Middle Years Programme

Design guide

For use from September 2014/January 2015

International Baccalaureate®
Baccalauréat International
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IB mission statement

The International Baccalaureate aims to develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect.

To this end the organization works with schools, governments and international organizations to develop challenging programmes of international education and rigorous assessment.

These programmes encourage students across the world to become active, compassionate and lifelong learners who understand that other people, with their differences, can also be right.

IB learner profile

The aim of all IB programmes is to develop internationally minded people who, recognizing their common humanity and shared guardianship of the planet, help to create a better and more peaceful world.

As IB learners we strive to be:

INQUIRERS
We nurture our curiosity, developing skills for inquiry and research. We know how to learn independently and with others. We learn with enthusiasm and sustain our love of learning throughout life.

KNOWLEDGEABLE
We develop and use conceptual understanding, exploring knowledge across a range of disciplines. We engage with issues and ideas that have local and global significance.

THINKERS
We use critical and creative thinking skills to analyse and take responsible action on complex problems. We exercise initiative in making reasoned, ethical decisions.

COMMUNICATORS
We express ourselves confidently and creatively in more than one language and in many ways. We collaborate effectively, listening carefully to the perspectives of other individuals and groups.

PRINCIPLED
We act with integrity and honesty, with a strong sense of fairness and justice, and with respect for the dignity and rights of people everywhere. We take responsibility for our actions and their consequences.

OPEN-MINDED
We critically appreciate our own cultures and personal histories, as well as the values and traditions of others. We seek and evaluate a range of points of view, and we are willing to grow from the experience.

CARING
We show empathy, compassion and respect. We have a commitment to service, and we act to make a positive difference in the lives of others and in the world around us.

RISK-TAKERS
We approach uncertainty with forethought and determination; we work independently and cooperatively to explore new ideas and innovative strategies. We are resourceful and resilient in the face of challenges and change.

BALANCED
We understand the importance of balancing different aspects of our lives—intellectual, physical, and emotional—to achieve well-being for ourselves and others. We recognize our interdependence with other people and with the world in which we live.

REFLECTIVE
We thoughtfully consider the world and our own ideas and experience. We work to understand our strengths and weaknesses in order to support our learning and personal development.

The IB learner profile represents 10 attributes valued by IB World Schools. We believe these attributes, and others like them, can help individuals and groups become responsible members of local, national and global communities.

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Contents

Purpose of this guide

This guide is for use from September 2014 or January 2015, depending on the start of the school year.

This document provides the framework for teaching and learning in design in the Middle Years Programme (MYP) and must be read and used in conjunction with the document *MYP: From principles into practice* (May 2014), which includes:

- general information about the programme
- the MYP unit planner, with guidance for developing the curriculum that is relevant for all subject groups
- detailed information about approaches to learning
- advice that supports access and inclusion (including accommodations for students with learning support requirements)
- a statement on academic honesty.

In MYP publications, requirements appear in a text box like this one.

Additional resources

Teacher support materials (TSMs) are available at the programme resource centre (https://resources.ibo.org). The TSM for design contains support for developing the written, taught and assessed curriculum. They provide examples of good practice, including course overviews, assessment tasks and markschemes, as well as student work with teacher comments.

An optional process of externally moderated assessment can lead to **IB MYP course results** for design courses, and these results can contribute to the awarding of an **IB MYP certificate**. More information is available in the annual publication Middle Years Programme *Assessment procedures*.

A range of publications that support the MYP are available at the IB store (http://store.ibo.org).

Acknowledgments

The IB gratefully acknowledges the generous contributions of IB World Schools and a global community of educators who collaborate in the development of the Middle Years Programme.

Programme model

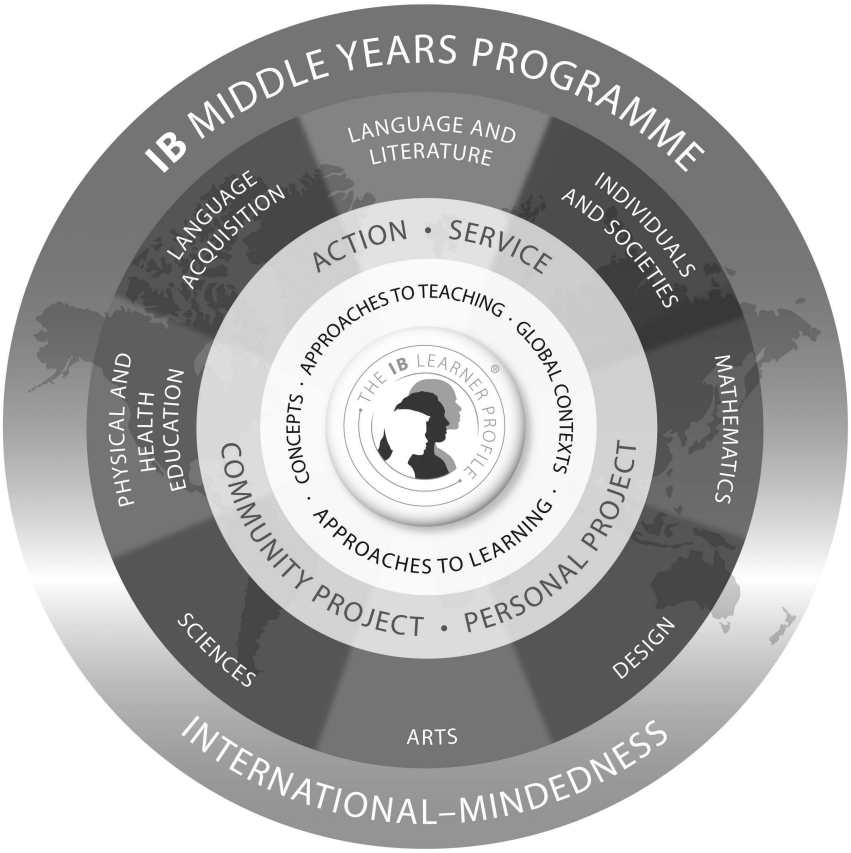

Figure 1
Middle Years Programme model

The MYP is designed for students aged 11 to 16. It provides a framework of learning that encourages students to become creative, critical and reflective thinkers. The MYP emphasizes intellectual challenge, encouraging students to make connections between their studies in traditional subjects and the real world. It fosters the development of skills for communication, intercultural understanding and global engagement—essential qualities for young people who are becoming global leaders.

The MYP is flexible enough to accommodate the demands of most national or local curriculums. It builds upon the knowledge, skills and attitudes developed in the IB Primary Years Programme (PYP) and prepares students to meet the academic challenges of the IB Diploma Programme (DP) and the IB Career-related Programme (CP).

The MYP:

- addresses holistically students' intellectual, social, emotional and physical **well-being**
- provides students opportunities to develop the **knowledge, attitudes and skills** they need in order to manage complexity, and take responsible action for the future

- ensures breadth and depth of understanding through study in **eight subject groups**
- requires the study of at least **two languages** to support students in understanding their own cultures and those of others
- empowers students to participate in **service with the community**
- helps to prepare students for **further education**, the **workplace** and a **lifetime of learning**.

Nature of design

Design, and the resultant development of new technologies, has given rise to profound changes in society: transforming how we access and process information; how we adapt our environment; how we communicate with others; how we are able to solve problems; how we work and live.

Design is the link between innovation and creativity, taking thoughts and exploring the possibilities and constraints associated with products or systems, allowing them to redefine and manage the generation of further thought through prototyping, experimentation and adaptation. It is human-centred and focuses on the needs, wants and limitations of the end user.

Competent design is not only within the reach of a small set of uniquely skilled individuals, but can be achieved by all. The use of well-established design principles and processes increases the probability that a design will be successful. To do this, designers use a wide variety of principles which, taken together, make up what is known as the design cycle.

- Designers adapt their approach to different design situations, but they have a common understanding of the process necessary to form valid and suitable solutions.
- A designer has a role and responsibility to the community and the environment. Their decisions can have a huge impact and, therefore, their ethics and morals can and should be questioned regularly.
- A designer should have the ability to maintain an unbiased view of a situation and evaluate a situation objectively, highlighting the strengths and weaknesses of a common product or system.
- Good communication is a key trait of any good designer through visual and oral presentation.

Designing requires an individual to be imaginative and creative, while having a substantial knowledge base of important factors that will aid or constrain the process. Decisions made need to be supported by adequate and appropriate research and investigation. Designers must adopt an approach that allows them to think creatively, while conforming to the requirements of a design specification.

Both the ideas of design and the process of design can only occur in a human context. Design is carried out by a community of people from a wide variety of backgrounds and traditions, and this has clearly influenced the way design has progressed at different times. It is important to understand, however, that to design is to be involved in a community of inquiry with certain common beliefs, methodologies, understandings and processes.

MYP design challenges all students to apply practical and creative thinking skills to solve design problems; encourages students to explore the role of design in both historical and contemporary contexts; and raises students' awareness of their responsibilities when making design decisions and taking action.

Inquiry and problem-solving are at the heart of the subject group. MYP design requires the use of the **design cycle** as a tool, which provides the methodology used to structure the inquiry and analysis of problems, the development of feasible solutions, the creation of solutions, and the testing and evaluation of the solution. In MYP design, a **solution** can be defined as a model, prototype, product or system that students have developed and created independently.

A well-planned design programme enables students to develop not only practical skills but also strategies for creative and critical thinking.

The MYP expects all students to become actively involved in, and to focus on, the whole design process rather than on the final product/solution.

Design across the IB continuum

The IB continuum of international education provides a progression of learning for students aged 3 to 19. In the IB Primary Years Programme (PYP), teaching and learning experiences challenge students to be curious, ask questions, explore and interact with the environment physically, socially and intellectually to construct meaning and refine their understanding. Even when there is no design component in the PYP, the use of structured inquiry is a precursor to the problem-solving and inquiry-based approach of MYP design. MYP design aims to build on what students learn and do in the PYP and other student-centred programmes of primary education. There are no prior formal learning requirements.

MYP design courses help specifically to prepare students for the study of computer science, design technology and information technology in a global society (ITGS) in the Diploma Programme (DP).

Computer science requires an understanding of the fundamental concepts of computational thinking, as well as knowledge of how computers and other digital devices operate.

Design technology aims to develop a high level of design literacy by enabling students to develop critical-thinking and design skills, which they can apply in a practical context.

ITGS is the study and evaluation of the impacts of information technology (IT) on individuals and society.

Figure 2 shows the IB continuum pathways to DP computer science, design technology and ITGS.

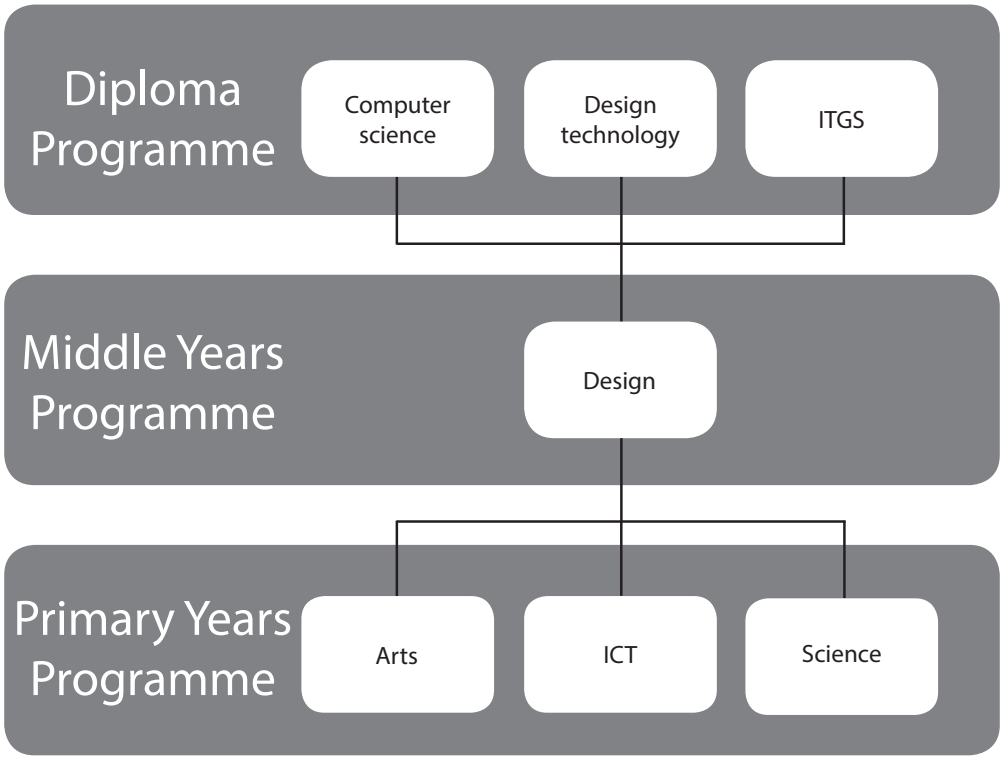

Figure 2

IB continuum pathway to design-related Diploma Programme courses

MYP design also helps to prepare students for overall success in the DP, and connects directly with their participation in creativity, activity, service (CAS) and the extended essay. In CAS, students continue to develop skills in design and evaluation that they use to undertake new challenges, design and plan activities and solve problems in a creative way.

The knowledge, skills and attitudes that students develop in design courses provide a meaningful foundation for further study and help to prepare students for, among others:

- careers in fashion, food, graphic, industrial, instructional, multimedia, product, publications, video game and web design
- architecture
- education
- roles in engineering, manufacturing, advertising and media industries
- project management.

Aims

The aims of all MYP subjects state what a teacher may expect to teach and what a student may expect to experience and learn. These aims suggest how the student may be changed by the learning experience.

The aims of MYP design are to encourage and enable students to:

- enjoy the design process, develop an appreciation of its elegance and power
- develop knowledge, understanding and skills from different disciplines to design and create solutions to problems using the design cycle
- use and apply technology effectively as a means to access, process and communicate information, model and create solutions, and to solve problems
- develop an appreciation of the impact of design innovations for life, global society and environments
- appreciate past, present and emerging design within cultural, political, social, historical and environmental contexts
- develop respect for others' viewpoints and appreciate alternative solutions to problems
- act with integrity and honesty, and take responsibility for their own actions developing effective working practices.

Objectives

The objectives of any MYP subject group state the specific targets that are set for learning in that subject. They define what the student will be able to accomplish as a result of studying the subject.

The objectives of MYP design encompass the factual, conceptual, procedural and metacognitive dimensions of knowledge.

> Schools **must** use the objectives provided in this guide for years 1, 3 and 5 of the programme.

Each objective is elaborated by a number of **strands**; a strand is an aspect or indicator of the learning expectation.

> Subject groups **must** address **all** strands of **all** four objectives **at least twice** in **each year** of the MYP.

These objectives relate directly to the assessment criteria found in the "Assessed curriculum" section of this guide.

Together these objectives reflect the knowledge, skills and attitudes that students need in order to engage with and solve complex, real-life problems in both familiar and unfamiliar contexts; they represent essential aspects of design methodology.

A Inquiring and analysing

Students are presented with a design situation, from which they identify a problem that needs to be solved. They analyse the need for a solution and conduct an inquiry into the nature of the problem.

In order to reach the aims of design, students should be able to:

i. explain and justify the need for a solution to a problem for a specified client/target audience

ii. identify and prioritize the primary and secondary research needed to develop a solution to the problem

iii. analyse a range of existing products that inspire a solution to the problem

iv. develop a detailed design brief which summarizes the analysis of relevant research.

B Developing ideas

Students write a detailed specification, which drives the development of a solution. They present the solution.

In order to reach the aims of design, students should be able to:

i. develop a design specification which clearly states the success criteria for the design of a solution

ii. develop a range of feasible design ideas which can be correctly interpreted by others

iii. present the final chosen design and justify its selection

iv. develop accurate and detailed planning drawings/diagrams and outline the requirements for the creation of the chosen solution.

C Creating the solution

Students plan the creation of the chosen solution and follow the plan to create a prototype sufficient for testing and evaluation.

In order to reach the aims of design, students should be able to:

i. construct a logical plan, which describes the efficient use of time and resources, sufficient for peers to be able to follow to create the solution

ii. demonstrate excellent technical skills when making the solution

iii. follow the plan to create the solution, which functions as intended

iv. fully justify changes made to the chosen design and plan when making the solution.

D Evaluating

Students design tests to evaluate the solution, carry out those tests and objectively evaluate its success. Students identify areas where the solution could be improved and explain how their solution will impact on the client or target audience.

In order to reach the aims of design, students should be able to:

i. design detailed and relevant testing methods, which generate data, to measure the success of the solution

ii. critically evaluate the success of the solution against the design specification

iii. explain how the solution could be improved

iv. explain the impact of the solution on the client/target audience.

Planning a progression of learning

Throughout the programme, students should engage with the curriculum and demonstrate their understanding at increasing levels of sophistication.

Year 1 In order to reach the aims of design, students should be able to:	Year 3 In order to reach the aims of design, students should be able to:	Year 5 In order to reach the aims of design, students should be able to:
Objective A: Inquiring and analysing		
i. explain and justify the need for a solution to a problem ii. state and prioritize the main points of research needed to develop a solution to the problem iii. describe the main features of an existing product that inspires a solution to the problem iv. present the main findings of relevant research.	i. explain and justify the need for a solution to a problem ii. construct a research plan, which states and prioritizes the primary and secondary research needed to develop a solution to the problem iii. analyse a group of similar products that inspire a solution to the problem iv. develop a design brief, which presents the analysis of relevant research.	i. explain and justify the need for a solution to a problem for a specified client/target audience ii. identify and prioritize the primary and secondary research needed to develop a solution to the problem iii. analyse a range of existing products that inspire a solution to the problem iv. develop a detailed design brief, which summarizes the analysis of relevant research.
Objective B: Developing ideas		
i. develop a list of success criteria for the solution ii. present feasible design ideas, which can be correctly interpreted by others iii. present the chosen design iv. create a planning drawing/diagram, which outlines the main details for making the chosen solution.	i. develop a design specification, which outlines the success criteria for the design of a solution based on the data collected ii. present a range of feasible design ideas, which can be correctly interpreted by others iii. present the chosen design and outline the reasons for its selection iv. develop accurate planning drawings/diagrams and outline requirements for the creation of the chosen solution.	i. develop a design specification, which clearly states the success criteria for the design of a solution ii. develop a range of feasible design ideas, which can be correctly interpreted by others iii. present the chosen design and justify its selection iv. develop accurate and detailed planning drawings/diagrams and outline the requirements for the creation of the chosen solution.

Year 1 In order to reach the aims of design, students should be able to:	Year 3 In order to reach the aims of design, students should be able to:	Year 5 In order to reach the aims of design, students should be able to:
Objective C: Creating the solution		
i. outline a plan, which considers the use of resources and time, sufficient for peers to be able to follow to create the solution ii. demonstrate excellent technical skills when making the solution iii. follow the plan to create the solution, which functions as intended iv. list the changes made to the chosen design and plan when making the solution.	i. construct a logical plan, which outlines the efficient use of time and resources, sufficient for peers to be able to follow to create the solution ii. demonstrate excellent technical skills when making the solution iii. follow the plan to create the solution, which functions as intended iv. explain changes made to the chosen design and plan when making the solution.	i. construct a logical plan, which describes the efficient use of time and resources, sufficient for peers to be able to follow to create the solution ii. demonstrate excellent technical skills when making the solution iii. follow the plan to create the solution, which functions as intended iv. fully justify changes made to the chosen design and plan when making the solution.
Objective D: Evaluating		
i. outline simple, relevant testing methods, which generate data, to measure the success of the solution ii. outline the success of the solution against the design specification iii. outline how the solution could be improved iv. outline the impact of the solution on the client/ target audience.	i. describe detailed and relevant testing methods, which generate accurate data, to measure the success of the solution ii. explain the success of the solution against the design specification iii. describe how the solution could be improved iv. describe the impact of the solution on the client/target audience.	i. design detailed and relevant testing methods, which generate data, to measure the success of the solution ii. critically evaluate the success of the solution against the design specification iii. explain how the solution could be improved iv. explain the impact of the solution on the client/ target audience.

The MYP design cycle

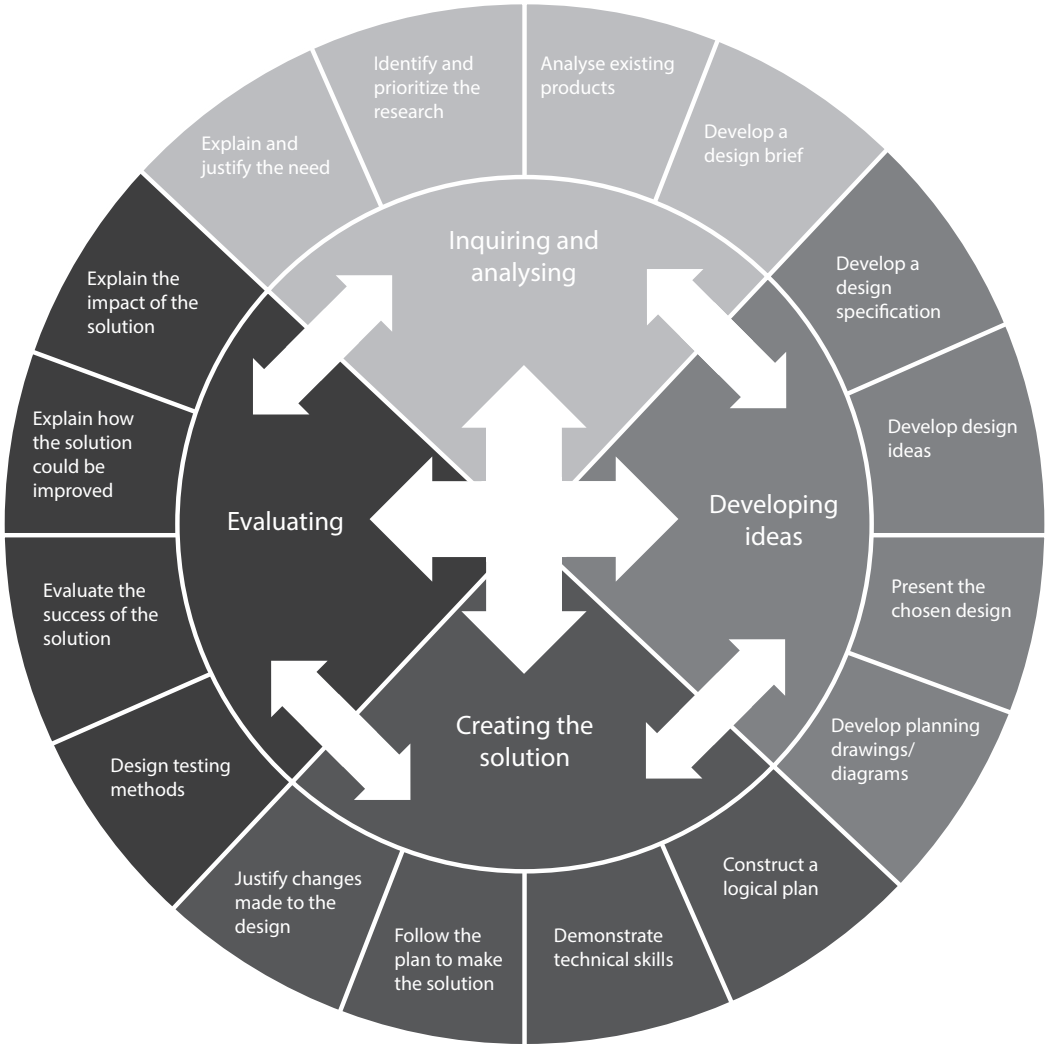

Figure 3
The MYP design cycle

Every designer may approach a problem in a different way. Depending on their specialism, designers tend to have their own methodology, but some general activities are common to all designers. The design cycle model underpins the design process.

The design cycle model (Figure 3) represents the MYP design methodology of how designers develop products. The process is divided into four stages: inquiring and analysing; developing ideas; creating the solution; evaluating. This incremental process allows the designer to go from identifying a design opportunity to the testing and evaluation of a solution. This process leads to the creation of solutions that solve a problem.

It is important to note that, while the design cycle includes several successive stages, the design cycle is an iterative and cyclical process. When using the design cycle, students will often need to revisit a previous stage before they can complete the stage they are currently working on. Solving design problems is not always a linear process.

Interdisciplinary learning

Interdisciplinary teaching and learning is grounded in individual subject groups and disciplines, but extends disciplinary understanding in ways that are:

- **integrative**—bringing together concepts, methods, or modes of communication from two or more subject groups, disciplines, or established areas of expertise to develop new perspectives
- **purposeful**—connecting disciplines to solve real-world problems, create products or address complex issues in ways that would have been unlikely through a single approach.

Interdisciplinary teaching and learning builds a connected curriculum that addresses the developmental needs of students in the MYP. It prepares students for further academic (inter)disciplinary study and for life in an increasingly interconnected world.

The MYP uses concepts and contexts as starting points for meaningful integration and transfer of knowledge across subject groups and disciplines. *Fostering interdisciplinary teaching and learning in the MYP* (2014) contains more information, including a detailed process for planning and recording interdisciplinary units.

> MYP schools are responsible for engaging students in at least one collaboratively planned interdisciplinary unit for each year of the programme.

MYP design offers many opportunities for interdisciplinary teaching and learning. Possible interdisciplinary units in this subject group could include inquiries into:

- relationships between athletic performance and technological innovation/design (physical and health education)
- scientific and aesthetic concepts and principles used to inform the development of design solutions (sciences and arts)
- interactive multimedia products used to communicate literary concepts (language and literature)
- historical and cultural developments of a product or system (individuals and societies).

Interdisciplinary learning can take place through large- and small-scale learning engagements. Authentic interdisciplinary learning often requires critical reflection and detailed collaborative planning. However, teachers and students can also make interdisciplinary connections through spontaneous learning experiences and conversations.

> All MYP subject-group teachers are responsible for developing meaningful ongoing opportunities for interdisciplinary teaching and learning.

MYP projects

The MYP community project (for students in years 3 or 4) and MYP personal project (for students in year 5) aim to encourage and enable sustained inquiry within a global context that generates new insights and deeper understanding. In these culminating experiences, students develop confidence as principled, lifelong learners. They grow in their ability to consider their own learning, communicate effectively and take pride in their accomplishments.

Courses in design help students to develop key approaches to learning (ATL) that lead to success and enjoyment in the MYP projects. In this subject group, students have important opportunities to practise ATL skills, especially creativity and communication. Creating novel solutions to authentic problems and designing improvements to existing products are essential aspects of design.

From their learning experiences in this subject group, students can find inspiration for their projects. The skills and experience they develop within design equips them to approach a variety of projects using the design cycle as a structured methodology for problem-solving and project management. Design teachers provide an important resource for any student whose project focuses on solving a problem.

Design offers many opportunities for learning through action. Inspiration from design for community projects and personal projects might include inquiries into:

- design methodologies, organizations, heroes or movements
- important personal, community or global issues, problems and solutions
- the development of sustainable solutions to everyday problems
- improving lives in the school, local community or wider world through the development of new technologies.

Requirements

Teaching hours

Schools must allocate the teaching hours necessary to meet the requirements of MYP design.

> The MYP requires at least 50 hours of teaching time for each subject group in each year of the programme.

In practice more time is often necessary to meet subject-group aims and objectives and to provide for the sustained, concurrent teaching that enables interdisciplinary study.

For students pursuing IB MYP course results that can contribute to the awarding of the IB MYP certificate, design courses should include at least 70 teaching hours in each of the final two years of the programme (MYP year 4 and MYP year 5).

The teaching of information and communication technology (ICT) skills should not be confused with, or take the place of, a digital design course. ICT comprises tools used to develop digital design solutions.

Organizing design in the school

In order to give the students an opportunity to meet the MYP design objectives at the highest level, teachers should plan a balanced curriculum that includes significant content. Design courses can be offered:

- as a distinct digital and/or product design course
- as a series of distinct digital and/or product design courses
- as a single course that combines digital and product design.

Digital design courses use the design cycle to solve problems through the use of a computer system. The study of digital design equips students to create computer-generated digital products/solutions to solve a problem and meet a perceived need. Two-dimensional (2D) tangible solutions created using computer-aided manufacturing techniques are typically the result of a digital design course. Distinct digital design courses include web design, interactive media design, programming and control, and so on.

Product design courses use the design cycle to solve problems through the use of tools, materials and systems. The study of product design equips students to manipulate a variety of materials to create tangible products/solutions to solve a problem and meet a need. Three-dimensional (3D) tangible solutions made using computer-aided manufacturing techniques are typically the result of a product design course. Distinct product design courses include food product design, fashion design, electronic product design, engineering design, and so on.

A combined digital and product design course uses the design cycle and combines knowledge, skills, techniques and materials of both digital and product design to develop products/solutions that solve a problem and meet a need. Combined courses include robotics, graphic product design, interface design, and so on.

All MYP design courses must ensure that students:

- use the design cycle to structure projects
- work towards meeting the aims and objectives of MYP design
- complete a design project.

Planning the design curriculum

IB World Schools are responsible for developing and structuring MYP design courses that provide opportunities for students to meet the aims and objectives of the programme. Each school's circumstances, including local and national curriculum requirements, determine the organization of design within the school.

MYP standards and practices require schools to facilitate and promote collaborative planning for the purpose of curriculum development and review.

Design objectives for years 1 to 5 of the curriculum provide continuity and outline a progression of learning. These objectives guide teachers in making decisions about developmentally appropriate learning experiences, including formative and summative assessments.

As they develop the vertical articulation of design over the years of the programme, teachers should plan increasingly complex units of work that encompass multiple objectives. However, within these units, discrete tasks or smaller units of work might concentrate on specific objectives or individual strands.

Design courses offer many opportunities to build interdisciplinary connections across the curriculum. Horizontal articulation for each year of the programme should coordinate teaching and learning across courses in design, as well as identify shared conceptual understandings and approaches to learning (ATL) that span multiple subject groups and help to create a coherent learning experience for students throughout the year.

All objectives must be developed in each year of the programme at the appropriate level. In planning the design curriculum, teachers will need to deconstruct the objectives so that they build, during years 1–4, towards the highest level in the final year of the programme, providing for continuity and progression in each objective. The objectives and interim objectives in this guide will guide teachers in making decisions about the choice of content and learning experiences offered to students, including the types of assessment that are appropriate for the students' particular stage of development.

In the final year of the programme, the curriculum should provide students with the opportunity to achieve the highest descriptor levels in the final assessment criteria.

Table 1 shows how the teaching and learning experiences and the students' expected outcomes in design should progress from the earlier years of to the final years of the MYP.

MYP year 1	MYP year 3	MYP year 5
Emphasis placed on individual strands of the objectives.	Emphasis placed on addressing individual objectives.	The objectives are fully addressed.
Students explore contrived, teacher-led design challenges set in familiar contexts.	Students explore identified, real-life problems set in familiar and unfamiliar contexts.	Students independently explore complex real-life problems set in unfamiliar contexts.
Students design for themselves.	Students design products for familiar groups of people.	Students design products for a client or an identified target audience.

MYP year 1	MYP year 3	MYP year 5
Students focus on skill development through focused tasks.	Students focus on advanced skill development through projects and short, focused tasks.	Students utilize a wide range of skills, developed through the previous years and apply them to a wide range of design situations.
Students are guided through units using structured templates.	Students can manage their own work organizing their time and folio appropriately.	Students independently manage their own work.
Teacher as leader and trainer.	Teacher as guide and advisor.	Teacher as facilitator.

Table 1
Progression from MYP year 1 to year 5

Resources

MYP design encourages the use of practical work to develop problem-solving and design-specific skills. The circumstances specific to individual schools will determine the number and kind of resources available for the development of design courses. However, whatever the course(s) developed, schools are responsible for ensuring the conditions for a safe working environment.

Group work

In many circumstances, students will want to, or need to, work in groups for their design units of work.

However, it is important to ensure that every member of the group benefits from the dynamics of the social interaction and the group-work learning experience. In the case of group work, teachers should be able to identify each student's role and responsibilities to ensure that he or she makes a contribution, and to assess each student's learning at each stage of the design cycle.

Teaching and learning through inquiry

Inquiry, in the broadest sense, is the process that is used to move to deeper levels of understanding. Inquiry involves speculating, exploring, questioning and connecting. In all IB programmes, inquiry develops curiosity and promotes critical and creative thinking.

The MYP structures sustained inquiry in design by developing **conceptual understanding** in **global contexts**. Teachers and students develop a **statement of inquiry** and use **inquiry questions** to explore the subject. Through their inquiry, students develop specific interdisciplinary and disciplinary **approaches to learning** skills.

Conceptual understanding

A concept is a "big idea"—a principle or notion that is enduring, the significance of which goes beyond particular origins, subject matter or place in time. Concepts represent the vehicle for students' inquiry into the issues and ideas of personal, local and global significance, providing the means by which they can explore the essence of design.

Concepts have an important place in the structure of knowledge that requires students and teachers to think with increasing complexity as they organize and relate facts and topics.

Concepts express understanding that students take with them into lifelong adventures of learning. They help students to develop principles, generalizations and theories. Students use conceptual understanding as they solve problems, analyse issues and evaluate decisions that can have an impact on themselves, their communities and the wider world.

> In the MYP, conceptual understanding is framed by prescribed key and related concepts. Teachers must use these concepts to develop the curriculum. Schools may identify and develop additional concepts to meet local circumstances and curriculum requirements.

Key concepts

Key concepts promote the development of a broad curriculum. They represent big ideas that are both relevant within and across disciplines and subjects. Inquiry into key concepts can facilitate connections between and among:

- courses within the design subject group (intra-disciplinary learning)
- other subject groups (interdisciplinary learning).

Table 2 lists the key concepts to be explored across the MYP. The key concepts contributed by the study of design are **communication**, **communities**, **development** and **systems**.

Aesthetics	Change	**Communication**	**Communities**
Connections	Creativity	Culture	**Development**
Form	Global interactions	Identity	Logic
Perspective	Relationships	**Systems**	Time, place and space

Table 2
MYP key concepts

These key concepts provide a framework for design, informing units of work and helping to organize teaching and learning.

Communication

Communication is the exchange or transfer of signals, facts, ideas and symbols. It requires a sender, a message and an intended receiver. Communication involves the activity of conveying information or meaning. Effective communication requires a common "language" (which may be written, spoken or non-verbal).

While exploring the concept of communication, students develop an awareness and understanding of how, why and when we need to ensure that clear messages are given and received throughout the design process. It ensures that ideas can be communicated clearly and each person involved in the development of an idea from conception to use has a common and consistent understanding of the solution and its function. Communication drives invention to become innovation.

When inquiring and analysing, students need to communicate with clients and target markets to identify the design need. When developing ideas, students engage in internal dialogue, using design sketches and models to think through the feasibility of their ideas. When creating the solution, students need to develop clear plans that can be followed easily. The final product must also clearly communicate its intent and how a user interacts with it.

Communities

Communities are groups that exist in proximity defined by space, time or relationship. Communities include, for example, groups of people sharing particular characteristics, beliefs or values as well as groups of interdependent organisms living together in a specific habitat.

Through MYP design, students will develop an understanding that a solution to a problem for one community will create problems for another, some on a small or even personal scale, while others may be far-reaching, affecting communities thousands of miles away or the global community.

When establishing the need and developing the design brief, the student always considers the community, whether this is a community that affects the design (target audience) or one that is affected by it. When developing ideas, engagement with the target audience and client drives the development to ensure it is fit-for-purpose, and the student must engage with the communities that effect and are affected by the solution when evaluating its effectiveness in solving the problem.

Development

Development is the act or process of growth, progress or evolution, sometimes through iterative improvements.

All ideas need refinement, through development, to become successful, appropriate and feasible. The development of solutions allows problems to be solved with greater success.

Even though the name suggests that the main focus of development would be found in developing ideas, students have to develop research plans as and when they realize that there is further information they need in order to solve the problem. Students constantly adapt and change their plans when creating the solution, dependent on the thoroughness of their planning and, when evaluating, students develop testing methods to assess the success of the solution.

Systems

Systems are sets of interacting or interdependent components. Systems provide structure and order in human, natural and built environments. Systems can be static or dynamic, simple or complex.

While exploring the concept of systems, students develop an awareness and understanding that everything is connected to a single system or multiple systems. Products and solutions are systems of components combined to carry out a specific function. Systems also structure processes: the design cycle is an example of a system. Open loop systems have an input, process and output. Closed loop systems have an input, process, output and mechanism for feedback.

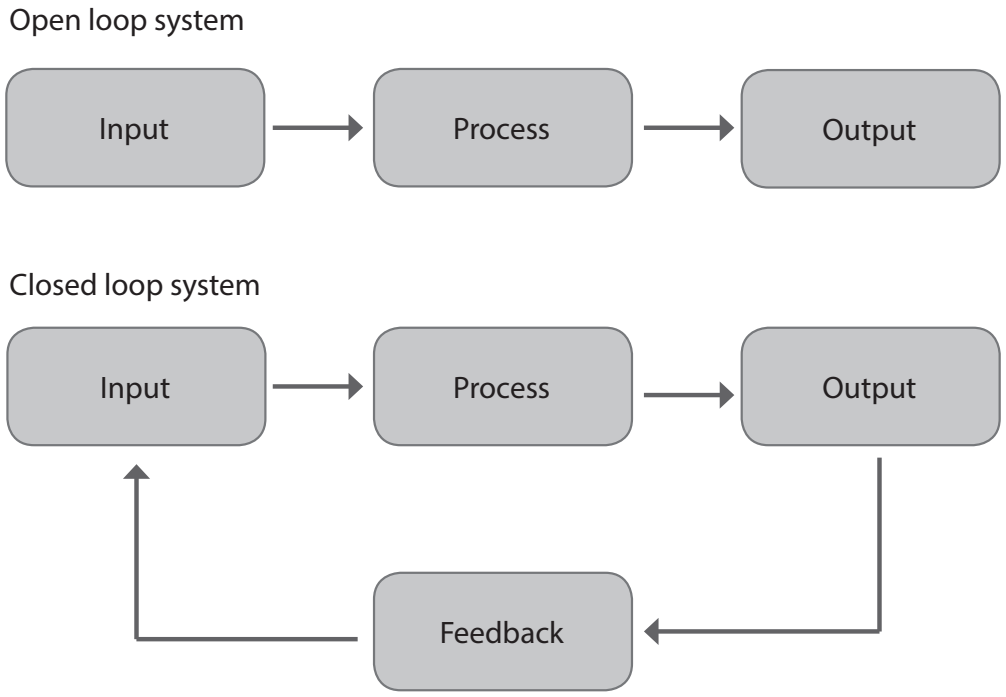

Figure 4
Open and closed loop systems

The student designs and develops systems for testing products when inquiring and analysing, and when developing testing methods for evaluating. Throughout developing ideas and creating the solution, students will develop a system or systems to solve that problem in the form of a product or solution. This is an inherent part of each objective.

Related concepts

Related concepts promote deep learning. They are grounded in specific disciplines and are useful for exploring key concepts in greater detail. Inquiry into related concepts helps students develop more complex and sophisticated conceptual understanding. Related concepts may arise from the subject matter of a unit or the craft of a subject—its features and processes.

Table 3 lists the related concepts for the study of design. Teachers are not limited to the related concepts listed in this chart and may choose others when planning units, including from other subject groups.

Related concepts in design		
Adaptation	Collaboration	Ergonomics
Evaluation	Form	Function
Innovation	Invention	Markets and trends
Perspective	Resources	Sustainability

Table 3
Related concepts in design

The appendix contains a glossary of these related concepts for design.

Global contexts for teaching and learning

Global contexts direct learning towards independent and shared inquiry into our common humanity and shared guardianship of the planet. Using the world as the broadest context for learning, MYP design can develop meaningful explorations of:

- identities and relationships
- orientation in space and time
- personal and cultural expression
- scientific and technical innovation
- globalization and sustainability
- fairness and development.

Teachers must identify a global context for teaching and learning, or develop additional contexts that help students explore the relevance of their inquiry (why it matters).

Many inquiries into design concepts naturally focus on scientific and technical innovation. However, courses in this subject group should, over time, offer students multiple opportunities to explore all MYP global contexts in relation to the aims and objectives of the subject group.

Statements of inquiry

Statements of inquiry set conceptual understanding in a global context in order to frame classroom inquiry and direct purposeful learning. Table 4 shows some possible statements of inquiry for MYP design units.

Statement of inquiry	Key concept Related concepts Global context	Possible project/study
A local invention can diffuse into a global market through successful and targeted communication.	• Communication • Invention, innovation, markets and trends • Orientation in space and time	Promotion of a product/service within a new market sector/ segment
Timely interaction with clients using appropriate communication techniques drives design decisions.	• Communication • Collaboration • Personal and cultural expression	Developing any digital or tangible product that focused on communication with a specific client
Communities can have many different perspectives that influence the way ideas develop and new discoveries are made.	• Communities • Perspective • Scientific and technical innovation	Development of software for learning or a digital learning environment
Designers adapt the form in which information is communicated in order to make it accessible to the end-user.	• Communities • Adaptation, form • Identities and relationships	Developing methods of communication used to teach, for example: resources for a flipped classroom; interactive learning
Fashion products can be influenced by developments in technology, which enhance their form and function while still meeting ergonomic requirements.	• Development • Ergonomics, form, function • Scientific and technical innovation	Smart materials and fashion products (thermochromic ink, wearable electronics)
Waste from one product can be used as a raw material for another, which results in developing a resource neutral process.	• Development • Resources, sustainability • Globalization and sustainability	Developing closed loop manufacturing systems Recycling and reusing waste Design for disassembly
Systems that are designed to meet an individual's ergonomic requirements can increase their ability to function within the world.	• Systems • Ergonomics, function • Fairness and development	Design for disabled Enhancing human function

Table 4

Example statements of inquiry

Inquiry questions

Teachers and students use statements of inquiry to help them identify factual, conceptual and debatable inquiry questions. Inquiry questions give direction to teaching and learning, and they help to organize and sequence learning experiences.

Table 5 shows some possible inquiry questions for MYP design units.

Factual questions: Remembering facts and topics:	Conceptual questions: Analysing big ideas:	Debatable questions: Evaluating perspectives and developing theories:
• Which electronic components can be used to create a sensory circuit? • What are the general rules of web design? • How can the nutritional value of a food product be determined? • What are the different aspects of form?	• How do inventions impact our lives? • What is the value of negative space? • Can digital products be sustainable?	• When is form more important than function? • Should all products be designed for everyone? • Are any ideas new, or are they new versions of old designs?

Table 5
Examples of factual, conceptual and debatable questions

Approaches to learning

All MYP units of work offer opportunities for students to develop and practise approaches to learning (ATL) skills. These skills provide valuable support for students working to meet the subject group's aims and objectives.

ATL skills are grouped into five categories that span the IB continuum of international education. IB programmes identify discrete skills in each category that can be introduced, practised and consolidated in the classroom and beyond.

While ATL skills are relevant across all MYP subject groups, teachers may also identify ATL skill indicators especially relevant for, or unique to, a particular subject group or course.

Table 6 suggests some of the indicators that can be important in design.

Category	Skill indicator
Thinking skills	Analyse products and suggest how to improve them.
Social skills	Demonstrate active listening when interviewing clients.
Communication skills	Develop detailed design drawings for a manufacturer.
Self-management skills	Plan the creation of a solution.
Research skills	Find out how to translate 2D storyboards into 3D animations.

Table 6

Examples of design-specific skill indicators

Well-designed learning engagements and assessments provide rich opportunities for students to practise and demonstrate ATL skills. Each MYP unit explicitly identifies ATL skills around which teaching and learning can focus, and through which students can authentically demonstrate what they are able to do. Formative assessments provide important feedback for developing discrete skills, and many ATL skills support students as they demonstrate their achievements in summative assessments of subject-group objectives.

Table 7 lists some specific ATL skills that students can demonstrate through performances of understanding in design.

Approaches to learning (ATL)
Thinking (**critical thinking):** observe users interact with a solution in order to evaluate its success.
Research (information literacy): evaluate sources of secondary information to ensure their reliability and relevance.

Table 7

Examples of design demonstrations of ATL skills

Subject-specific guidance

General guidance

The specific content of an MYP design course will differ according to the local or national circumstances. However, all MYP design courses should allow students to:

- meet the aims and objectives of MYP design by the end of the programme
- use the design cycle to develop intellectual and practical approaches to problem-solving
- inquire into design problems and establish the need for a solution
- establish design specifications for products/solutions through analysis of the problem and need
- generate feasible ideas and develop them into products/solutions of appropriate sophistication
- develop technical (practical) skills to manipulate digital and/or physical materials
- test and evaluate products/solutions to analyse their effectiveness at solving the problem or meeting the need.

Time allocation

In order to complete 2–3 design projects in year 5 that allow students to meet the objectives of the course, each project should be allocated at least 15–20 hours of teaching time. This time allocation should allow students to create products/solutions that are sufficiently sophisticated and complex. As a guide, the time should be split equally between addressing each objective. Such a division of time should provide students with the necessary time to work towards achieving the highest achievement levels in all criteria, and not to use all of the available time on creating their solution.

However, in earlier years, the proportion of time devoted to the development of practical, technical skills should be higher. This increased allocation of time will facilitate the development of skills that the student will require to work independently in years 4 and 5 of the programme.

Class size

MYP courses in design require schools to plan for class sizes small enough to ensure a learning environment characterized by:

- adequate supervision
- individual attention and full participation
- appropriate access to equipment and facilities
- safe and enjoyable learning experiences for all students.

Design situations

An understanding of design and the design cycle is an iterative and developmental process. As such, students need support and structure in order to develop their ability to solve real-life design problems. However, in earlier MYP years, this is not always possible and students do not always have the required knowledge, understanding and skills.

In earlier years of the programme, students can complete design challenges that focus on particular strands of an objective. Design challenges provide a key strategy to scaffold teaching and learning.

A **design challenge** is typically set within a contrived situation and has comparatively weak links to real life. The nature of the challenge will be given to students by the teacher, who will lead them through the design cycle process to develop a product. The challenge will be focused and specific with limited scope for different outcomes.

In later years, MYP design courses should address design problems.

A **design problem** is a real-life problem that needs to be solved for a specific client or a target market. The nature of the problem will be explored by students, who will consider a variety of ways to approach and investigate possible solutions. The problem will include physical or functional requirements that all feasible solutions must meet. Real-life situations that are relevant to students' lives and local reality pose interesting and provoking problems to solve.

Recommended design tasks

The use of different types of design tasks are recommended to frame teaching and learning in design. The task types stated below are typical activities used to equip students with the knowledge, skills and understanding needed to successfully design solutions to problems. They are designed to give opportunity for students to explore the design cycle and to gain experience of how design relates to real life.

Design project

The design project is a compulsory component of **all** MYP design courses.

This task must be assessed using **all** four criteria. It must be presented as a design folder that is clearly divided into four sections: one per criterion. It must begin with the student's inquiry into the problem and end with the evaluation of the product/solution. Students are presented with a design situation by the teacher, from which they identify their own problem.

Other recommended tasks include the **product/system study** and the **design and make**.

Effective use of information and communication technology in design

Information and communication technology (ICT) involves the use of computers, its applications and communication facilities in teaching and learning activities. Therefore, the use of ICT goes beyond MYP design and extends to all the teaching and learning in all subjects across the curriculum. The effective use of ICT is an approaches to learning (ATL) skill and, as such, schools must ensure that a whole-school approach is in place to allow students to develop information technology literacy and become competent users of computers.

Depending upon the school's resources, ICT should be used whenever appropriate:

- as a means of expanding students' knowledge of the world in which they live
- as a channel for developing concepts and skills
- as a powerful communication tool.

The use of ICT does not necessarily involve the use of the design cycle. ICT is a tool, which can be used in digital and product design courses to develop solutions to problems. While design teachers may be given responsibility by their school for helping students develop ICT literacy, teaching and learning ICT skills should not be confused with, or take the place of, any design course.

Subject-specific guidance on design tasks and the use of ICT in the design cycle is available in the teacher support material (TSM) on the programme resource centre.

Alignment of objectives and assessment criteria

In the MYP, assessment is closely aligned with the written and taught curriculum. Each strand from MYP design has a corresponding strand in the assessment criteria for this subject group. Figure 5 illustrates this alignment and the increasingly complex demands for student performance at higher achievement levels.

B Developing ideas

In order to reach the aims of design, students should be able to:

i. develop design specifications which clearly states the success criteria for the design of a solution

ii. develop a range of feasible design ideas, which can be correctly interpreted by others

iii. present the chosen design and justify its selection

iv. develop accurate and detailed planning drawings/diagrams and outline the requirements for the creation of the chosen solution.

Achievement level	Level descriptor
0	The student **does not** reach a standard identified by any of the descriptors below.
1–2	The student: i. **lists some basic** design specifications for the design of a solution ii. **presents one** design, which can be interpreted by others iii. **creates** incomplete planning drawings/diagrams.
3–4	The student: i. **lists some** design specifications, which relate to the success criteria for the design of a solution ii. **presents a few** feasible designs, using an appropriate medium(s) **or** annotation, which can be interpreted by others iii. **justifies** the selection of the chosen design with reference to the design specification iv. **creates** planning drawings/diagrams or **lists** requirements for the creation of the chosen solution.
5–6	The student: i. **develops** design specifications which **outline** the success criteria for the design of a solution ii. **develops a range of** feasible design ideas using an appropriate medium(s) **and** annotation which can be interpreted by others iii. **presents** the chosen design and **justifies** it's selection with reference to the design specification iv. **develops accurate** planning drawings/diagrams and **lists** requirements for the creation of the chosen solution.
7–8	The student: i. **develops detailed** design specifications, which **explain** the success criteria for the design of a solution based on the analysis of the research ii. **develops a range of** feasible design ideas, using an appropriate medium(s) **and detailed** annotation, which can be **correctly** interpreted by others iii. **presents** the chosen design and **justifies fully and critically** it's selection with **detailed** reference to the design specification iv. **develops accurate and detailed** planning drawings/diagrams and **outlines** requirements for the creation of the chosen solution.

Figure 5
Design objectives and criteria alignment

Assessment criteria overview

Assessment for design courses in all years of the programme is criterion-related, based on four equally weighted assessment criteria:

Criterion A	Inquiring and analysing	**Maximum 8**
Criterion B	Developing ideas	**Maximum 8**
Criterion C	Creating the solution	**Maximum 8**
Criterion D	Evaluating	**Maximum 8**

Subject groups **must** assess **all** strands of **all** four assessment criteria **at least twice** in **each year** of the MYP.

In the MYP, subject-group objectives correspond to assessment criteria. Each criterion has eight possible achievement levels (1–8), divided into four bands that generally represent limited (1–2); adequate (3–4); substantial (5–6); and excellent (7–8) performance. Each band has its own unique descriptor that teachers use to make "best-fit" judgments about students' progress and achievement.

This guide provides the **required assessment criteria** for years 1, 3 and 5 of MYP design. In response to national or local requirements, schools may add criteria and use additional models of assessment. Schools must use the appropriate assessment criteria as published in this guide to report students' final achievement in the programme.

Teachers clarify the expectations for each summative assessment task with direct reference to these assessment criteria. Task-specific clarifications should clearly explain what students are expected to know and do. They might be in the form of:

- a task-specific version of the required assessment criteria
- a face-to-face or virtual classroom discussion
- a detailed task sheet or assignment.

Design assessment criteria: Year 1

Criterion A: Inquiring and analysing

Maximum: 8

At the end of year 1, students should be able to:

i. explain and justify the need for a solution to a problem

ii. state and prioritize the main points of research needed to develop a solution to the problem

iii. describe the main features of one existing product that inspires a solution to the problem

iv. present the main findings of relevant research.

Achievement level	Level descriptor
0	The student **does not** reach a standard described by any of the descriptors below.
1–2	The student: i. **states** the need for a solution to a problem ii. **states** the findings of research.
3–4	The student: i. **outlines** the need for a solution to a problem ii. **states some** points of research needed to **develop** a solution, **with some guidance** iii. **states** the main features of an existing product that inspires a solution to the problem iv. **outlines some of** the main findings of research.
5–6	The student: i. **explains** the need for a solution to a problem ii. **states** and **prioritizes** the main points of research needed to **develop** a solution to the problem, **with some guidance** iii. **outlines** the main features of an existing product that inspires a solution to the problem iv. **outlines** the main findings of relevant research.
7–8	The student: i. **explains** and **justifies** the need for a solution to a problem ii. **states** and **prioritizes** the main points of research needed to **develop** a solution to the problem, **with minimal guidance** iii. **describes** the main features of an existing product that inspires a solution to the problem iv. **presents** the main findings of relevant research.

Criterion B: Developing ideas

Maximum: 8

At the end of year 1, students should be able to:

i. develop a list of success criteria for the solution

ii. present feasible design ideas, which can be correctly interpreted by others

iii. present the chosen design

iv. create a planning drawing/diagram which outlines the main details for making the chosen solution.

Achievement level	Level descriptor
0	The student **does not** reach a standard described by any of the descriptors below.
1–2	The student: i. **states one** basic success criterion for a solution ii. **presents one** design idea, which can be interpreted by others iii. **creates** an incomplete planning drawing/diagram.
3–4	The student: i. **states a few** success criteria for the solution ii. **presents more than one** design idea, using an appropriate medium(s) or labels key features, which can be interpreted by others iii. **states** the key features of the chosen design iv. **creates** a planning drawing/diagram or **lists** requirements for the creation of the chosen solution.
5–6	The student: i. **develops a few** success criteria for the solution ii. **presents a few** feasible design ideas, using an appropriate medium(s) and labels key features, which can be interpreted by others iii. **presents** the chosen design **stating** the key features iv. **creates** a planning drawing/diagram and **lists** the main details for the creation of the chosen solution.
7–8	The student: i. **develops a list of** success criteria for the solution ii. **presents** feasible design ideas, using an appropriate medium(s) and outlines the key features, which can be correctly interpreted by others iii. **presents** the chosen design **describing** the key features iv. **creates** a planning drawing/diagram, which **outlines** the main details for making the chosen solution.

Criterion C: Creating the solution

Maximum: 8

At the end of year 1, students should be able to:

i. outline a plan, which considers the use of resources and time, sufficient for peers to be able to follow to create the solution

ii. demonstrate excellent technical skills when making the solution

iii. follow the plan to create the solution, which functions as intended

iv. list the changes made to the chosen design and plan when making the solution.

Achievement level	Level descriptor
0	The student **does not** reach a standard described by any of the descriptors below.
1–2	The student: i. **demonstrates minimal** technical skills when making the solution ii. **creates** the solution, which functions **poorly** and is presented **in an incomplete form**.
3–4	The student: i. **lists** the main steps in a plan that contains some details, resulting in peers having difficulty following the plan to create the solution ii. **demonstrates satisfactory** technical skills when making the solution iii. **creates** the solution, which **partially** functions and is **adequately** presented iv. **states one change** made to the chosen design **or** plan when making the solution.
5–6	The student: i. **lists** the steps in a plan, which **considers** time and resources, resulting in peers being able to follow the plan to create the solution ii. **demonstrates competent** technical skills when making the solution iii. **creates** the solution, which functions **as intended** and is presented **appropriately** iv. **states one change** made to the chosen design **and** plan when making the solution.
7–8	The student: i. **outlines** a plan, which **considers** the use of resources and time, sufficient for peers to be able to follow to create the solution ii. **demonstrates excellent** technical skills when making the solution iii. follows the plan to **create** the solution, which functions as **intended** and is presented **appropriately** iv. **lists the changes** made to the chosen design and plan when making the solution.

Criterion D: Evaluating

Maximum: 8

At the end of year 1, students should be able to:

i. outline simple, relevant testing methods, which generate data, to measure the success of the solution

ii. outline the success of the solution against the design specification

iii. outline how the solution could be improved

iv. outline the impact of the solution on the client/target audience.

Achievement level	Level descriptor
0	The student **does not** reach a standard described by any of the descriptors below.
1–2	The student: i. **defines** a testing method, which is used to measure the success of the solution ii. **states** the success of the solution.
3–4	The student: i. **defines** a **relevant** testing **method**, which generates data, to measure the success of the solution ii. **states** the success of the solution against the design specification based on the results of **one relevant** test iii. **states one way** in which the solution could be improved iv. **states one way** in which the solution can impact the client/target audience.
5–6	The student: i. **defines relevant** testing **methods**, which generate data, to measure the success of the solution ii. **states** the success of the solution against the design specification based on **relevant** product testing iii. **outlines one way** in which the solution could be improved iv. **outlines** the impact of the solution on the client/target audience, **with guidance**.
7–8	The student: i. **outlines simple, relevant** testing methods, which generate data, to measure the success of the solution ii. **outlines** the success of the solution against the design specification based on **authentic** product testing iii. **outlines** how the solution could be improved iv. **outlines** the impact of the solution on the client/target audience.

Design assessment criteria: Year 3

Criterion A: Inquiring and analysing

Maximum: 8

At the end of year 3, students should be able to:

i. explain and justify the need for a solution to a problem

ii. construct a research plan, which states and prioritizes the primary and secondary research needed to develop a solution to the problem

iii. analyse a group of similar products that inspire a solution to the problem

iv. develop a design brief, which presents the analysis of relevant research.

Achievement level	Level descriptor
0	The student **does not** reach a standard described by any of the descriptors below.
1–2	The student: i. **states** the need for a solution to a problem ii. **states some of** the main findings of relevant research.
3–4	The student: i. **outlines** the need for a solution to a problem ii. **states** the research needed to **develop** a solution to the problem, **with some guidance** iii. **outlines one existing** product that inspires a solution to the problem iv. **develops** a **basic** design brief, which **outlines some of the findings** of relevant research.
5–6	The student: i. **explains** the need for a solution to a problem ii. **constructs** a research plan, which **states** and **prioritizes** the primary and secondary research needed to **develop** a solution to the problem, **with some guidance** iii. **describes** a group of similar products that inspire a solution to the problem iv. **develops** a design brief, which **outlines** the **findings** of relevant research.
7–8	The student: i. **explains** and **justifies** the need for a solution to a problem ii. **constructs** a research plan, which **states** and **prioritizes** the primary and secondary research needed to **develop** a solution to the problem **independently** iii. **analyses** a group of similar products that inspire a solution to the problem iv. **develops** a design brief, which **presents** the **analysis** of relevant research.

Criterion B: Developing ideas

Maximum: 8

At the end of year 3, students should be able to:

i. develop a design specification which outlines the success criteria for the design of a solution based on the data collected

ii. present a range of feasible design ideas, which can be correctly interpreted by others

iii. present the chosen design and outline the reasons for its selection

iv. develop accurate planning drawings/diagrams and outline requirements for the creation of the chosen solution.

Achievement level	Level descriptor
0	The student **does not** reach a standard described by any of the descriptors below.
1–2	The student: i. **lists** a few basic success criteria for the design of a solution ii. **presents** one design idea, which can be interpreted by others iii. **creates** incomplete planning drawings/diagrams.
3–4	The student: i. **constructs** a list of the success criteria for the design of a solution ii. **presents a few** feasible design ideas, using an appropriate medium(s) **or explains** key features, which can be interpreted by others iii. **outlines** the **main** reasons for choosing the design with reference to the design specification iv. **creates** planning drawings/diagrams or **lists** requirements for the chosen solution.
5–6	The student: i. **develops** design specifications, which **identify** the success criteria for the design of a solution ii. **presents a range of** feasible design ideas, using an appropriate medium(s) **and explains** key features, which can be interpreted by others iii. **presents** the chosen design and **outlines** the **main** reasons for its selection with reference to the design specification iv. **develops** accurate planning drawings/diagrams and **lists** requirements for the creation of the chosen solution.
7–8	The student: i. **develops** a design specification which **outlines** the success criteria for the design of a solution based on the data collected ii. **presents** a range of feasible design ideas, using an appropriate medium(s) **and annotation**, which can be correctly interpreted by others iii. **presents** the chosen design and **outlines** the reasons for its selection with reference to the design specification iv. **develops** accurate planning drawings/diagrams and **outlines** requirements for the creation of the chosen solution.

Criterion C: Creating the solution

Maximum: 8

At the end of year 3, students should be able to:

i. construct a logical plan, which outlines the efficient use of time and resources, sufficient for peers to be able to follow to create the solution

ii. demonstrate excellent technical skills when making the solution

iii. follow the plan to create the solution, which functions as intended

iv. explain changes made to the chosen design and the plan when making the solution.

Achievement level	Level descriptor
0	The student **does not** reach a standard described by any of the descriptors below.
1–2	The student: i. **demonstrates minimal** technical skills when making the solution ii. **creates** the solution, which functions **poorly** and is presented **in an incomplete form**.
3–4	The student: i. **outlines** each step in a plan that contains some details, resulting in peers having difficulty following the plan to create the solution ii. **demonstrates satisfactory** technical skills when making the solution iii. **creates** the solution, which **partially** functions and is **adequately** presented iv. **outlines** changes made to the chosen design **or** plan when making the solution.
5–6	The student: i. **constructs** a plan, which **considers** time and resources, sufficient for peers to be able to follow to create the solution ii. **demonstrates competent** technical skills when making the solution iii. **creates** the solution, which functions **as intended** and is presented **appropriately** iv. **outlines** changes made to the chosen design **and** plan when making the solution.
7–8	The student: i. **constructs** a **logical** plan, which **outlines** the efficient use of time and resources, sufficient for peers to be able to follow to create the solution ii. **demonstrates excellent** technical skills when making the solution iii. follows the plan to **create** the solution, which functions **as intended** and is presented **appropriately** iv. **explains** changes made to the chosen design and plan when making the solution.

Criterion D: Evaluating

Maximum: 8

At the end of year 3, students should be able to:

i. describe detailed and relevant testing methods, which generate accurate data, to measure the success of the solution

ii. explain the success of the solution against the design specification

iii. describe how the solution could be improved

iv. describe the impact of the solution on the client/target audience.

Achievement level	Level descriptor
0	The student **does not** reach a standard described by any of the descriptors below.
1–2	The student: i. **describes a** testing **method**, which is used to measure the success of the solution ii. **states** the success of the solution.
3–4	The student: i. **describes a relevant** testing **method**, which generates data, to measure the success of the solution ii. **outlines** the success of the solution against the design specification based on relevant product testing iii. **lists** the ways in which the solution could be improved iv. **outlines** the impact of the solution on the client/target audience.
5–6	The student: i. **describes relevant** testing **methods**, which generate data, to measure the success of the solution ii. **describes** the success of the solution against the design specification based on **relevant** product testing iii. **outlines** how the solution could be improved iv. **describes** the impact of the solution on the client/target audience, **with guidance**.
7–8	The student: i. **describes detailed and relevant** testing **methods**, which generate **accurate** data, to measure the success of the solution ii. **explains** the success of the solution against the design specification based on **authentic** product testing iii. **describes** how the solution could be improved iv. **describes** the impact of the solution on the client/target audience.

Design assessment criteria: Year 5

Criterion A: Inquiring and analysing

Maximum: 8

At the end of year 5, students should be able to:

i. explain and justify the need for a solution to a problem for a specified client/target audience

ii. identify and prioritize primary and secondary research needed to develop a solution to the problem

iii. analyse a range of existing products that inspire a solution to the problem

iv. develop a detailed design brief, which summarizes the analysis of relevant research.

Achievement level	Level descriptor
0	The student **does not** reach a standard described by any of the descriptors below.
1–2	The student: i. **states** the need for a solution to a problem for a specified client/target audience ii. **develops** a basic design brief, which **states** the **findings** of relevant research.
3–4	The student: i. **outlines** the need for a solution to a problem for a specified client/target audience ii. **outlines** a research plan, which **identifies** primary and secondary research needed to **develop** a solution to the problem, **with some guidance** iii. **analyses one** existing product that inspires a solution to the problem iv. **develops** a design brief, which **outlines** the analysis of relevant research.
5–6	The student: i. **explains** the need for a solution to a problem for a specified client/target audience ii. **constructs** a research plan, which **identifies** and **prioritizes** primary and secondary research needed to **develop** a solution to the problem, **with some guidance** iii. **analyses a range of** existing products that inspire a solution to the problem iv. **develops** a design brief, which **explains** the analysis of relevant research.

Achievement level	Level descriptor
7–8	The student: i. **explains** and **justifies** the need for a solution to a problem for a client/ target audience ii. **constructs** a **detailed** research plan, which **identifies** and **prioritizes** the primary and secondary research needed to **develop** a solution to the problem independently iii. **analyses a range of** existing products that inspire a solution to the problem in detail iv. **develops** a **detailed** design brief, which **summarizes** the analysis of relevant research.

Criterion B: Developing ideas

Maximum: 8

At the end of year 5, students should be able to:

i. develop design specifications, which clearly states the success criteria for the design of a solution

ii. develop a range of feasible design ideas, which can be correctly interpreted by others

iii. present the chosen design and justify its selection

iv. develop accurate and detailed planning drawings/diagrams and outline the requirements for the creation of the chosen solution.

Achievement level	Level descriptor
0	The student **does not** reach a standard described by any of the descriptors below.
1–2	The student: i. **lists some basic** design specifications for the design of a solution ii. **presents one** design, which can be interpreted by others iii. **creates** incomplete planning drawings/diagrams.
3–4	The student: i. **lists some** design specifications, which relate to the success criteria for the design of a solution ii. **presents a few** feasible designs, using an appropriate medium(s) **or** annotation, which can be interpreted by others iii. **justifies** the selection of the chosen design with reference to the design specification iv. **creates** planning drawings/diagrams or **lists** requirements for the creation of the chosen solution.
5–6	The student: i. **develops** design specifications, which **outline** the success criteria for the design of a solution ii. **develops a range of** feasible design ideas, using an appropriate medium(s) **and** annotation, which can be interpreted by others iii. **presents** the chosen design and **justifies** its selection with reference to the design specification iv. **develops accurate** planning drawings/diagrams and **lists** requirements for the creation of the chosen solution.

Achievement level	Level descriptor
7–8	The student: i. **develops detailed** design specifications, which **explain** the success criteria for the design of a solution based on the analysis of the research ii. **develops a range of** feasible design ideas, using an appropriate medium(s) **and detailed** annotation, which can be **correctly** interpreted by others iii. **presents** the chosen design and **justifies fully and critically** its selection with **detailed** reference to the design specification iv. **develops accurate and detailed** planning drawings/diagrams and **outlines** requirements for the creation of the chosen solution.

Criterion C: Creating the solution

Maximum: 8

At the end of year 5, students should be able to:

i. construct a logical plan, which describes the efficient use of time and resources, sufficient for peers to be able to follow to create the solution

ii. demonstrate excellent technical skills when making the solution

iii. follow the plan to create the solution, which functions as intended

iv. fully justify changes made to the chosen design and plan when making the solution.

Achievement level	Level descriptor
0	The student **does not** reach a standard described by any of the descriptors below.
1–2	The student: i. **demonstrates minimal** technical skills when making the solution ii. **creates** the solution, which functions **poorly** and is presented **in an incomplete form**.
3–4	The student: i. **constructs a plan** that contains some production details, resulting in peers having difficulty following the plan ii. **demonstrates satisfactory** technical skills when making the solution iii. **creates** the solution, which **partially** functions and is **adequately** presented iv. **outlines** changes made to the chosen design and plan when making the solution.
5–6	The student: i. **constructs a logical plan**, which considers time and resources, sufficient for peers to be able to follow to create the solution ii. **demonstrates competent** technical skills when making the solution iii. **creates** the solution, which functions **as intended** and is presented **appropriately** iv. **describes** changes made to the chosen design and plan when making the solution.
7–8	The student: i. **constructs a detailed and logical plan**, which **describes** the efficient use of time and resources, sufficient for peers to be able to follow to create the solution ii. **demonstrates excellent** technical skills when making the solution. iii. follows the plan to **create** the solution, which functions **as intended** and is presented **appropriately** iv. fully **justifies** changes made to the chosen design and plan when making the solution.

Criterion D: Evaluating

Maximum: 8

At the end of year 5, students should be able to:

i. design detailed and relevant testing methods, which generate data, to measure the success of the solution

ii. critically evaluate the success of the solution against the design specification

iii. explain how the solution could be improved

iv. explain the impact of the solution on the client/target audience.

Achievement level	Level descriptor
0	The student **does not** reach a standard described by any of the descriptors below.
1–2	The student: i. **designs a** testing **method**, which is used to measure the success of the solution ii. **states** the success of the solution.
3–4	The student: i. **designs a relevant** testing **method**, which generates data, to measure the success of the solution ii. **outlines** the success of the solution against the design specification based on **relevant** product testing iii. **outlines** how the solution could be improved iv. **outlines** the impact of the solution on the client/target audience.
5–6	The student: i. **designs relevant** testing **methods**, which generate data, to measure the success of the solution ii. **explains** the success of the solution against the design specification based on **relevant** product testing iii. **describes** how the solution could be improved iv. **explains** the impact of the solution on the client/target audience, **with guidance**.
7–8	The student: i. **designs detailed and relevant** testing **methods**, which generate data, to measure the success of the solution ii. critically **evaluates** the success of the solution against the design specification based on **authentic** product testing iii. **explains** how the solution could be improved iv. **explains** the impact of the product on the client/target audience.

Notes for criterion A

- When developing the design brief, students should concisely summarize only the useful and relevant information they have found through their research. They will present this information in their own words. Students should not copy and paste information from sources without analysis or indicating relevance.

Notes for criterion B

- In MYP design, a feasible idea is one that the student can create within the allocated time with the tools and facilities available to them.
- Examples of "planning drawings/diagrams" for digital design solutions include website navigation maps, interface layout—aesthetic considerations (websites), detailed sketches (graphic design), detailed storyboards (video editing and animations), and so on.
- Examples of "planning drawings/diagrams" for product design solutions include scale drawing with measurements (orthographic), part and assembly drawings, exploded drawings, recipes, cutting plans, and so on.

Notes for criterion C

- When changes have been made to the solution, students must describe and justify each change. If there are no changes to the plan, students are not required to describe or justify any changes.
- **Technical skills:** A student's level of technical skill can be determined using the following two factors:
  - the complexity of skill demonstrated
  - the level of guidance needed from the teacher to complete the task.

The teacher should determine an age-appropriate level of technical skill demonstrated by the student using a "best-fit" approach. A clarification is detailed below.

Minimal technical skills: Simple skills are demonstrated and the student requires a great deal of assistance after they have received initial instruction on how to use tools.

Satisfactory technical skills: Simple and complex skills are demonstrated and the student requires some assistance after they have received initial instruction on how to use complex tools.

Competent technical skills: Complex skills are demonstrated and the student generally works independently, requiring some guidance after initial instruction.

Excellent technical skills: A wide range of complex skills are demonstrated and the student works independently, requiring minimal guidance after initial instruction.

Notes for criterion D

- **Product testing:** This is a stage in the design process where versions of products (for example, prototypes) are tested against the design need (specification), applied to the context and presented to the end-user or target audience. These tests may include the collection and analysis of data. Types of testing include **user trial and observation:** (usability and intuitiveness), **field/performance test:** (functionality and performance), **expert appraisal:** (beta testing, consumer testing)
- **Authentic tests:** The tests are relevant to the project and are completed by appropriate testers to gain high-quality quantitative and qualitative feedback.

MYP eAssessment

Students seeking **IB MYP course results** for design courses must complete an ePortfolio in which they demonstrate their achievement of the subject group's objectives. For each assessment session, the IB publishes a partially completed design unit planner (including required assessment tasks) that teachers must develop and deliver in their own contexts. The recommended teaching time for the ePortfolio unit is approximately 20 hours.

The resulting portfolio of student work is marked by the student's teacher(s), based on the school's internal standardization of judgments against MYP design assessment criteria for year 5. Successful results can contribute to students' attainment of the **IB MYP certificate**.

A process of external moderation assures accurate and consistently applied standards.

Optional eAssessment in design is offered in design, digital design and product design.

Using partially completed unit planners

Partially completed unit planners contain the following completed sections, which must remain unchanged in their development by schools.

- Global context and exploration
- Key concept
- Related concept(s)
- Statement of inquiry
- A factual, conceptual and debatable inquiry question (indicative of additional questions that may be developed and added to by teachers and students)
- Summative assessment task(s)
- Relationship between summative assessment tasks and statement of inquiry

Upon their publication, the IB unit plans are to be completed by the teacher responsible for teaching the unit and managing the summative assessment. Where more than one teacher is involved, this should be done collaboratively.

During the teaching period, teachers should support the learning process as usual, providing appropriate formative feedback that guides students in developing and improving their work. Teachers are responsible for using principled professional judgment when determining the nature and extent of feedback they provide on students' ePortfolio tasks. It is appropriate to provide general guidance rather than extensive annotations, detailed edits, or extended critiques.

In order to ensure fairness and to prevent undue influence, teachers' feedback on ePortfolio tasks must only advise students generally on how to approach and complete their work. As a shared standard of good practice, teachers must provide only one round of formal feedback on candidates' work for each task. Once students have submitted the final version of their ePortfolio for school-based assessment, it cannot be retracted or redone.

Teachers must ensure that all student work submitted for eAssessment is prepared according to IB requirements. In particular, students and teachers are responsible for understanding all IB academic honesty requirements, especially those relating to authenticity and intellectual property. Teachers must explain clearly to students and parents that all work submitted for school-based assessment—including MYP ePortfolios—must be the candidate's own authentic and individual work. Teachers must use appropriate means to ensure that each candidate's work is, in their professional judgment, authentic. If a candidate does submit work for assessment that is not authentic, the school must follow its internal policy for dealing with academic honesty issues.

Plagiarism and collusion are unprincipled breaches of IB regulations, potentially subjecting candidates to consequences for academic misconduct. In addition, inauthentic student work can distort assessment results and potentially disadvantage all students in the school's cohort by unfairly skewing its moderation sample.

When awarding criterion level totals, teachers must base their judgment of student achievement entirely on the completed candidate work that is to be presented for moderation. Reported achievement levels should not be influenced by the teacher's previous experience with the candidate or by work that is not represented in the candidate's ePortfolio.

If more than one teacher is responsible for assessment, an internal standardization process should be used to ensure that all candidates are marked to the same standard. Teachers are encouraged to keep a record of their comments about the candidate's work to explain the levels they have awarded (especially where marginal judgments are made) as they help the examiner support the teacher's judgments. Teacher comments should be uploaded with work that is selected as part of the moderation sample.

Once criterion level totals have been submitted for all candidates, IBIS will select which ePortfolios must be uploaded for moderation by the IB. The content of each ePortfolio is limited to the summative assessment task(s) required by the IB's partially completed unit planner for the relevant session.

Assessment tasks

The design cycle requires students to present their work for each unit through the headings of the four criteria. The partially completed unit planner for design requires students to submit work following the design cycle (encompassing all strands of all criteria) to create a solution (or range of solutions) in respect of a particular response, such as an inclusive community. Students will be guided towards perspectives they may consider in relation to that response and some ideas, which may be explored for final solutions.

ePortfolio process

Planning the unit

Teachers complete the unit planner according to their own local contexts and curriculum requirements. This approach allows a teacher who is restricted to a particular teaching area for the duration of teaching this unit to plan appropriately based on available resources. An example might be that two product design classes run simultaneously for MYP year 5, one in computer-aided manufacturing and one in food product design. Each teacher can complete the content of his or her unit to allow for the use of those facilities and the general resources available, as well as from his or her own background and the cultural context of the school.

Planning for assessment

It is essential that all summative assessment undertaken by the teacher is set against the criteria for MYP year 5 as published in this guide. Submissions will be student work only—background information, including the completed unit planner or task-specific clarifications (used for the benefit of student learning) will not be submitted to the IB.

The work produced for summative assessment must be the student's own work. However, teachers play an important role as students plan for and complete the required tasks. Teachers should ensure that students are familiar with:

- the requirements of the type of work to be internally assessed
- the assessment criteria (students must ensure that the work submitted addresses the objectives effectively).

If a student is not able to complete the work without substantial support, teachers should note the circumstances and nature of support provided in their comments justifying the levels awarded.

Requirements for assessment

Students complete a portfolio of work in the form of a design project, following the design cycle.

Where a prescribed summative assessment task or the teaching context of the school result in students working within groups or collaboratively, students must only be assessed for their individual contribution to the submission. It is essential that the work of each student is clearly identifiable for the assessment process, both to the teacher and to IB examiners.

When selecting evidence for group activities, care must be taken that each student features prominently enough to allow for only his or her contribution to be assessed. Students and their contribution to an activity must be clearly identifiable. The following examples show how this might be achieved.

- Text evidence—students record their personal contribution, ensuring they carefully identify their role in the development and any eventual outcome, paying particular attention to documenting their individual approach, investigation and contribution made to the collaborative process.
- Video and photographic evidence—each student ensures that he or she is clearly identifiable, for example, by wearing a coloured top that contrasts with other members of the group, so he or she can be recognized as the focus of assessment.
- Audio evidence—audio evidence is not generally recommended for collaborative or group work because it is not possible to identify each individual contributor.

Submission of the ePortfolio

Submission limits (examiners will not read beyond these limits)	
Written work	40 A4 pages
Appendix (unassessed)*	10 A4 pages

*An appendix can be used to demonstrate supporting research or raw data that would otherwise impact upon the overall maximum page count. It will not be formally assessed, but may be referred to in order to confirm specific parts of the report.

Design subject-specific grade descriptors

Subject-specific grade descriptors serve as an important reference in the assessment process. Through careful analysis of subject-group criteria and the general grade descriptors, they have been written to capture and describe in a single descriptor the performance of students at each grade for each MYP subject group.

Subject-specific grade descriptors are also the main reference used to select grade boundaries for each discipline in each assessment session. During this process, the grade award team compares student performance against descriptors of achievement at grades 2 and 3; 3 and 4; and 6 and 7 (other boundaries are set at equal intervals between these key transitions). The grade award process is able to compensate for variations in challenge between ePortfolio tasks and in standards applied to marking (both between subjects and for a particular subject across sessions) by setting boundaries for each discipline and examination session, with reference to real student work.

Subject-specific grade descriptors tie eAssessment to criterion-related assessment and to MYP assessment criteria and level descriptors, which put the programme's criterion-related assessment philosophy into practice.

Grade	Descriptor
7	Produces high-quality, frequently innovative design solutions through the application of the design cycle. Communicates comprehensive, nuanced understanding of design concepts and contexts through independent and detailed work. Consistently demonstrates sophisticated critical and creative thinking to inform research methods and to refine selected solutions. Frequently transfers knowledge and applies skills, with independence and expertise, to complex real-world issues.
6	Produces high-quality, occasionally innovative design solutions through the application of the design cycle. Communicates extensive understanding of design concepts and contexts through independent and detailed work. Demonstrates critical and creative thinking to inform research methods and to refine selected solutions, frequently with sophistication. Transfers knowledge and applies skills, often with independence, to real-world issues.
5	Produces generally high-quality design solutions through the application of the design cycle. Communicates good understanding of design concepts and contexts. Demonstrates critical and creative thinking to inform research methods and to refine selected solutions, sometimes with sophistication. Usually transfers knowledge and applies skills, with some independence, to real-world issues.

Grade	Descriptor
4	Produces good-quality design solutions through the application of the design cycle. Communicates basic understanding of design concepts and contexts, with few misunderstandings and minor gaps. Often demonstrates critical and creative thinking to inform research methods and to refine selected solutions. Transfers some knowledge and applies some skills in familiar situations, but requires support in unfamiliar situations.
3	Produces design solutions of an acceptable quality that generally follow the design cycle. Communicates basic understanding of design concepts and contexts in the work with occasional significant misunderstandings or gaps. Begins to demonstrate some critical and creative thinking to inform research methods and to refine selected solutions. Begins to transfer knowledge and apply skills, requiring support even in familiar situations.
2	Produces work of limited quality. Communicates limited understanding of some design concepts and contexts. Demonstrates limited evidence of critical or creative thinking. Limited evidence of transfer of knowledge or application of skills.
1	Produces work of a very limited quality. Conveys many significant misunderstandings or lacks understanding of most design concepts and contexts. Very rarely demonstrates critical or creative thinking. Very inflexible, rarely shows evidence of knowledge or skills.

Related concepts in design

Related concept	Definition
Adaptation	Adaptation involves incorporating ideas found in one product into the development of a new product.
Collaboration	Collaboration involves two or more people sharing expertise and experience, working together to solve a problem and realize shared goals.
Ergonomics	Ergonomics is the application of scientific information and understanding of how humans relate to products, systems, interfaces and environments.
Evaluation	In design, evaluation involves the gathering and processing of data to determine an action. Evaluation involves feedback, which can be used to control, revise or modify.
Form	Form concerns the overall shape and configuration of a product. It relates to aspects such as aesthetics, shape, colour and texture.
Function	The function of a solution refers to what it has been designed to do and how effective it is at enabling that action to be performed.
Innovation	Innovation is the successful diffusion of an invention into the marketplace.
Invention	An invention is an entirely novel product or a feature of a product that is unique.
Markets and trends	Markets can be considered as sectors and segments comprised of groups of individuals with similar needs. Trends involve short- and long-term patterns of consumer behaviour.
Perspective	Perspective relates to the point of view of various stakeholders involved in solving a problem. Stakeholders can have different perspectives and can include clients, target audiences, focus groups, consumers, manufacturers and experts.
Resources	Resources relate to the supply of a commodity. In MYP design, these commodities can be classified as information, materials and equipment.
Sustainability	Sustainability is the capacity to endure, which can have environmental, economic and social dimensions. In MYP design, sustainability can be considered in the following ways. • Green and Eco-design • Sustainable consumption • Sustainable design • Sustainable development • Sustainable innovation • Sustainable production

Design glossary

Term	Definition
Appropriate quality	This is the best product/solution that the student can produce, taking into account the resources available, the skills and techniques he or she has used, his or her educational development, how the product/solution addresses the identified need, and aspects of safety and ergonomics.
Authentic tests	The tests are relevant to the project and are completed by appropriate testers to gain high-quality quantitative and qualitative feedback.
Client	An individual, a company or organization that commissions a designer to develop a solution to a personal or particular design problem.
Computer-aided design (CAD)	The use of computers to design products/solutions.
Computer-aided manufacture (CAM)	The use of computers to cut materials or create components, normally using CAD or numeric control.
Design brief	The student's response to the design situation, based on his or her research, detailing how he or she intends to solve the problem. This will summarize the relevant findings from his or her research, and inform the development of his or her design specification.
Design situation	A short introduction to a project written by the teacher or client, which frames a design project in terms of the nature of the problem to be addressed or an area from which students will identify a challenge or problem that needs to be solved. The design situation is drawn from the statement of inquiry and presents the scope of a project.
Design specification	A detailed description of the conditions, requirements and restrictions with which a design must comply. This is a precise and accurate list of facts, such as conditions, dimensions, materials, process and methods, that are important for the designer and for the user. All appropriate solutions will need to comply with the design specification.
Expert appraisal	A type of product testing, which relies on the knowledge of an expert in the operation of a product. This can include interviewing an expert, beta testing and consumer testing.
Field test	A type of product testing, which tests the performance of a new product under the conditions it will be used, which normally focuses on aspects of functionality (durability, robustness, suitability to its environment, and so on).
Performance test	An evaluation of the actual performance of a product within the task or learning objective using the conditions under which it will be performed and the absolute standard for acceptable performance.

Term	Definition
Planning drawings/ diagrams	Detailed drawings or diagrams, which include details of a product's components and how they are combined/assembled.
Target audience	A group of similar users who require a solution to a common problem or a product that fills a common need or want.
User trial	A type of product test carried out by allowing the target market to interact with the product/solution. The observation of people using a product and collection of comments from people who have used a product. This normally focuses on usability and intuitive interaction.

MYP command terms for design

Command term	Definition
Analyse	Break down in order to bring out the essential elements or structure. (To identify parts and relationships, and to interpret information to reach conclusions.)
Construct	Display information in a diagrammatic or logical form.
Create	To evolve from one's own thought or imagination, as a work or an invention.
Define	Give the precise meaning of a word, phrase, concept or physical quantity.
Demonstrate	Make clear by reasoning or evidence, illustrating with examples or practical application.
Describe	Give a detailed account or picture of a situation, event, pattern or process.
Design	Produce a plan, simulation or model.
Develop	To improve incrementally, elaborate or expand in detail. Evolve to a more advanced or effective state.
Evaluate	Make an appraisal by weighing up the strengths and limitations.
Explain	Give a detailed account including reasons or causes. (See also "Justify".)
Identify	Provide an answer from a number of possibilities. Recognize and state briefly a distinguishing fact or feature.
Justify	Give valid reasons or evidence to support an answer or conclusion. (See also "Explain".)
List	Give a sequence of brief answers with no explanation.
Outline	Give a brief account or summary.
Present	Offer for display, observation, examination or consideration.
Prioritize	Give relative importance to, or put in an order of preference.
State	Give a specific name, value or other brief answer without explanation or calculation.
Summarize	Abstract a general theme or major point(s).

Selected reading

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