessment, and is compulsory for both SL and HL students. It enables students to demonstrate the application of their skills and knowledge, and to pursue their personal interests, without the time limitations and other constraints that are associated with written examinations.

## Assessment at a glance

Type of assessment	Format of assessment	Time (hours)		Weighting of final grade (%)	
		SL	HL	SL	HL
<b>External</b>					
Paper 1	No technology allowed. <b>Section A:</b> compulsory short-response questions based on the syllabus. <b>Section B:</b> compulsory extended-response questions based on the syllabus.	1.5	2	40	30
Paper 2	Technology allowed. <b>Section A:</b> compulsory short-response questions based on the syllabus. <b>Section B:</b> compulsory extended-response questions based on the syllabus.	1.5	2	40	30
Paper 3	Technology allowed. Two compulsory extended-response problem-solving questions.		1		20
<b>Internal</b>					
Exploration		15	15	20	20

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# International Baccalaureate Diploma Programme Subject Brief

## Mathematics: applications and interpretation

First assessments for SL and HL—2021

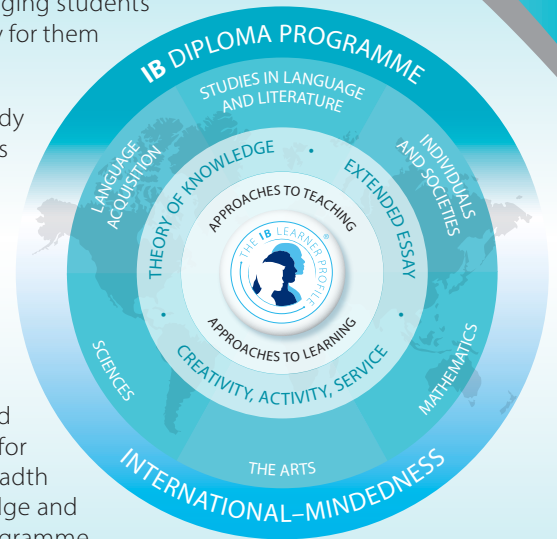
The Diploma Programme (DP) is a rigorous pre-university course of study designed for students in the 16 to 19 age range. It is a broad-based two-year course that aims to encourage students to be knowledgeable and inquiring, but also caring and compassionate. There is a strong emphasis on encouraging students to develop intercultural understanding, open-mindedness, and the attitudes necessary for them to respect and evaluate a range of points of view.

The course is presented as six academic areas enclosing a central core. Students study two modern languages (or a modern language and a classical language), a humanities or social science subject, an experimental science, mathematics and one of the creative arts. Instead of an arts subject, students can choose two subjects from another area. It is this comprehensive range of subjects that makes the Diploma Programme a demanding course of study designed to prepare students effectively for university entrance. In each of the academic areas students have flexibility in making their choices, which means they can choose subjects that particularly interest them and that they may wish to study further at university.

Normally, three subjects (and not more than four) are taken at higher level (HL), and the others are taken at standard level (SL). The IB recommends 240 teaching hours for HL subjects and 150 hours for SL. Subjects at HL are studied in greater depth and breadth than at SL. In addition, three core elements—the extended essay, theory of knowledge and creativity, activity, service—are compulsory and central to the philosophy of the programme.

This IB DP subject brief has three key components:

- I. Course description and aims
- II. Curriculum model overview
- III. Assessment model



## I. Course description and aims

Individual students have different needs, aspirations, interests and abilities. For this reason there are two different DP subjects in mathematics, Mathematics: analysis and approaches and Mathematics: applications and interpretation. Each course is designed to meet the needs of a particular group of students. Both courses are offered at SL and HL.

The IB DP Mathematics: applications and interpretation course recognizes the increasing role that mathematics and technology play in a diverse range of fields in a data-rich world. As such, it emphasizes the meaning of mathematics in context by focusing on topics that are often used as applications or in mathematical modelling. To give this understanding a firm base, this course includes topics that are traditionally part of a pre-university mathematics course such as calculus and statistics. Students are encouraged to solve real-world problems, construct and communicate this mathematically and interpret the conclusions or generalizations.

Students should expect to develop strong technology skills, and will be intellectually equipped to appreciate the links between the theoretical and the practical concepts in mathematics. All external assessments involve the use of technology. Students are also encouraged to develop the skills needed to continue their mathematical growth in other learning environments.

The internally assessed exploration allows students to develop independence in mathematical learning. Throughout the course students are encouraged to take a considered approach to various mathematical activities and to explore different mathematical ideas.

The aims of all DP mathematics courses are to enable students to:

- develop a curiosity and enjoyment of mathematics, and appreciate its elegance and power
- develop an understanding of the concepts, principles and nature of mathematics
- communicate mathematics clearly, concisely and confidently in a variety of contexts
- develop logical and creative thinking, and patience and persistence in problem solving to instil confidence in using mathematics
- employ and refine their powers of abstraction and generalization
- take action to apply and transfer skills to alternative situations, to other areas of knowledge and to future developments in their local and global communities
- appreciate how developments in technology and mathematics influence each other
- appreciate the moral, social and ethical questions arising from the work of mathematicians and the applications of mathematics
- appreciate the universality of mathematics and its multicultural, international and historical perspectives
- appreciate the contribution of mathematics to other disciplines, and as a particular “area of knowledge” in the TOK course
- develop the ability to reflect critically upon their own work and the work of others
- independently and collaboratively extend their understanding of mathematics.

## II. Curriculum model overview

Mathematics: applications and interpretation and Mathematics: analysis and approaches share 60 hours of common content.

Syllabus component	Recommended teaching hours	
	SL	HL
<ul style="list-style-type: none"> <li>Number and algebra</li> <li>Functions</li> <li>Geometry and trigonometry</li> <li>Statistics and probability</li> <li>Calculus</li> </ul>	16 31 18 36 19	29 42 46 52 41
Development of investigational, problem-solving and modelling skills and the exploration of an area of mathematics	30	30
<b>Total teaching hours</b>	150	240

## III. Assessment model

Problem-solving is central to learning mathematics and involves the acquisition of mathematical skills and concepts in a wide range of situations, including non-routine, open-ended and real-world problems.

The assessment objectives are common to Mathematics: applications and interpretation and to Mathematics: analysis and approaches.

- **Knowledge and understanding:** Recall, select and use their knowledge of mathematical facts, concepts and techniques in a variety of familiar and unfamiliar contexts.
- **Problem solving:** Recall, select and use their knowledge of mathematical skills, results and models in both abstract and real-world contexts to solve problems.
- **Communication and interpretation:** Transform common realistic contexts into mathematics; comment on the context; sketch or draw mathematical diagrams, graphs or constructions both on paper and using technology; record methods, solutions and conclusions using standardized notation; use appropriate notation and terminology.
- **Technology:** Use technology accurately, appropriately and efficiently both to explore new ideas and to solve problems.
- **Reasoning:** Construct mathematical arguments through use of precise statements, logical deduction and inference and by the manipulation of mathematical expressions.
- **Inquiry approaches:** Investigate unfamiliar situations, both abstract and from the real world, involving organizing and analyzing information, making conjectures, drawing conclusions, and testing their validity.

The exploration is an integral part of the course and its assessment, and is compulsory for both SL and HL students. It enables students to demonstrate the application of their skills and knowledge, and to pursue their personal interests, without the time limitations and other constraints that are associated with written examinations.

## Assessment at a glance

Type of assessment	Format of assessment	Time (hours)		Weighting of final grade (%)	
		SL	HL	SL	HL
<b>External</b>					
Paper 1	Technology allowed. Compulsory short-response questions based on the syllabus.	1.5	2	40	30
Paper 2	Technology allowed. Compulsory extended-response questions based on the syllabus.	1.5	2	40	30
Paper 3	Technology allowed. Two compulsory extended-response problem-solving questions.		1		20
<b>Internal</b>					
Exploration		15	15	20	20

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# International Baccalaureate Diploma Programme Subject Brief

## The arts: Music

First assessment 2022

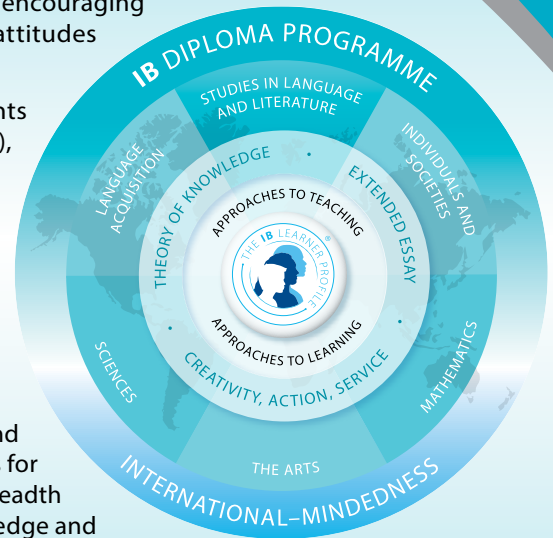
The Diploma Programme (DP) is a rigorous pre-university course of study designed for students in the 16 to 19 age range. It is a broad-based two-year course that aims to encourage students to be knowledgeable and inquiring, but also caring and compassionate. There is a strong emphasis on encouraging students to develop intercultural understanding, open-mindedness, and the attitudes necessary for them to respect and evaluate a range of points of view.

The course is presented as six academic areas enclosing a central core. Students study two modern languages (or a modern language and a classical language), a humanities or social science subject, an experimental science, mathematics and one of the creative arts. Instead of an arts subject, students can choose two subjects from another area. It is this comprehensive range of subjects that makes the Diploma Programme a demanding course of study designed to prepare students effectively for university entrance. In each of the academic areas students have flexibility in making their choices, which means they can choose subjects that particularly interest them and that they may wish to study further at university.

Normally, three subjects (and not more than four) are taken at higher level (HL), and the others are taken at standard level (SL). The IB recommends 240 teaching hours for HL subjects and 150 hours for SL. Subjects at HL are studied in greater depth and breadth than at SL. In addition, three core elements—the extended essay, theory of knowledge and creativity, activity, service—are compulsory and central to the philosophy of the programme.

These IB DP subject briefs illustrate the following key course components.

I. Course description and aims      II. Curriculum model overview      III. Assessment model



## I. Course description and aims

The Diploma Programme Music course (for first teaching from 2020) has been designed to prepare the 21st century music student for a world in which global musical cultures and industries are rapidly changing.

The course is grounded in the knowledge, skills and processes associated with the study of music and offers a strengthened approach to student creativity through practical, informed and purposeful explorations of diverse musical forms, practices and contexts. The course also ensures a holistic approach to learning, with the roles of performer, creator and researcher afforded equal importance in all course components.

The aims of the music course are to enable students to:

- explore a range of musical contexts and make links to, and between, different musical practices, conventions and forms of expression
- acquire, develop and experiment with musical competencies through a range of musical practices, conventions and forms of expression, both individually and in collaboration with others
- evaluate and develop critical perspectives on their own music and the work of others.

### Alignment with DP arts courses

The curriculum moves into alignment with other DP arts courses, through the clear articulation of the balance between the theoretical and practical disciplines of music. A new set of assessment tasks that link directly to the processes and roles experienced in the curriculum have been developed. These robust tasks address the concept of holistic musical development by removing optionality (and thereby the possibility to specialize in one skill at the expense of others) and incorporating practical music-making into all tasks. Assessment tasks are now presented as coursework, balanced between internal and external assessment. There are three common components at SL and HL, with a discrete HL extension component which invites students to work within the parameters of real-life music industry practices.

### Engagement with diverse musical material

The new course seeks to be inclusive of students with wide-ranging personal and cultural musical backgrounds. In place of prescribed musical content, students and teachers in the new course have the agency to personalise unique approaches to musical forms, genres and pieces. The exploration of diverse musical material is focused through the lenses of four areas of inquiry.

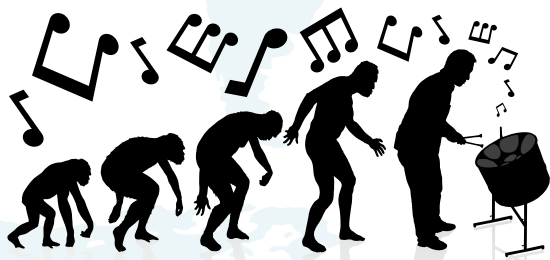
- Music for sociocultural and political expression
- Music for listening and performance,
- Music for dramatic impact, movement and entertainment
- Music technology in the digital age.



### A framework for study and assessment

Engagement with these areas of inquiry takes place across three contexts—personal, local and global. These contexts invite students to move beyond familiar musical material (personal context), to experience music from the culture or community around them (local context), as well as engaging with previously unfamiliar music (global context). Combined with the contexts, the areas of inquiry offer a “matrix” onto which students can plot the variety of their musical encounters. This new flexibility is not only about choice in the learning, teaching and assessment—it is also about forging deep, life-long connections between students’ passions and interests and the wider world of music and music-making. All musical encounters are experienced in the roles of researcher, creator and performer, and are related through teaching and assessment to the processes of exploring, experimenting and presenting music. Academic rigour is assured through the requirement for students to critically analyse the music with which they engage, drawing information and conclusions which they then apply to their own practical music making through creating and performing.

### What do students do in a music classroom?



Engage with a diverse range of music that will broaden their musical horizons and provide stimuli to expand their own music-making



Connect theoretical studies to practical work to gain a deeper understanding of the music they engage with.



Communicate and present music as researchers, creators and performers.

### How are music students assessed?

Students at SL and HL submit the following common assessment tasks.

**An exploration portfolio:** Written work demonstrating engagement with, and understanding of, diverse musical material, along with practical exercises in creating and performing

**An experimentation report:** Written work in the form of a rationale and commentary that supports practical musical evidence of experimentation in creating and performing

**A musical presentation:** Finished works in creating and performing, supported by programme notes.

In addition, HL students will submit the following project.

**A collaborative project:** A continuous multimedia presentation documenting a real-life project, containing evidence of the project proposal, the process and evaluation, and the realized project, or curated selections of it.

### By the end of the course students will have:

- broadened their musical horizons through engagement with diverse musical material
- analysed a wide range of music
- engaged with music technology as a compulsory part of the course
- gained confidence in the essential processes associated with music-making
- developed as holistic musicians with experience as creators and performers

- developed both independent and collaborative working skills
- honed their inquiry, reflection and critical thinking skills.

### The course is ideal for students who ...

- are interested in both the practical and theoretical aspects of music-making
- respond to a creative approach to composition and performance
- value collaboration
- wish to experience a DP arts course
- plan to study music in university or college.

## II. Curriculum model overview

Syllabus component	Teaching hours	
	SL	HL
<b>Exploring music in context</b> Students will learn how to engage with a diverse range of music that will broaden their musical horizons and provide stimuli to expand their own music-making. They will demonstrate diversity and breadth in their exploration by engaging with music from the areas of inquiry in personal, local and global contexts.	45	45
<b>Experimenting with music</b> Students connect theoretical studies to practical work and gain a deeper understanding of the music they engage with. Through this theoretical and practical work as researchers, creators and performers, they will learn to experiment with a range of musical material and stimuli from the areas of inquiry across local and global contexts.	45	45
<b>Presenting music</b> Students learn to practise and prepare finished pieces that will be performed or presented to an audience. In working towards completed musical works, they expand their musical identity, demonstrate their level of musicianship, and learn to share and communicate their music as researchers, creators and performers.	60	60
<b>The contemporary music maker (HL only)</b> Music at higher level (HL) builds on the learning of musical competencies and challenges students to engage with the musical processes in settings of contemporary music-making. For the HL component, students plan and collaboratively create a project that draws on the competencies, skills and processes in all of the musical roles of the music course and is inspired by real-life practices of music-making.	n/a	90
<b>Total teaching hours</b>	<b>150</b>	<b>240</b>

## III. Assessment model

	External/ internal	SL	HL
<b>Exploring music in context</b> Students select samples of their work for a portfolio submission. Students submit: <ol style="list-style-type: none"> <li>written work demonstrating engagement with, and understanding of, diverse musical material</li> <li>practical exercises in creating and performing</li> </ol>	External	30%	20%
<b>Experimenting with music</b> Students submit an experimentation report with evidence of their musical processes in creating and performing in two areas of inquiry in a local and/or global context. The report provides a rationale and commentary for each process. Students submit: <ol style="list-style-type: none"> <li>a written experimentation report that supports the experimentation</li> <li>practical musical evidence of the experimentation process in creating and performing</li> </ol>	Internal	30%	20%
<b>Presenting music</b> Students submit a collection of works demonstrating engagement with diverse musical material from four areas of inquiry. The submission contains: <ol style="list-style-type: none"> <li>Programme notes</li> <li>Presenting as a creator: composition and/or improvisation</li> <li>Presenting as a performer: solo and/or ensemble</li> </ol>	External	40%	30%
<b>The contemporary music-maker (HL only)</b> Students submit a continuous multimedia presentation documenting their real-life project which evidences: <ol style="list-style-type: none"> <li>the project proposal</li> <li>the process and evaluation</li> <li>the realized project, or curated selections of it.</li> </ol>	Internal		30%
		100%	100%

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# International Baccalaureate Diploma Programme Subject Brief

## The arts:

### Theatre—Higher level

First assessments 2016 – Last assessments 2022

The IB Diploma Programme (DP) is a rigorous, academically challenging and balanced programme of education designed to prepare students aged 16 to 19 for success at university and life beyond. The DP aims to encourage students to be knowledgeable, inquiring, caring and compassionate, and to develop intercultural understanding, open-mindedness and the attitudes necessary to respect and evaluate a range of viewpoints. Approaches to teaching and learning (ATL) within the DP are deliberate strategies, skills and attitudes that permeate the teaching and learning environment. Students develop skills from five ATL categories: thinking, research, social, self-management and communication.

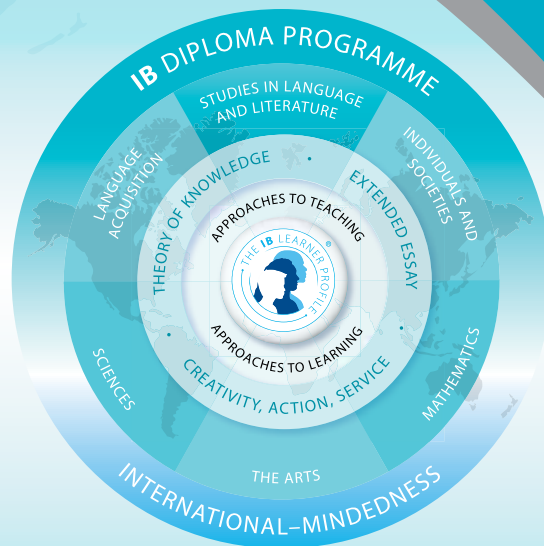
To ensure both breadth and depth of knowledge and understanding, students must choose at least one subject from five groups: 1) their best language, 2) additional language(s), 3) social sciences, 4) experimental sciences, and 5) mathematics. Students may choose either an arts subject from group 6, or a second subject from groups 1 to 5. At least three and not more than four subjects are taken at higher level (240 recommended teaching hours), while the remaining are taken at standard level (150 recommended teaching hours). In addition, three core elements—the extended essay, theory of knowledge and creativity, action, service—are compulsory and central to the philosophy of the programme.

These IB DP subject briefs illustrate three key course components.

I. Course description and aims

II. Curriculum model overview

III. Assessment model



## I. Course description and aims

Theatre is a practical subject that encourages discovery through experimentation, risk-taking and the presentation of ideas. The IB DP theatre course is multifaceted and gives students the opportunity to actively engage in theatre as creators, designers, directors and performers. It emphasizes working both individually and collaboratively as part of an ensemble. The teacher's role is to create opportunities that allow students to explore, learn, discover and collaborate to become autonomous, informed and skilled theatre-makers.

Students learn to apply research and theory to inform and to contextualize their work. Through researching, creating, preparing, presenting and critically reflecting on theatre, they gain a richer understanding of themselves, their community and the world. Students experience the course from contrasting artistic and cultural perspectives. They learn about theatre from around the world, the importance of making theatre with integrity, and the impact that theatre can have on the world. It enables them to discover and engage with different forms of theatre across time, place and culture, promoting international-mindedness and an appreciation of the diversity of theatre.

The aims of all DP arts subjects are to enable students to:

1. enjoy lifelong engagement with the arts
2. become informed, reflective and critical practitioners in the arts
3. understand the dynamic and changing nature of the arts
4. explore and value the diversity of the arts across time, place and cultures
5. express ideas with confidence and competence
6. develop perceptual and analytical skills

In addition, the aims of the HL theatre course are to enable students to:

7. explore theatre in a variety of contexts and understand how these contexts inform practice (theatre in context)
8. understand and engage in the processes of transforming ideas into action (theatre processes)
9. develop and apply theatre production, presentation and performance skills, working both independently and collaboratively (presenting theatre)
10. understand and appreciate the relationship between theory and practice (theatre in context, theatre processes, presenting theatre).

## II. Curriculum model overview

Component	Recommended teaching hours
<p><b>Theatre in context</b></p> <ul style="list-style-type: none"> <li>• Research and examine the various contexts of: <ul style="list-style-type: none"> <li>o at least one theatre theorist</li> <li>o at least one published play text and reflect on live theatre</li> <li>o at least one world theatre tradition.</li> </ul> </li> <li>• Reflect on personal approaches, interests and skills in theatre. Research and examine at least one starting point and the approaches employed by an appropriate professional theatre company, and consider how this might influence personal approaches.</li> </ul>	<b>80</b>



### Theatre processes

- Explore at least one theorist and collaboratively engage in creating theatre based on their theory.
- Take part in the practical exploration of at least two contrasting published play texts and engage with the process of transforming a play text into action.
- Practically examine the performance conventions of at least one world theatre tradition and apply this to the staging of a moment of theatre.
- Respond to at least one starting point and engage with the process of transforming it collaboratively into an original piece of theatre.

80

### Presenting theatre

- Create, present and evaluate at least one theatre piece based on an aspect of a theatre theorist's work.
- Direct and present at least one scene or section from one published play text.
- Present a moment of theatre which demonstrates the performance convention(s) of at least one world theatre tradition.
- Participate in at least one production of a collaboratively created piece of original theatre, created from a starting point, which is presented to others.

80

2. Demonstrate application and analysis of knowledge and understanding
  - Explain the relationship and significance of the integration of production, performance and research elements
  - Explore and demonstrate different ways through which ideas can be presented and transformed into action
  - Explain what has informed, influenced and had impact on their work
3. Demonstrate synthesis and evaluation
  - Evaluate their work and the work of others
  - Discuss and justify choices
  - Examine the impact their work has had on others
4. Select, use and apply a variety of appropriate skills and techniques
  - Demonstrate appropriate skills and techniques in the creation and presentation of theatre in different specialist theatre roles
  - Demonstrate organization of material including use and attribution of sources
  - Demonstrate the ability to select, edit and present work appropriately

### Assessment at a glance

Type of assessment	Format of assessment	Weighting of final grade (%)
External		75
Solo theatre piece	Create and present a solo theatre piece (4–8 minutes) based on an aspect(s) of theatre theory.	35
Director's notebook	Develop ideas regarding how a play text could be staged for an audience.	20
Research presentation	Deliver an individual presentation (15 minutes maximum) that outlines and physically demonstrates research into a convention of a theatre tradition.	20
Internal		25
Collaborative project	Collaboratively create and present an original piece of theatre (lasting 13–15 minutes) for and to a specified target audience.	25

The theatre course is structured for the assessment tasks to be ongoing with skills being developed throughout the course and the material for assessment developed throughout the latter part of the course.

From the beginning of the course, and at regular intervals, students are required to maintain a theatre journal. Although elements of the journal may be selected, adapted and presented for assessment, the journal itself is not directly assessed or moderated. It is, however, regarded as a fundamental activity of the course.

### III. Assessment model

Having followed the theatre course students are expected to:

1. Demonstrate knowledge and understanding of specified content
  - Describe the relationship between theatre and its contexts
  - Identify appropriate and valuable information from research for different specialist theatre roles
  - Present ideas, discoveries and learning, gained through research and practical exploration to others

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# International Baccalaureate Diploma Programme Subject Brief

## The arts:

### Visual arts—Higher level

First assessments 2016 – Last assessments 2022

The IB Diploma Programme (DP) is a rigorous, academically challenging and balanced programme of education designed to prepare students aged 16 to 19 for success at university and life beyond. The DP aims to encourage students to be knowledgeable, inquiring, caring and compassionate, and to develop intercultural understanding, open-mindedness and the attitudes necessary to respect and evaluate a range of viewpoints. Approaches to teaching and learning (ATL) within the DP are deliberate strategies, skills and attitudes that permeate the teaching and learning environment. In the DP, students develop skills from five ATL categories: thinking, research, social, self-management and communication.

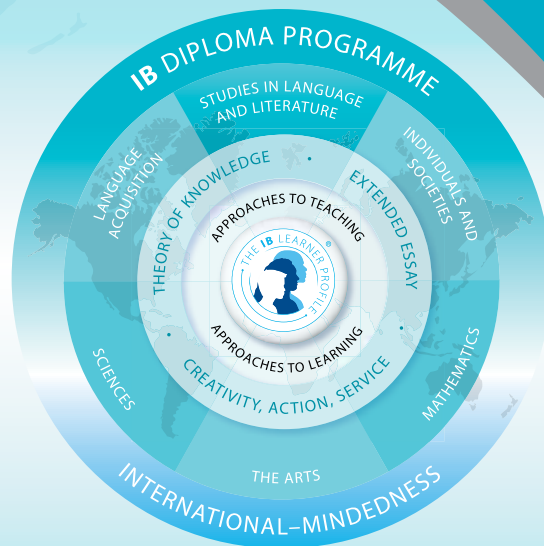
To ensure both breadth and depth of knowledge and understanding, students must choose at least one subject from five groups: 1) their best language, 2) additional language(s), 3) social sciences, 4) experimental sciences, and 5) mathematics. Students may choose either an arts subject from group 6, or a second subject from groups 1 to 5. At least three and not more than four subjects are taken at higher level (240 recommended teaching hours), while the remaining are taken at standard level (150 recommended teaching hours). In addition, three core elements—the extended essay, theory of knowledge and creativity, action, service—are compulsory and central to the philosophy of the programme.

These IB DP subject briefs illustrate three key course components.

I. Course description and aims

II. Curriculum model overview

III. Assessment model



## I. Course description and aims

The IB Diploma Programme visual arts course encourages students to challenge their own creative and cultural expectations and boundaries. It is a thought-provoking course in which students develop analytical skills in problem-solving and divergent thinking, while working towards technical proficiency and confidence as art-makers. In addition to exploring and comparing visual arts from different perspectives and in different contexts, students are expected to engage in, experiment with and critically reflect upon a wide range of contemporary practices and media. The course is designed for students who want to go on to further study of visual arts in higher education as well as for those who are seeking lifelong enrichment through visual arts.

The role of visual arts teachers should be to actively and carefully organize learning experiences for the students, directing their study to enable them to reach their potential and satisfy the demands of the course. Students should be empowered to become autonomous, informed and skilled visual artists.

The aims of the arts subjects are to enable students to:

1. enjoy lifelong engagement with the arts
2. become informed, reflective and critical practitioners in the arts
3. understand the dynamic and changing nature of the arts
4. explore and value the diversity of the arts across time, place and cultures
5. express ideas with confidence and competence
6. develop perceptual and analytical skills.

In addition, the aims of the visual arts course at SL and HL are to enable students to:

7. make artwork that is influenced by personal and cultural contexts
8. become informed and critical observers and makers of visual culture and media
9. develop skills, techniques and processes in order to communicate concepts and ideas.

## II. Curriculum model overview

Component	Recommended teaching hours
<p><b>Visual arts in context</b></p> <ul style="list-style-type: none"> <li>• Examine and compare the work of artists from different cultural contexts.</li> <li>• Consider the contexts influencing their own work and the work of others.</li> <li>• Make art through a process of investigation, thinking critically and experimenting with techniques.</li> <li>• Apply identified techniques to their own developing work.</li> <li>• Develop an informed response to work and exhibitions they have seen and experienced.</li> <li>• Begin to formulate personal intentions for creating and displaying their own artworks.</li> </ul>	<b>80</b>

<p><b>Visual arts methods</b></p> <ul style="list-style-type: none"> <li>• Look at different techniques for making art.</li> <li>• Investigate and compare how and why different techniques have evolved and the processes involved.</li> <li>• Experiment with diverse media and explore techniques for making art.</li> <li>• Develop concepts through processes informed by skills, techniques and media.</li> <li>• Evaluate how their ongoing work communicates meaning and purpose.</li> <li>• Consider the nature of “exhibition”, and think about the process of selection and the potential impact of their work on different audiences.</li> </ul>	<b>80</b>
<p><b>Communicating visual arts</b></p> <ul style="list-style-type: none"> <li>• Explore ways of communicating through visual and written means.</li> <li>• Make artistic choices about how to most effectively communicate knowledge and understanding.</li> <li>• Produce a body of artwork through a process of reflection and evaluation, showing a synthesis of skill, media and concept.</li> <li>• Select and present resolved works for exhibition.</li> <li>• Explain the ways in which the works are connected.</li> <li>• Discuss how artistic judgments impact the overall presentation.</li> </ul>	<b>80</b>

Throughout the course students are required to maintain a visual arts journal. Although sections of the journal will be selected, adapted and presented for assessment, the journal itself is not directly assessed or moderated. It is, however, regarded as a fundamental activity of the course.

### III. Assessment model

Having followed the visual arts course, students are expected to:

1. Demonstrate knowledge and understanding of specified content
  - Identify various contexts in which the visual arts can be created and presented
  - Describe artwork from differing contexts, and identify the ideas, conventions and techniques employed by the art-makers
  - Recognize the skills, techniques, media, forms and processes associated with the visual arts
  - Present work, using appropriate visual arts language, as appropriate to intentions
2. Demonstrate application and analysis of knowledge and understanding
  - Express concepts, ideas and meaning through visual communication

- Analyse artworks from a variety of different contexts
  - Apply knowledge and understanding of skills, techniques, media, forms and processes related to art-making
3. Demonstrate synthesis and evaluation
    - Critically analyse and discuss artworks created by themselves and others and articulate an informed personal response
    - Formulate personal intentions for the planning, development and making of artworks that consider how meaning can be conveyed to an audience
    - Demonstrate the use of critical reflection to highlight success and failure in order to progress work
    - Evaluate how and why art-making evolves and justify the choices made in their own visual practice
  4. Select, use and apply a variety of appropriate skills and techniques
    - Experiment with different media, materials and techniques in art-making
    - Make appropriate choices in the selection of images, media, materials and techniques in art-making
    - Demonstrate technical proficiency in the use and application of skills, techniques, media, images, forms and processes
    - Produce a body of resolved and unresolved artworks as appropriate to intentions

### Assessment at a glance

Type of assessment	Format of assessment	Weighting of final grade (%)
External		60
Comparative study	<ul style="list-style-type: none"> <li>• 10–15 screens which examine and compare at least 3 artworks, at least 2 of which need to be by different artists</li> <li>• 3–5 screens which analyse the extent to which the student’s work and practices have been influenced by the art and artists examined</li> <li>• A list of sources used</li> </ul>	20
Process portfolio	<ul style="list-style-type: none"> <li>• 13–25 screens which evidence sustained experimentation, exploration, manipulation and refinement of a variety of art-making activities</li> </ul>	40
Internal		40
Exhibition	<ul style="list-style-type: none"> <li>• A curatorial rationale that does not exceed 700 words</li> <li>• 8–11 artworks</li> <li>• Exhibition text (stating the title, medium, size and intention) for each artwork</li> </ul>	40

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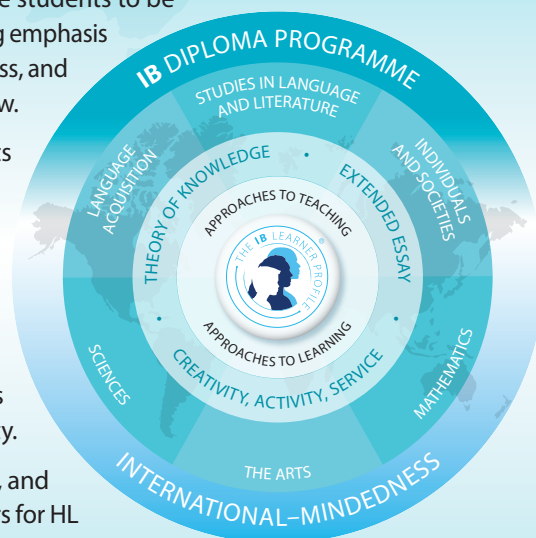
# Diploma Programme core: Theory of knowledge

First assessment 2022

The Diploma Programme (DP) is a rigorous pre-university course of study designed for students in the 16 to 19 age range. It is a broad-based two-year course that aims to encourage students to be knowledgeable and inquiring, but also caring and compassionate. There is a strong emphasis on encouraging students to develop intercultural understanding, open-mindedness, and the attitudes necessary for them to respect and evaluate a range of points of view.

The course is presented as six academic areas enclosing a central core. Students study two modern languages (or a modern language and a classical language), a humanities or social science subject, an experimental science, mathematics and one of the creative arts. Instead of an arts subject, students can choose two subjects from another area. It is this comprehensive range of subjects that makes the Diploma Programme a demanding course of study designed to prepare students effectively for university entrance. In each of the academic areas students have flexibility in making their choices, which means they can choose subjects that particularly interest them and that they may wish to study further at university.

Normally, three subjects (and not more than four) are taken at higher level (HL), and the others are taken at standard level (SL). The IB recommends 240 teaching hours for HL subjects and 150 hours for SL. Subjects at HL are studied in greater depth and breadth than at SL. In addition, three core elements—the extended essay, theory of knowledge and creativity, activity, service—are compulsory and central to the philosophy of the programme.



## I. Course description and aims

The theory of knowledge (TOK) course plays a special role in the DP by providing an opportunity for students to reflect on the nature, scope and limitations of knowledge and the process of knowing. In this way, the main focus of TOK is not on students acquiring new knowledge but on helping students to reflect on, and put into perspective, what they already know. TOK underpins and helps to unite the subjects that students encounter in the rest of their DP studies. It engages students in explicit reflection on how knowledge is arrived at in different disciplines and areas of knowledge, on what these areas have in common and the differences between them.

The aims of the TOK course are:

- to encourage students to reflect on the central question, “How do we know that?”, and to recognize the value of asking that question
- to expose students to ambiguity, uncertainty and questions with multiple plausible answers
- to equip students to effectively navigate and make sense of the world, and help prepare them to encounter novel and complex situations
- to encourage students to be more aware of their own perspectives and to reflect critically on their own beliefs and assumptions
- to engage students with multiple perspectives, foster open-mindedness and develop intercultural understanding
- to encourage students to make connections between academic disciplines by exploring underlying concepts and by identifying similarities and differences in the methods of inquiry used in different areas of knowledge
- to prompt students to consider the importance of values, responsibilities and ethical concerns relating to the production, acquisition, application and communication of knowledge.

## II. Curriculum model overview

Course elements	Minimum teaching hours
<p><b>Core theme: Knowledge and the knower</b></p> <p>This theme provides an opportunity for students to reflect on themselves as knowers and thinkers, and on the different communities of knowers to which we belong.</p>	32
<p><b>Optional themes</b></p> <p>Students are required to study <b>two</b> optional themes from the following five options.</p> <ul style="list-style-type: none"><li>• Knowledge and technology</li><li>• Knowledge and language</li><li>• Knowledge and politics</li><li>• Knowledge and religion</li><li>• Knowledge and indigenous societies</li></ul>	
<p><b>Areas of knowledge</b></p> <p>Students are required to study the following <b>five</b> areas of knowledge.</p> <ul style="list-style-type: none"><li>• History</li><li>• The human sciences</li><li>• The natural sciences</li><li>• The arts</li><li>• Mathematics</li></ul>	50

## III. Assessment model

Students are required to complete **two** assessment tasks for TOK.

- Theory of knowledge exhibition
- Theory of knowledge essay on a prescribed title

### Assessment objectives

Having completed the TOK course, students should be able to:

- demonstrate TOK thinking through the critical examination of knowledge questions
- identify and explore links between knowledge questions and the world around us
- identify and explore links between knowledge questions and areas of knowledge
- develop relevant, clear and coherent arguments
- use examples and evidence effectively to support a discussion
- demonstrate awareness and evaluation of different points of view
- consider the implications of arguments and conclusions.

## Assessment details

Type of assessment	Format of assessment	Hours	Weighting
<b>External</b>	Theory of knowledge essay	10	2/3 or 67%
Students are required to write an essay in response to one of the six prescribed titles that are issued by the IB for each examination session. As an external assessment component, it is marked by IB examiners.			
<b>Internal</b>	Theory of knowledge exhibition	8	1/3 or 33%
Students are required to create an exhibition of three objects with accompanying commentaries that explores how TOK manifests in the world around us. This component is internally assessed by the teacher and externally moderated by the IB at the end of the course.			

## IV. Sample questions

### Specimen essay titles

- How important are the opinions of experts in the search for knowledge? Answer with reference to the arts and one other area of knowledge.
- Is the division of the natural sciences and mathematics into separate areas of knowledge artificial?
- When historians and natural scientists say that they have explained something, are they using the word “explain” in the same way?
- Are there fewer ethical constraints on the pursuit of knowledge in the arts than in the human sciences?
- How do our expectations impact our interpretations? Discuss with reference to history and one other area of knowledge.
- To what extent do you agree with the claim that “knowledge is of no value unless you put it into practice” (Anton Chekhov)? Answer with reference to two areas of knowledge.

### Sample exhibition prompts

- What counts as knowledge?
- On what grounds might we doubt a claim?
- Are some types of knowledge less open to interpretation than others?
- Is bias inevitable in the production of knowledge?
- Should some knowledge not be sought on ethical grounds?
- What role do experts play in influencing our consumption or acquisition of knowledge?
- How can we distinguish between knowledge, belief and opinion?

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# International Baccalaureate Diploma Programme Subject Brief

## Diploma Programme Core:

### Extended essay, including the world studies option

First assessment 2018



The IB Diploma Programme (DP) is a rigorous, academically challenging and balanced programme of education designed to prepare students aged 16 to 19 for success at university and life beyond. The DP aims to encourage students to be knowledgeable, inquiring, caring and compassionate, and to develop intercultural understanding, open-mindedness and the attitudes necessary to respect and evaluate a range of viewpoints. Approaches to teaching and learning (ATL) within the DP are deliberate strategies, skills and attitudes that permeate the teaching and learning environment. In the DP, students develop skills from five ATL categories: thinking, research, social, self-management and communication.

To ensure both breadth and depth of knowledge and understanding, students must choose six courses from six distinct groups:

1) studies in language and literature; 2) language acquisition; 3) individuals and societies; 4) sciences; 5) mathematics; 6) the arts. Students may choose to replace the arts course with a second course from one of the other five groups. At least three, and not more than four, subjects are taken at higher level (240 recommended teaching hours), while the remaining are taken at standard level (150 recommended teaching hours). In addition, three core elements—the extended essay, theory of knowledge, and creativity, activity, service—are compulsory and central to the philosophy of the programme.



These DP subject briefs illustrate four key course components.

I. Course description and aims

II. Overview of the extended essay process

III. Assessment model

IV. Sample extended essay topics

## I. Course description and aims

The extended essay is a compulsory, externally assessed piece of independent research into a topic chosen by the student and presented as a formal piece of academic writing. The extended essay is intended to promote high-level research and writing skills, intellectual discovery and creativity while engaging students in personal research. This leads to a major piece of formally presented, structured writing of up to 4,000 words in which ideas and findings are communicated in a reasoned, coherent and appropriate manner.

Students are guided through the process of research and writing by an assigned supervisor (a teacher in the school). All students undertake three mandatory reflection sessions with their supervisor, including a short interview, or *viva voce*, following the completion of the extended essay.

Extended essay topics may be chosen from a list of approved DP subjects—normally one of the student's six chosen subjects for the IB diploma or the world studies option. World studies provides students with the opportunity to carry out an in-depth interdisciplinary study of an issue of contemporary global significance, using two IB disciplines.

The aims of the extended essay are to provide students with the opportunity to:

- engage in independent research with intellectual initiative and rigour
- develop research, thinking, self-management and communication skills
- reflect on what has been learned throughout the research and writing process.

## II. Overview of the extended essay process

### The extended essay process

#### The research process

1. Choose the approved DP subject.
2. Choose a topic.
3. Undertake some preparatory reading.
4. **Formulate a well-focused research question.**
5. Plan the research and writing process.
6. Plan a structure (outline headings) for the essay. This may change as the research develops.
7. Carry out the research.

### Writing and formal presentation

The required elements of the final work to be submitted are as follows.

- Title page
- Contents page
- Introduction
- Body of the essay
- Conclusion
- References and bibliography

The upper limit of 4,000 words includes the introduction, body, conclusion and any quotations.

### Reflection process

As part of the supervision process, students undertake three mandatory reflection sessions with their supervisor. These sessions form part of the formal assessment of the extended essay and research process. The purpose of these sessions is to provide an opportunity for students to reflect on their engagement with the research process and is intended to help students consider the effectiveness of their choices, re-examine their ideas and decide on whether changes are needed. The final reflection session is the viva voce.

The viva voce is a short interview (10–15 minutes) between the student and the supervisor, and is a mandatory conclusion to the process.

The viva voce serves as:

- a check on plagiarism and malpractice in general
- an opportunity to reflect on successes and difficulties
- an opportunity to reflect on what has been learned
- an aid to the supervisor's report.

## III. Assessment model

The extended essay, including the world studies option, is assessed against common criteria and is interpreted in ways appropriate to each subject. Students are expected to:

- provide a logical and coherent rationale for their choice of topic
- review what has already been written about the topic
- formulate a clear research question
- offer a concrete description of the methods used to investigate the question
- generate reasoned interpretations and conclusions based on their reading and independent research in order to answer the question
- reflect on what has been learned throughout the research and writing process.

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## Assessment at a glance

Assessment criteria	Description
Focus and method	The topic, the research question and the methodology are clearly stated.
Knowledge and understanding	The research relates to the subject area/discipline used to explore the research question, and knowledge and understanding is demonstrated through the use of appropriate terminology and concepts.
Critical thinking	Critical-thinking skills have been used to analyse and evaluate the research undertaken.
Presentation	The presentation follows the standard format expected for academic writing.
Engagement	The student's engagement with their research focus and the research process.

The extended essay contributes to the student's overall score for the diploma through the award of points in conjunction with theory of knowledge. A maximum of three points are awarded according to a student's combined performance in both the extended essay and theory of knowledge.

## IV. Sample extended essay topics

- What is the relationship between the length of an exhaust pipe and the frequency of the sound it emits?
- How far was the Christian Democrat victory in the Italian elections of 1948 influenced by Cold War tensions?
- How effective is Friedrich Dürrenmatt's use of colour to convey his message in the play *Der Besuch der alten Dame*?



# International Baccalaureate Diploma Programme Subject Brief

## Creativity, activity, service

For students graduating in 2017 and after



The IB Diploma Programme (DP) is a rigorous, academically challenging and balanced programme of education designed to prepare students aged 16 to 19 for success at university and life beyond. The DP aims to encourage students to be knowledgeable, inquiring, caring and compassionate, and to develop intercultural understanding, open-mindedness and the attitudes necessary to respect and evaluate a range of viewpoints. Approaches to teaching and learning (ATL) are deliberate strategies, skills and attitudes that permeate the teaching and learning environment. In the DP, students develop skills from five ATL categories: thinking, research, social, self-management and communication.

To ensure both breadth and depth of knowledge and understanding, students must choose six courses from six distinct groups: 1) studies in language and literature; 2) language acquisition; 3) individuals and societies, 4) sciences; 5) mathematics; 6) the arts. Students may choose to replace the arts course with a second course from one of the other five groups. At least three, and not more than four, subjects are taken at higher level (240 recommended teaching hours), while the remaining are taken at standard level (150 recommended teaching hours). In addition, three core elements—the extended essay, theory of knowledge and creativity, activity, service—are compulsory and central to the philosophy of the programme.

These DP subject briefs illustrate four key course components.

- I. Description and aims
- II. Programme overview



- III. Learning outcomes
- IV. Sample projects

## I. Description and aims

Creativity, activity, service (CAS) is at the heart of the DP. With its holistic approach, CAS is designed to strengthen and extend students' personal and interpersonal learning from the Primary Years Programme (PYP) and Middle Years Programme (MYP).

CAS is organized around the three strands of creativity, activity and service defined as follows.

- Creativity—exploring and extending ideas leading to an original or interpretive product or performance.
- Activity—physical exertion contributing to a healthy lifestyle.
- Service—collaborative and reciprocal engagement with the community in response to an authentic need.

CAS aims to develop students who:

- enjoy and find significance in a range of CAS experiences
- purposefully reflect upon their experiences
- identify goals, develop strategies and determine further actions for personal growth
- explore new possibilities, embrace new challenges and adapt to new roles
- actively participate in planned, sustained and collaborative CAS projects
- understand they are members of local and global communities with responsibilities towards each other and the environment.

A CAS experience is a specific event in which the student engages with one or more of the three CAS strands. It can be a single event or an extended series of events. A CAS project is a collaborative series of sequential CAS experiences lasting at least one month. Typically, a student's CAS

programme combines planned/unplanned singular and ongoing experiences. All are valuable and may lead to personal development. However, a meaningful CAS programme must be more than just a series of unplanned/singular experiences. Students must be involved in at least one CAS project during the programme.

## II. Programme overview

The CAS programme formally begins at the start of the DP and continues regularly for at least 18 months with a reasonable balance between creativity, activity and service.

A CAS experience must:

- fit within one or more of the CAS strands
- be based on a personal interest, skill, talent or opportunity for growth
- provide opportunities to develop the attributes of the IB learner profile
- not be used or included in the student's DP course requirements.

CAS students have guidance at the school level through a variety of resources including the school's CAS handbook, information sessions and meetings. In addition, students have three formal interviews with the school's CAS coordinator/adviser.

Typically, students' service experiences involve the following stages.

- Investigation, preparation and action that meets an identified need.
- Reflection on significant experiences throughout to inform problem-solving and choices.
- Demonstration allowing for sharing of what has taken place.

All CAS students are expected to maintain and complete a CAS portfolio as evidence of their engagement with CAS. The CAS portfolio is a collection of evidence that showcases CAS experiences and student reflections; it is not formally assessed.

A school's CAS programme is evaluated as part of the school's regular programme evaluation and self-study process that assesses the overall implementation of the DP.

### III. Learning outcomes

Completion of CAS is based on student achievement of the seven CAS learning outcomes. Through their CAS portfolio, students provide the school with evidence demonstrating achievement of each learning outcome. Some learning outcomes may be achieved many times, while others may be achieved less frequently. In their CAS portfolio, students provide the school with evidence of having achieved each learning outcome at least once through their CAS programme.

Learning outcome	Descriptor
<b>Identify own strengths and develop areas for growth.</b>	Students are able to see themselves as individuals with various abilities and skills, of which some are more developed than others.
<b>Demonstrate that challenges have been undertaken, developing new skills in the process.</b>	A new challenge may be an unfamiliar experience or an extension of an existing one. The newly acquired or developed skills may be shown through new experiences or through increased expertise in an established area.
<b>Demonstrate how to initiate and plan a CAS experience.</b>	Students can articulate the stages from conceiving an idea to executing a plan for individual or collaborative CAS experiences. Students may show their knowledge and awareness by building on a previous experience or by launching a new idea or process.
<b>Show commitment to, and perseverance in, CAS experiences.</b>	Students demonstrate regular involvement and active engagement in CAS.

<b>Demonstrate the skills and recognize the benefits of working collaboratively.</b>	Students are able to identify, demonstrate and critically discuss the benefits and challenges of collaboration gained through CAS experiences.
<b>Demonstrate engagement with issues of global significance.</b>	Students are able to identify and demonstrate their understanding of global issues, make responsible decisions and take appropriate action in response to the issue either locally, nationally or internationally.
<b>Recognize and consider the ethics of choices and actions.</b>	Students show awareness of the consequences of choices and actions in planning and carrying out CAS experiences.

### IV. Sample projects

- **Creativity:** A student group plans, designs and creates a mural.
- **Activity:** Students organize and participate in a sports team including training sessions and matches against other teams.
- **Service:** Students set up and conduct tutoring for people in need.
- **Service and activity:** Students plan and participate in the planting and maintenance of a garden with members of the local community.
- **Creativity, activity and service:** Students rehearse and perform a dance production for a community retirement home.

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