Middle Years Programme

Guide to MYP eAssessment

2015 live pilot examinations

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Middle Years Programme

Guide to MYP eAssessment

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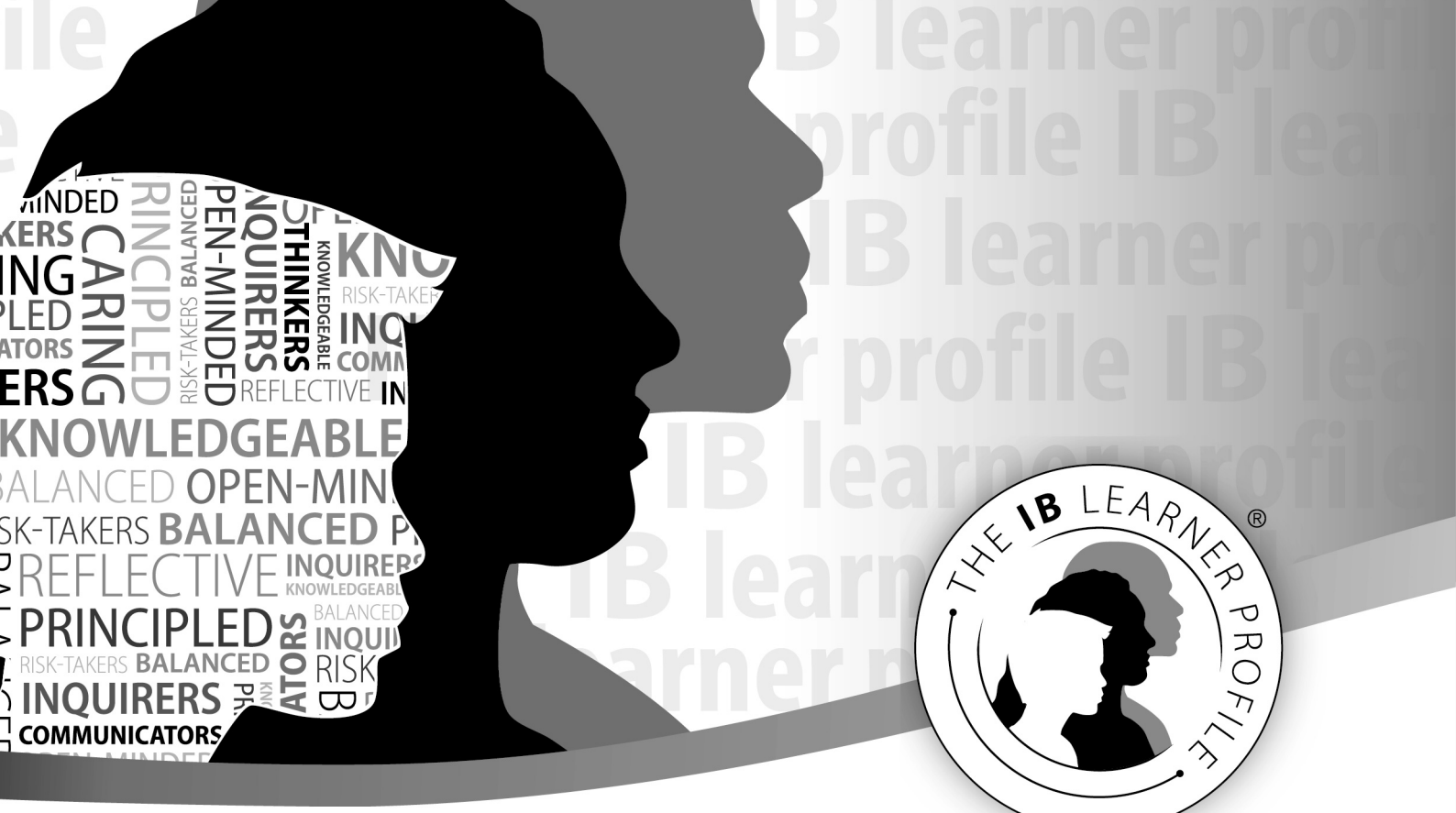
IB mission statement

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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Introduction

The new IB Middle Years Programme (MYP) assessment model includes a range of strategies for assessing what students know and are able to do. In addition to the mandatory external moderation of the personal project in 2016, schools may offer MYP eAssessment. MYP eAssessment focuses on synthesizing information, evaluating findings and applying them to real-world situations. MYP students demonstrate their achievement through creative writing, investigation and analysis of a wide range of sources.

IB examiners assess:

- **ePortfolios** of carefully defined coursework in language acquisition, arts, design and physical and health education, using a process of dynamic sampling to moderate results to a global standard

- **onscreen examinations** (two hours in duration) for selected courses in language and literature, individuals and societies, sciences, mathematics, and interdisciplinary learning.

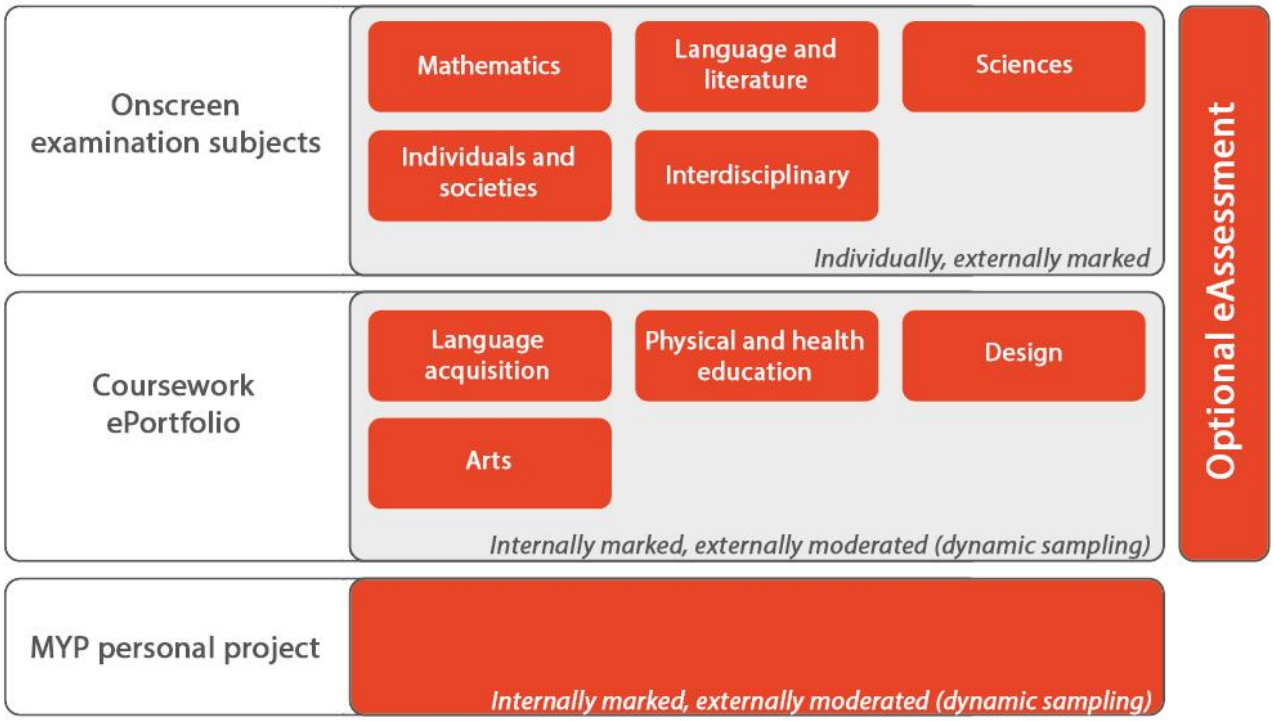


Figure 1

MYP external assessment model

This assessment design has been informed by the careful consideration of assessment principles and represents a careful balance between:

- rigour and resources—developing robust assessments that do not consume too much time and represent an age-appropriate level of demand

- validity and reliability—valuing the rich, textured value of teacher-based assessment in classroom learning environments while seeking external standardization of student achievement

- flexibility and consistency—respecting the needs of individual learning communities while creating a unifying standard across the MYP.

This new assessment structure will bring significant benefits to the MYP community. MYP onscreen examinations are designed to assess conceptual understanding and academic skills in a way that takes full advantage of the power of technology to create a stimulating learning environment.

MYP onscreen examinations can:

- inspire deeper learning in MYP classrooms and reinforce good practice in teaching and learning by providing models for teachers to use in their own formative and summative assessment
- develop teachers' assessment literacy through post-assessment analysis of results and review of examinations, markschemes and explanatory notes from senior examiners
- provide a renewable and ever-growing resource of stimulating material that inspires classroom discussion and helps students to understand the demands of the programme
- develop confidence in school communities (for school leaders, parents, teachers and students) that local judgments about student achievement have been individually, externally validated
- create a shared vision of excellence in which students' hard work and success are internationally recognized.

External final assessment in the MYP affords a unique opportunity for the entire MYP community to focus on a common global context, and to explore how subject group objectives fit within the programme's broader goals of developing appreciation for our common humanity and shared responsibility as guardians of the planet. MYP eAssessment creates a fair foundation for judging student achievement and prompts continuity in teaching and learning through the final stages of the programme. As part of a broad and balanced assessment model, onscreen examinations help students to develop essential academic and personal skills that prepare them for future study—including the rigorous demands of the IB Diploma Programme and IB Career-related Certificate.

How to use this guide

This document contains information to help teachers and students to familiarize themselves with the style and content of pilot MYP onscreen examinations to take place in May 2015. The following subjects are available for registration for May 2015.

- Language and literature (English, French and Spanish)
- History (available in English, French and Spanish)
- Biology (available in English and French)
- Mathematics (available in English, French and Spanish)
- Interdisciplinary learning (available in English, French and Spanish)

These pilot examinations do not contribute to the award of the MYP certificate in 2015. They provide schools with an opportunity to participate in the MYP eAssessment process before the first full assessment session based on the new model in May 2016. It is anticipated that the examinations will be sat as additional subjects to the subjects for which students will be moderating. For example, the biology examination can be taken where a candidate is moderating for integrated sciences and the interdisciplinary learning assessment will be relevant as an additional subject for all students. By registering candidates for the examinations, schools will experience the background work needed to prepare for the examination through downloading and opening the application on which the assessment will run on school's computers, as well as monitoring the examinations taking place and returning the work to the IB for marking. More importantly, schools will gain an insight into how their students respond to the assessments in order to inform the preparation of students for the first live session in 2016.

In order to allow schools to gain most benefit from this opportunity, for this session only, students in year 4 of the MYP and schools whose main session is in November are invited to register for May 2015 pilot onscreen examinations. This way, students in the first cohort will already be experienced in the style of the assessments and the use of the technology well before their certification session. During February 2015, familiarization material will be published to further support students as they, with their teachers, prepare for the session.

For the subjects examined in the May 2015 MYP eAssessment session, this guide contains the following information.

- Topic lists (as previously published in the *eAssessment development report (April 2014)*
- Examination blueprints
- Sample tasks and markschemes (amended based on feedback from the 2013 trial examinations)
- Subject-specific grade descriptors

Topic lists

The MYP provides a curriculum framework that offers schools flexibility to determine engaging, relevant, challenging and significant content to meet local requirements and student needs. As a concept-driven curriculum, the MYP helps students to develop structured inquiries that include facts, topics and concepts.

For the purpose of external assessment, the MYP identifies a range of subject-specific topics that constitute one of the variables that authors consider when they create onscreen examinations. These topics are at a lower level of specification than the formal syllabus of a similar subject in the IB Diploma Programme, and they leave considerable leeway for schools to develop their own written curriculum according to MYP requirements.

These topics define the examinable subject matter for MYP eAssessments. In their local development of the MYP curriculum, schools are not limited to these topics. This list does not constitute the exclusive IB-approved curriculum for MYP years 4–5.

MYP eAssessments are designed to make judgments about the level of students' conceptual understanding; this list is not intended to create a specific body of factual knowledge that must be mastered in year 5 in order to be successful in onscreen examinations. Schools that engage in MYP external assessment can develop a variety of approaches that familiarize students with these topics and provide opportunities for students to construct understanding using many different facts.

Topic lists help to promote equality in candidate experience and maintain a consistent level of challenge across examination sessions. They also have value for establishing the rigour of the programme in ways that support its recognition by external accrediting bodies. They represent a general consensus in the IB community of typical expectations and developmentally appropriate levels of sophistication for MYP year 5 students. At the same time, topics represent a level of curriculum development (especially for schools seeking IB-validated grades) that preserves the MYP's character as a global framework from which to develop a locally responsive curriculum.

Examination blueprints

MYP onscreen assessments are constructed as a series of tasks that sample, simulate or replicate internal assessment practices. The assessments follow an agreed structure that provides a clear framework for authoring each examination. As part of an ethical assessment model, these assessment blueprints ensure consistency and transparency, and they guarantee a balanced approach to measuring students' achievement with respect to MYP objectives. MYP onscreen assessment blueprints document the close connection of large-scale assessment with subject-group objectives, classroom learning engagements and the programme's rigorous internal assessment requirements.

These blueprints enable teachers and students to review the nature and purpose of MYP eAssessment. They provide an important resource for helping students to prepare for onscreen examinations, focusing attention on subject-group criteria and assessment strategies in each subject group.

Sample tasks and markschemes

These tasks represent revised versions of the onscreen examination tasks created for trialling MYP eAssessment in 2013. They represent only one section of a full onscreen examination, and must be used as representative specimens only. These sample tasks offer a paper-based version of the examination tasks so that teachers and students can prepare for participation in the pilot onscreen examinations in 2015, and they must be read in the context of the broader MYP onscreen examination blueprints. The sample tasks may not be fully consistent with the blueprints as they were written before the blueprints were developed. The markschemes are representative of the answers anticipated by the examining team but they have not been subject to a real session where standardization would lead to refinement in light of real student responses.

Full specimen examinations in an onscreen format are scheduled to be available prior to the first onscreen examinations for MYP certification in 2016.

Subject-specific grade descriptors

Subject-specific grade descriptors serve as an important reference in the assessment process. Each eAssessment is constructed to reflect closely the assessment criteria of the subject group, both by assessing every possible strand of the criteria and ensuring that each criterion has equal weighting across the assessment as a whole. The use of command terms helps to ensure a consistent rigour in the examinations, which are transparent and accessible to students across a wide range of achievement.

Even with this careful construction, variability always exists when students and examiners interact with particular questions and examiners respond to real student responses. In order to ensure fairness, grade boundaries are set only after careful analysis of marked candidate scripts against general grade descriptors.

During this analysis, 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). When there is sufficient evidence that student performance at a particular mark demonstrates the level of achievement set out in the grade descriptor (for example, scripts at a mark of 53 meet the requirements for a grade 4) scripts at the next mark down are considered. This is repeated and eventually the scripts fail to demonstrate the required level of achievement expressed by the descriptor, and it becomes clear that the scripts

under consideration are better described by the descriptor for the next grade down. This information, combined with actual performance of the whole cohort and background information such as feedback from candidates and teachers about the examinations, predicted criterion level totals, and achievement of previous cohorts, are all used to ensure that the eventual placement of boundaries is fair and consistent.

The MYP general grade descriptors are derived from the same achievement level descriptors on which all MYP assessment is based. Setting boundaries with reference to these descriptors, therefore, provides a valuable triangulation that helps to ensure that MYP eAssessment works within the larger context of the programme. MYP general grade descriptors serve to confirm recommended grade boundaries set forth in *MYP: From principles into practice* (May 2014) or, when necessary, as an agreed standard that allows boundaries for the performance of a specific cohort to be adjusted in light of examinations, students and examiners in the real world.

Preparing for MYP onscreen examinations

This document, together with a familiarization document planned for February 2015, is not expected to be the main source of information for student preparation. The examinations are designed to demonstrate good assessment practice for the MYP and as such these documents are to be used to supplement the relevant subject guides. The best preparation for eAssessment is good MYP classroom practice that helps students to:

- understand and demonstrate achievement against all strands of MYP subject-specific criteria
- generate and answer their own factual, conceptual and debatable questions
- develop confidence in applying what they know in unfamiliar situations
- think critically and creatively about MYP key and related concepts and the relationships among them
- practise ATL skills in communication and presentation onscreen, and under examination conditions
- explore multiple facets of ideas and phenomena within a range of global contexts
- use multiple perspectives to analyse issues and challenges
- adapt, modify and expand on what they know, based on additional information
- learn how to generalize, generate new methods, and use procedural knowledge flexibly to solve complex problems
- attend to, and be able to explain, their own reasoning and problem-solving process.

Other documents useful in planning for MYP eAssessment

- *Handbook of procedures for the Middle Years Programme: Onscreen examinations 2015 live pilot*
- *School IT requirements for conducting MYP onscreen examinations from 2015 onwards*
- *eAssessment development report* (April 2014)
- *Report on the trial MYP eAssessments held in October and December 2013*
- *MYP fees and pricing framework*

A video presentation on the look and feel of MYP onscreen examinations is also available on the OCC.

In February 2015, the IB will publish a document designed to help students to familiarize themselves with specific function of the onscreen examination platform.

Standards for onscreen examinations

Common features of MYP onscreen examinations

Each assessment is carefully constructed using background resources to engage students with interesting scenarios and problems. Background resources can be in a range of multimedia formats, and students will be able to respond in various ways using tool sets selected to support subjects and question types.

Each task targets at least one assessment criterion, and each question is carefully written to stimulate a response that demonstrates student's achievement with respect to strands within those criteria. The tasks pose a range of questions—from open-ended prompts that cover multiple or all strands within a criterion to shorter more strand-specific questions. Tasks are designed to offer students opportunities to reach the highest levels of achievement and to distinguish performance across achievement bands. Each examination overall has an even distribution of demand and marks across the four required relevant MYP subject-group criteria.

Each task begins by explicitly identifying its key and related concepts. Each task has a single key concept, but may engage multiple related concepts. At least two different key concepts will be covered somewhere in the assessment.

The MYP structures sustained inquiry by developing conceptual understanding in global contexts. Each examination series will focus on a specified global context. At least one task on each assessment will be developed in light of this global context. The global context for a session will be published in December for schools undertaking assessment in May and June for those assessed in November.

Standardized symbols, notation and terminology for sciences and mathematics

MYP eAssessments will use the standards adopted by the IB from a system of notation based on ISO 80000 (International Organization for Standardization, 2009). Students are expected to recognize this notation in both sciences and mathematics, and teachers should introduce this notation as a regular part of MYP courses in these subject groups as appropriate.

For onscreen examinations, symbols, units and equations—where appropriate—will be provided on a toolbar to ensure consistent usage and authentic age-appropriate scientific and mathematical communication. If an examination question requires additional symbols or notations, they will be defined and explained within the context of the relevant task.

Candidates must always use correct mathematical notation, not calculator notation. Candidates should be familiar with scientific notation, also referred to as standard form as follows:

$a \times 10^k$ where $1 \leq a \leq 10$ and $k \in \mathbf{Z}$

Calculator notation such as 6.02E23 will not be accepted.

Answers will require an appropriate use of significant figures or decimal places based on the demands of the question. Unless otherwise indicated, final answers are to be given correct to three significant figures. Estimation is to be completed by rounding; truncation will not be accepted.

Correct use of subscript and superscript is expected in all relevant scientific and mathematical contexts.

Units used for measurement and calculation will refer to the SI units (*Système international d'unités)* where possible. Candidates must also be familiar with more demanding derived units (mol, dm^{-3}, J g^{-1}, $°C^{-1}$, $kJmol^{-1}$, gdm^{-3}, ms^{-1}, ms^{-2}).

Exceptions:

- Mass is measured in kg but also in g, particularly in laboratory conditions. The tonne (t), which is equivalent to 1,000 kg, will be used for larger masses.
- Volume is measured in dm^{-3} but also in cm^{-3}, particularly in laboratory conditions.
- Temperature is measured in °C.
- Pressure is measured in Pa (Pascal).

Where specific currency symbols are required, they will be provided as a button on the toolbar.

For the purposes of eAssessment, the updated CLP hazard symbols used will be taken from http://www.unece.org/trans/danger/publi/ghs/pictograms.html.

The following list does not constitute additional curriculum specifications beyond the MYP mathematics framework published in the subject-group guide and the sciences topic list. Rather, the symbols below depict the universe of mathematical and scientific symbols that could be used in relevant questions and the symbols that will be available for students to use in their responses They provide a common shared communication convention for MYP eAssessment in these subjects.

Symbol	Meaning
$\mathbf{N}$	The set of positive integers and zero, {0, 1, 2, 3, ...}
$\mathbf{Z}$	The set of integers, {0, ±1, ±2, ±3, ...}
$\mathbf{Q}$	The set of rational numbers
$\mathbf{R}$	The set of real numbers
$+$	Plus
$-$	Minus
$\pm$	Plus or minus
$a \times b$	a multiplied by/times b Note: also accepted $a \cdot b$ (half-high dot) ab Not accepted: a b
a b a/b	Divided by Note: also accepted a x b^{-1}
$=$	Is equal to
$\neq$	Is not equal to
$\equiv$	Is identical to
$\approx$	Is approximately equal to
$\sim$	Is proportional to
$<$	Less than
$\leq$	Less than or equal to
$\ll$	Much less than
$>$	Greater than
$\geq$	Greater than or equal to

Symbol	Meaning
$\gg$	Much greater than
∞	Infinity
$\parallel$	Is parallel to
$\perp$	Is perpendicular to
$.\dot{8}\dot{1}$	Recurring decimal, where the dot appears over the first and last repeating numeral
$\sphericalangle ABC$	Angle at vertex B in the triangle ABC Note: the angle is not oriented, it holds that $\sphericalangle ABC = \sphericalangle CBA$
$\overline{AB}$	Line segment from A to B
$\overrightarrow{AB}$	Vector from A to B
$\mathbf{a}$	Vector a Note: An arrow above the letter symbol can be used instead of bold face type to indicate a vector ($\vec{a}$).
$\mathbf{a} \cdot \mathbf{b}$	Dot product of a and b Note: Must be in bold to distinguish from simple multiplication
Σ	Sigma, sum of
$\sum_{i=1}^{n} a_i$	$a_1 + a_2 + \ldots + a_n$, sum of a_1, a_2, …, a_n
a^p	a to the power of p Note: use of calculator terminology ^ will not be accepted
$\sqrt{a}$	Square root Note: $a^{1/2}$ will also be accepted.
$\sqrt[n]{a}$	N[th] root of a Note: If the symbol acts on a composite expression, parentheses or brackets must be used to avoid ambiguity Also accepted $a^{1/n}$
$\overline{x}$	Mean value of x
σ	Standard deviation
$\lvert a \rvert$	Absolute value of a Also: vector magnitude
f, g, h...	Functions, models, eg f(x) =.... Note: y = also accepted where not dictated by stimulus or question
f^{-1}, g^{-1}	Inverse functions
$g \circ f$	Composite function Note: $(g \circ f)(x) = g(f(x))$ In the composite $(g \circ f)$, the function g is applied after function f has been applied.
e	Base of natural logarithm

Symbol	Meaning
$\log_a x$	Logarithm to the base a of argument x
$\ln x$	Natural logarithm of x
π	Pi, ratio of the circumference of a circle to its diameter
$\sin x, \cos x, \tan x$ $\sin^{-1}, \cos^{-1}, \tan^{-1}$	Sine of x, cosine of x, tangent of x Inverse functions of above Note: arcsin, etc will be accepted but not provided on the calculator or toolbar.
$\in$	Is an element of
$\notin$	Is not an element of
$\emptyset$	The empty (null) set
$n(A)$	The number of elements in the finite set A
$\mathbb{U}$	The universal set
$\cup$	Union
$\cap$	Intersection
$\subset$	Is a proper subset of
$\subseteq$	Is a subset of
A'	The complement of the set A
ρ	Density of a material
α	Alpha-particle
β	Beta-particle
γ	Gamma rays
λ	Wavelength
Δ	Change in (delta)
μ	Micro- (as a prefix for measurement)

Possible response objects

A response object is the space where students produce their answers to the questions or tasks posed in MYP eAssessment. Response objects may be linked so that a candidate's response dynamically influences another object (for example, completing a table may populate a graph or bar chart).

Response objects may include:

- text box with parameters (the size of the text box indicates the length of an expected or typical response; some tasks may have recommendation regarding length of response in words or characters, in which case a word count will be provided)
- table (designating structure, adding data, labelling)
- graph (designating type, labelling)
- mathematics canvas with a range of available tools
- drawing canvas with default standard tools
- drawing editor

- MCQ (multiple-choice question responses)
- MCG (multiple-choice graphic responses)
- text highlight
- mini cloze (fill in words, selected from drop-down pick-list)
- match two items (such as image and label) (click and click)
- link
- drag and drop
- factor trees
- electrical circuit drawing tool
- chemical equation editor
- equipment drawing tool
- drawing canvas/flow-charting tool
- animation (including interactive animation)
- simulation (with and without data generation).

Onscreen examinations will include a spellcheck function, and some operating systems will provide their own version to which candidates will have access. In an onscreen environment, the use of various spellcheck operations is a contemporary communications skill that requires its own management, flexible thinking and critical analysis of results.

Language and literature

Language and literature topic list

MYP language and literature courses feature a flexible and culturally sensitive approach to determining the nature and complexity of students' engagement with the subject. There are no prescribed texts; teachers choose works of literature that:

- suit the needs and interests of their students
- broaden their students' experiences and perspectives
- increase historical and intercultural understanding
- model linguistic competency in communicating effectively with an increasing variety of audiences and purposes
- include geographical diversity and translations from other languages.

Literary forms in MYP language and literature courses typically include poetry, prose (short stories and novels from a variety of genres), mythology and drama. Additional forms of literature may include:

- biography and autobiography
- essays, letters, narrative non-fiction and informational text
- screenplays, film, television programmes and drama series
- speeches, oral traditions
- graphic novels.

MYP teachers choose written and visual texts of sufficient complexity that allow students to encounter a range of age-appropriate styles in which they can explore linguistic, literary and visual devices, as well as supportive tools. More information about text types can be found on pages 24 and 52 of the *Language and literature guide*.

Text types and works of literature studied in MYP language and literature courses must provide vocabulary, syntax, depth and levels of meaning and styles of language of appropriate sophistication. Ideas and issues typically explored might include:

- identity, heritage, culture, diversity
- communities, globalization, migration, displacement
- social history, civilizations, journeys
- media and mass communication
- childhood, adolescence, youth, rebellion, innocence and experience, human sexuality
- families, friendships, relationships
- systems, power and protest, justice, peace and conflict, freedom and independence

- health and well-being, environment, lifestyle
- social roles, norms and expectations, gender, inclusion, minorities, class
- utopias, dystopias, survival
- religion, faith, values, ritual, spirituality, taboos
- allegiance, betrayal, revenge, atonement, forgiveness.

Language and literature examination blueprint

Overview

The eAssessment will reflect the teaching and learning in the subject and will be split into two tasks. Marks will be evenly distributed across the four criteria within a small variance of three marks.

The following table illustrates how a language and literature assessment will be structured.

Task	Main criteria assessed	Marks
Analysing task	A, B, D	50
Producing text task	B, C, D	70
		120

Sources

A variety of sources will feature in each assessment and will include the following.

- an extract from a literary text or poem
- a multimedia text
- static image(s).

Tools

Most questions will be answered using a standard text tool set. Other tools to facilitate different response types, such as annotations and mind maps, will be made available as they are required.

Task details

Analysing task

This task assesses students' ability to analyse then compare and contrast two unseen text extracts. It is composed of a series of short response questions which focus on criterion A, followed by an extended response question which is assessed using criteria A, B and D. The task assesses students' ability to:

- analyse written, verbal and non-verbal techniques, giving justifications for their opinions (Criterion A)
- organize their work in a coherent and logical manner (Criterion B)
- produce language demonstrating a high degree of linguistic and grammatical accuracy (Criterion D).

The text extracts will consist of one written and one multimedia text.

Producing text task

The second task is connected to the global context. It assesses students' ability to:

- organize their work in a coherent and logical manner (Criterion B)
- reflect critically on new ideas and perspectives, producing text which demonstrates engagement with the creative process and an awareness of impact on audience (Criterion C)
- produce language demonstrating a high degree of linguistic and grammatical accuracy (Criterion D).

It is composed of two extended response questions. The stimulus for the first writing question will consist of a visual text(s). The second requires students to reflect critically on a text studied in the classroom. This text **must** be linked to the specific global context set for the year of study, can be any genre and must be studied as part of one or more units in the classroom.

MYP eAssessment

October 2013 Trial

ENGLISH LANGUAGE AND LITERATURE

- **Key concept:** creativity
- **Related concepts:** self-expression; genres/conventions; style
- **Criteria:** B (Organizing), C (Producing text) and D (Using language)

[16 marks max]

1. *Choose **one** of the following prompts and write a response based on the image provided. You should aim to write between **400 and 600 words**.* ***[16 marks]***

(a) Write an internal monologue expressing the thoughts and feelings of a narrator involved in this scene.

or

(b) **Narrate** the events that follow on from the moment shown in the image.

or

(c) Imagine you are the person in this image. **Describe** what you can see.

[Source: iStockphoto LP]

MARKSCHEME

MYP eAssessment

October 2013 Trial

ENGLISH LANGUAGE AND LITERATURE

This task assesses the following criteria:	
Criterion B: Organizing	4 marks
Criterion C: Producing text	8 marks
Criterion D: Using language	4 marks
Total mark for this task	16 marks

Criterion B: Organizing ***[4 marks]***

- To what extent does the chosen organizational structure and presentation style serve the context and intention?
- How coherent and logical is the structure?
- To what extent are language-specific conventions followed?

Criterion clarifications specific to this task:

1. (a)

*To be awarded **[3 marks]** students may:*

- establish the narrator's predicament
- (purposefully) introduce ideas haphazardly to demonstrate that the narrator's thoughts and feelings change as the scenario evolves
- construct a considered sequence of events.

*To be awarded **[4 marks]** students will do all the above and in addition may:*

- use a variety of appropriate structural techniques (paragraphing, varying sentence lengths, time shifts, etc) to enhance the intended tone of the scenario.

(b)

*To be awarded **[3 marks]** students may:*

- establish a reason why the character is there
- develop a storyline that is logical and credible
- ensure a smooth transition between subsequent events.

*To be awarded **[4 marks]** students will do all the above and in addition may:*

- use a variety of appropriate structural techniques (paragraphing, varying sentence lengths, time shifts, etc) to introduce a fuller picture of the character and events narrated.

(c)

*To be awarded **[3 marks]** students may:*

- provide a description that immediately captures the interest of the audience
- successfully build an image of the scene in the mind of the reader
- develop details logically and credibly.

*To be awarded **[4 marks]** students will do all the above and in addition may:*

- use a variety of appropriate structural techniques (paragraphing, varying sentence lengths, time shifts, etc) to develop and enhance the reader's visualization of the scene.

Descriptor	Marks
The student **does not** reach a standard described by any of the descriptors below.	0
The student: • **rarely** employs organizational structures that serve the context and intention • organizes opinions and ideas with a **minimal degree** of **coherence and logic** • **rarely** uses language-specific conventions to show the reason for the order of ideas • **uses an inappropriate or very inconsistent** presentation style that does not serve the context and intention.	1
The student: • **sometimes** employs organizational structures that serve the context and intention • organizes opinions and ideas with **some degree** of **coherence and logic** • **inconsistently** uses language-specific conventions to show the reason for the order of ideas • **sometimes** uses a presentation style that serves the context and intention.	2
The student: • **usually** employs **competent** organizational structures that serve the context and intention • organizes opinions and ideas in a **coherent and logical** manner with ideas building on each other • **sometimes** uses language-specific conventions to show the reason for the order of ideas • **usually** uses a presentation style that **competently** serves the context and intention.	3
The student: • **consistently** employs **sophisticated** organizational structures that serve the context and intention • **effectively** organizes opinions and ideas in a **sustained**, **coherent and logical** manner with ideas building on each other in a **sophisticated** manner • **consistently** uses language-specific conventions to show the reason for the order of ideas • **consistently** uses a presentation style that serves the context and intention **effectively**.	4

Criterion C: Producing text ***[8 marks]***

- To what extent does the student demonstrate imagination, sensitivity and creativity?
- How successfully does the student employ literary techniques?
- To what extent do the chosen literary features demonstrate an awareness of the audience?

Criterion clarifications specific to this task:

1. (a)

*To be awarded **[5/6 marks]** students may:*

- include some relevant details that will make this a personal account
- include some descriptive details of the scene
- use some literary features to express the feelings of the narrator.

*To be awarded **[7/8 marks]** students will do all the above and in addition may:*

- begin to explore a change and development in the narrator's thoughts and feelings, using some literary techniques to do this.

(b)

*To be awarded **[5/6 marks]** students may:*

- demonstrate some awareness of the context of the scene
- describe the following events with some consistency with the image
- attempt, by choice of vocabulary and even some literary features, to make these events exciting or interesting.

*To be awarded **[7/8 marks]** students will do all the above and in addition may:*

- attempt to describe the events from a particular point of view, using some literary techniques to do this.

(c)

*To be awarded **[5/6 marks]** students may:*

- attempt to write in the first person in a way that is relevant to the image
- select for description, what they think will interest an audience

- attempt to include detail in the description that will give some significance to what is being seen.

*To be awarded **[7/8 marks]** students will do all the above and in addition may:*

- attempt to show what impact this selection of detail has on the person in the image, using some literary techniques to do this.

Descriptor	Marks
The student **does not** reach a standard described by any of the descriptors below.	0
The student: • creates work that demonstrates **a limited degree** of imagination and sensitivity • makes **minimal** choices, including literary features, which serve content, context and intention; demonstrates a **limited** awareness of the role of the audience • selects **few relevant** details and examples to justify ideas • **rarely** employs literary techniques • demonstrates **minimal** creativity through minimal exploration of and critical reflection on new perspectives and ideas.	1–2
The student: • creates work that demonstrates **some degree** of imagination and sensitivity • makes choices, including literary features, which **sometimes** serve content, context and intention; demonstrates **some** awareness of the role of the audience • selects **some relevant** details and examples to justify ideas • employs **some** literary techniques • demonstrates **some** creativity through minimal exploration of and critical reflection on new perspectives and ideas.	3–4
The student: • creates work that demonstrates **considerable degree** of insight, imagination and sensitivity • makes **thoughtful** choices, including literary features, which **usually** serve content, context and intention; demonstrates a **good** awareness of the role of the audience • selects **relevant** details and examples to justify ideas • employs **a range of** literary techniques with **some** effectiveness • demonstrates creativity through **substantial** exploration of and critical reflection on new perspectives and ideas.	5–6
The student: • creates work that demonstrates **high degree** of insight, imagination and sensitivity • makes **perceptive** choices, including literary features, which serve content, context and intention; demonstrates a **clear** awareness of the role of the audience • selects **highly relevant** details and examples to justify ideas with precision • employs **a range of** literary techniques in a **highly effective** manner • demonstrates creativity through **perceptive** exploration of and critical reflection on new perspectives and ideas.	7–8

Criterion D: Using language ***[4 marks]***

- To what extent does the student demonstrate a range of vocabulary, sentence structures and forms of expression?
- How appropriate are the register and style?
- To what extent does accuracy aid communication?

Criterion clarifications specific to this task:

1. (a)

*To be awarded **[3 marks]**, the monologue will contain a varied range of vocabulary, register and style appropriate to the task, and a high level of accuracy.*

*To be awarded **[4 marks]**, the monologue will contain an effective and varied range of vocabulary, register and style appropriate to the task, and a high level of accuracy and effective communication.*

(b)

*To be awarded **[3 marks]**, the narration will contain a varied range of vocabulary, register and style appropriate to the task, and a high level of accuracy.*

*To be awarded **[4 marks]**, the narration will contain an effective and varied range of vocabulary, register and style appropriate to the task, and a high level of accuracy and effective communication.*

(c)

*To be awarded **[3 marks]**, the description will contain a varied range of vocabulary, register and style appropriate to the task, and a high level of accuracy.*

*To be awarded **[4 marks]**, the description will contain an effective and varied range of vocabulary, register and style appropriate to the task, and a high level of accuracy and effective communication.*

Descriptor	Mark
The student **does not** reach a standard described by any of the descriptors below.	0
The student: • uses a **limited** range of accurate and appropriate vocabulary, sentence structures and forms of expression • uses an **inappropriate or very inconsistent** register and style that do not serve the context and intention • uses grammar, syntax and punctuation with **limited** accuracy; errors **often** hinder communication • uses spelling/writing with **limited** accuracy; errors **often** hinder communication.	1
The student: • uses an **adequate** range of accurate and appropriate vocabulary, sentence structures and forms of expression • **sometimes** uses a register and style that serve the context and intention • uses grammar, syntax and punctuation with **a good degree** of accuracy; errors **sometimes** hinder communication • uses spelling/writing with **a good degree** of accuracy; errors **sometimes** hinder communication.	2
The student: • uses a **varied** range of accurate and appropriate vocabulary, sentence structures and forms of expression • **usually** uses a register and style that **competently** serve the context and intention • uses grammar, syntax and punctuation with **a considerable degree** of accuracy; errors do not hinder **effective** communication • uses spelling/writing with **a considerable degree** of accuracy; errors do not hinder **effective** communication.	3
The student: • **effectively** uses a **substantial** range of accurate and appropriate vocabulary, sentence structures and forms of expression • **consistently** uses a register and style that serve the context and intention **effectively** • uses grammar, syntax and punctuation with **a high degree** of accuracy; errors do not hinder **effective** communication • uses spelling/writing with **a high degree** of accuracy; errors are minor and communication is **effective** and **compelling**.	4

Language and literature subject-specific grade descriptors

Grade	Subject-specific descriptor
1	The student: • analyses texts in a very limited way, rarely justifying opinions and ideas with examples or relevant terminology; provides very little comparison and contrast of works • produces texts with little imagination, sensitivity and creativity, offering no new perspectives; demonstrates no sensitivity to context and intention; rarely makes stylistic choices • demonstrates limited accuracy in spelling/writing, pronunciation, grammar, syntax and punctuation, which frequently hinders communication; demonstrates very limited organization of opinions and ideas, often incoherent; demonstrates very limited or inappropriate use of language-specific conventions.
2	The student: • analyses texts at a basic level, occasionally justifying opinions and ideas with few examples or relevant terminology; provides little comparison and contrast of works • produces texts with limited imagination, sensitivity and creativity, offering few new perspectives; demonstrates minimal sensitivity to context and intention; makes few stylistic choices • demonstrates limited accuracy in spelling/writing, pronunciation, grammar, syntax and punctuation, which frequently hinders communication; demonstrates limited organization of opinions and ideas with little coherence and logic; demonstrates limited or inappropriate use of language-specific conventions.
3	The student: • analyses texts at a basic level, occasionally justifying opinions and ideas with basic examples and relevant terminology; superficially compares and contrasts works • produces texts with some imagination, sensitivity and creativity, offering new perspectives; demonstrates limited sensitivity to context and intention; makes some stylistic choices • demonstrates adequate accuracy in spelling/ writing, pronunciation, grammar, syntax but with errors that sometimes hinder communication; organizes opinions and ideas with some coherence and logic; accurately uses language-specific conventions.

Grade	Subject-specific descriptor
4	The student: • analyses texts satisfactorily, inconsistently justifying opinions and ideas with examples and relevant terminology; satisfactorily compares and contrasts works • produces texts with a satisfactory degree of imagination, sensitivity and creativity, offering new perspectives; demonstrates some sensitivity to context and intention; makes stylistic choices • demonstrates generally good accuracy in spelling/writing, pronunciation, grammar, syntax and punctuation, although some errors may hinder communication; organizes opinions and ideas with satisfactory coherence and logic; accurately uses language-specific conventions.
5	The student: • analyses texts competently, justifying opinions and ideas with sufficient examples, explanations and terminology; competently compares and contrasts works • produces texts with a considerable degree of imagination, sensitivity and creativity, offering new perspectives; demonstrates some sensitivity to context and intention; makes stylistic choices that reflect considerable appreciation for the ways in which language, structure, technique and style shape meaning and impact an audience • demonstrates accuracy in spelling/writing, pronunciation, grammar, syntax and punctuation so communication is not hindered; organizes opinions and ideas coherently and logically; accurately uses language-specific conventions.
6	The student: • analyses texts thoughtfully, justifying opinions and ideas with appropriate examples, explanations and terminology; thoughtfully compares and contrasts works • produces texts with a substantial degree of imagination, sensitivity and creativity, offering new perspectives; demonstrates considerable sensitivity to context and intention; makes stylistic choices that reflect considerable appreciation for the ways in which language, structure, technique and style shape meaning and impact an audience • communicates appropriately and with a substantial degree of accuracy in spelling/writing, pronunciation, grammar, syntax and punctuation; organizes opinions and ideas effectively; consistently and effectively uses language-specific conventions.

Grade	Subject-specific descriptor
7	The student: • analyses texts perceptively, justifying opinions and ideas thoroughly with effective examples, explanations and terminology; perceptively compares and contrasts texts • produces texts with a high degree of imagination, sensitivity and creativity, consistently offering new perspectives; demonstrates considerable sensitivity to context and intention; makes stylistic choices that reflect an appreciation of the ways in which language, structure, technique and style shape meaning and impact an audience • communicates effectively and with a high degree of accuracy in spelling/writing, pronunciation, grammar, syntax and punctuation; organizes opinions and ideas coherently, logically and with sophistication; consistently and effectively uses language-specific conventions.

History

History topic list

- Superpowers, empires and supra-national alliances and organizations
- Significant individuals
- Warfare and peacekeeping
- Independence and national identity
- Rights and social protest
- Industrialization, industry and labour
- Trade, aid and exchange
- Intellectual and ideological movements/developments
- Pioneers, innovators and developers
- Medicine and health
- Individual, household and daily life
- Social, cultural and artistic developments

Individuals and societies examination blueprint

Overview

Assessments will model good unit planning practice for the subject. The assessment will be split into three tasks. The first two tasks will have a suggested time of 30 minutes each and will assess two criteria each. The final task will have a suggested time of 60 minutes and will assess all four criteria. Marks will be evenly distributed across the four criteria within a small variance of three marks. The title of each task will vary between disciplines; the history titles are shown below.

The following table illustrates how an Individual and Societies assessment **could** be structured.

Task	Main criteria assessed	Marks
Engagement with sources*	A, D	30
Investigation task*	B, C	30
Extended response*	A, B, C, D	60
		120

*These are history titles only; other individuals and societies subject will use different task titles.

Sources

A variety of sources will feature in each assessment and could include the following.

- Primary/secondary text sources
- Articles
- Journals
- Blogs
- Data tables
- Static images
- Photomations
- Videos
- Animations
- Charts
- Graphs

Tools

Most questions will be answered using a standard text tool set. Other tools to facilitate different response types such as flow charts, graphing tools and data tables will be made available as they are required.

Task details

These details are specific to history.

Engagement with sources

This task will include questions that ask students to:

- identify key ideas/points from a source or sources
- Find contradictory evidence in two sources
- find a counterclaim in one of the sources in relation to a presented claim
- identify the origin, purpose, value and limitations (OPVL) of sources or to compare and contrast or evaluate values and limitations of sources.

Investigation task

A series of sources are used to stimulate responses to structured questions. While it is impossible to replicate an entire investigation within the constraints of the assessment, some of the discrete skills involved in completing an investigation could include:

- formulating a research question
- identifying sources of information that could be used in an investigation
- practical tasks relating to research skills, such as utilizing screenshots of Google™ searches, or tasks focused on organizing data
- the justification of choices in investigation.

Extended response

The final task assesses students' ability to engage in the activity of producing a piece of extended writing or communicating creatively. The following list is not exhaustive.

- Essay
- Creative writing—blog, article
- Letter
- Presentation
- Poster/infographic

MYP eAssessment

October 2013 Trial

HISTORY

- **Global context:** globalization and sustainability
- **Key concept:** global interactions
- **Related concepts:** causality (cause/consequence)
- **Criteria:** A (Knowing and understanding) and D (Thinking critically)

[30 marks max]

Background resources

This task assesses your understanding of the concept of global interactions, and the ways that people come into conflict with each other. The task focuses specifically on exploring the causes and consequences of conflict. Please note the following sources refer to specific conflicts such as the Second World War or the American Civil War. You do not need to have studied these specific conflicts to be able to answer the task questions.

SOURCE A *Extract adapted from* Causes of War *by Jack Levy and William Thompson. Jack Levy is a professor in the department of political science at Rutgers University, and William Thompson is a professor in the department of political science at Indiana University.*

> War has been a persistent pattern of interaction between and within states and other political units for [thousands of years]. In its many varieties, it is probably the most destructive form of human behavior. War kills people, destroys resources, [slows down] economic development, ruins environments, spreads disease, … reshapes cultures, disrupts families, and traumatizes people. Preparation for war, whether for conquest or for protection, [takes] valued resources away from more [positive] social activities.

[Source: Extract adapted from Levy, J and Thompson, W (2010). *Causes of War*. Oxford, UK. Wiley Blackwell.]

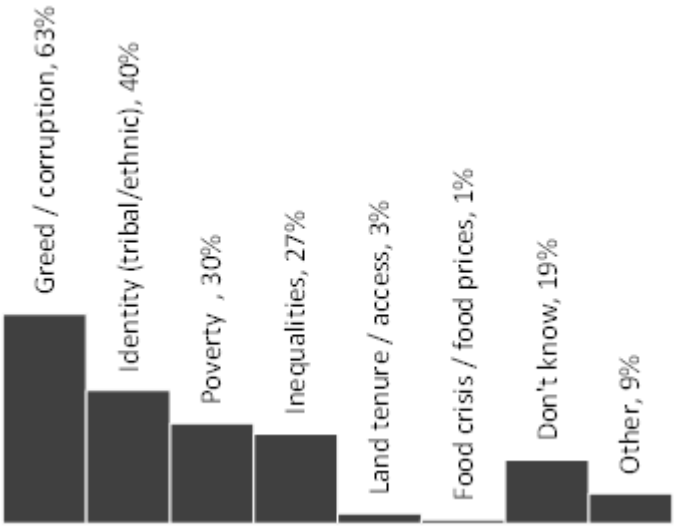
SOURCE B *This speech was given by the British Prime Minister, Neville Chamberlain, on 1 September 1939, after Adolf Hitler's German troops invaded Poland. Chamberlain and others had spent years negotiating with Hitler (the German Chancellor) to try to prevent war in Europe. On 3 September, with German attacks on Poland continuing, Chamberlain announced a state of war between Britain and Germany.*

No man can say that the Government could have done more to try to keep open the way for a ... settlement of the dispute between Germany and Poland. Nor have we neglected any means of making it crystal clear to the German Government that if they insisted on using force again in the manner in which they had used it in the past we were resolved to oppose them by force.

Now that all the relevant documents are being made public we shall stand at the bar of history knowing that the responsibility for this terrible catastrophe lies on the shoulders of one man, the German Chancellor, who has not hesitated to plunge the world into misery in order to serve his own senseless ambitions... We have no quarrel with the German people, except that they allow themselves to be governed by a Nazi government. As long as that government exists ... there will be no peace in Europe. We shall merely pass from one crisis to another, and see one country after another attacked.

[Source: Speech by the UK prime minister Neville Chamberlain to the UK parliament, 1 September 1939. Contains Parliamentary information licensed under the Open Parliament Licence v1.0.]

SOURCE C *Root causes of the civil wars in Liberia between 1989 and 2003*



[Source: Vinck P, Pham PN, Kreutzer T (June 2011). *Talking Peace: A Population*-B*ased Survey on Attitudes about Security, Dispute Resolution, and Post*-C*onflict Reconstruction in Liberia*. Human Rights Center, University of California, Berkeley – accessible at *www.peacebuildingdata.org*.]

SOURCE D *First World War cemetery at Verdun*

[Source: © iStock.com/stockcam]

SOURCE E *Causes of the US Civil War*

The Northern and Southern sections of the United States developed along different lines. The South remained [an economy based mostly on agriculture], while the North became more and more industrialized. Different social cultures and political beliefs developed. All of this led to disagreement on issues such as taxes, tariffs and internal improvements as well as states rights versus federal rights. The burning issue that led to the disruption of the union, however, was the debate over the future of slavery.

[Source: "Causes of The Civil War", taken from *www.historynet.com/causes-of-the-civil-war*. Date accessed 20 May 2013.]

30-minute task

1. According to the sources A to E what are **three** causes and **two** consequences of conflict? ***[5 marks]***

Causes:		
1.		***[1 mark]***
2.		***[1 mark]***
3.		***[1 mark]***
Consequences:		
1.		***[1 mark]***
2.		***[1 mark]***

2. **Outline** the purpose, values and limitations for sources A and B with reference to the origin stated in the table provided. (The cells of the table are expandable.) ***[10 marks]***

Source	**Origin (given)**	**Purpose (2 marks)**	**Value (4 marks)**	**Limitation (4 marks)**
A	A 2010 book written by two US university professors, Jack Levy and William Thompson			
B	A speech given by British Prime Minister, Neville Chamberlain, on 1 September 1939			

3. "Individual people are the main cause of wars and conflicts." To what extent do you agree with this claim? Answer with reference to the sources A to E and also with reference to your own knowledge of conflicts you have studied. ***[15 marks]***

MARKSCHEME

MYP eAssessment

October 2013 Trial

HISTORY

1. According to the sources, A to E what are **three** causes and **two** consequences of conflict?

Criterion A: Knowing and understanding ***[5 marks]***

Mark positively and reward appropriate answers including where different words are used to express the ideas mentioned in the sources.

*Award **[1 mark]** for each cause of conflict correctly identified from the sources (listed below), up to a maximum of **[3 marks]**.*

*Award **[1 mark]** for each consequence of conflict correctly identified from the sources (listed below), up to a maximum of **[2 marks]**.*

Causes	**Consequences**
individual political leaders	death
ambition	destruction of resources
greed	environmental impact
corruption	the spread of disease
poverty	impact on economic development
inequality	impact on culture
food	disruption to families
ethnic/tribal identity	trauma
conflicts over land	diversion of resources from other activities

Causes	Consequences
differences in social cultures and political beliefs	
differences in economic development	
disagreement on issues such as taxes	
tariffs and internal improvements	
disagreements over state versus federal rights	
disagreement over issues such as slavery	

2. **Outline** the purpose, values and limitations for sources A and B with reference to the origin stated in the table provided.

Source	Origin	Purpose	Values	Limitations
A	A 2010 book written by two US university professors, Jack Levy and William Thompson	• Award **[1 mark]** for correctly identifying the purpose of the source.	• Award **[1 mark]** for correctly stating one value of the source in relation to indicative content below. Other valid answers should be rewarded.	• Award **[1 mark]** for correctly stating one limitation of the source in relation to indicative content below. Other valid answers should be rewarded.
			• Award **[1 mark]** for correctly stating one value of the source in relation to indicative content below. Other valid answers should be rewarded.	• Award **[1 mark]** for correctly stating one limitation of the source in relation to indicative content below. Other valid answers should be rewarded.
B	A speech given by British Prime Minister, Neville Chamberlain, on 1 September 1939	• Award **[1 mark]** for correctly identifying the purpose of the source.	• Award **[1 mark]** for correctly stating one value of the source in relation to indicative content below. Other valid answers should be rewarded.	• Award **[1 mark]** for correctly stating one limitation of the source in relation to indicative content below. Other valid answers should be rewarded.
			• Award **[1 mark]** for correctly stating one value of the source in relation to indicative content below. Other valid answers should be rewarded.	• Award **[1 mark]** for correctly stating one limitation of the source in relation to indicative content below. Other valid answers should be rewarded.

Criterion D: Thinking critically ***[10 marks]***

Indicative content

Purpose

- Source A is to analyse the causes of war.
- Source B is to justify to the Parliament why Neville Chamberlain would have to use force against the Germans.

Value

- Source A:
  - is written by expert academics from academic institutions
  - the authors could have a more impartial perspective and are writing with the benefit of hindsight.
- Source B:
  - is an original speech by a person directly involved in the conflict, so provides an insight into the event from someone involved
  - may, or may not, be more reliable as it was written before war was declared rather than being influenced by knowledge of the events of the Second World War
  - shows the public image the British Prime Minister wanted to convey.

Limitations

- Source A:
    - is a general book about the causes of war, which may lack detailed analysis of the causes of particular conflicts
    - the authors are writing in the US, so may have a particular perspective, which would be different from someone writing in a different context.
- Source B:
    - Chamberlain is attempting to explain and justify his actions so his account may lack objectivity
    - the focus on Chamberlain's role may suggest that information about the role and the significance of other politicians or countries may not be fully developed.

3. "Individual people are the main cause of wars and conflicts." To what extent do you agree with this claim? Answer with reference to the sources A to E and also with reference to your own knowledge of conflicts you have studied.

Criterion A: Knowing and Understanding *[10 marks]*

Descriptor	Marks
The student does not reach a standard described by any of the descriptors below.	0
The response uses limited relevant terminology. The response demonstrates limited knowledge and understanding of content and concepts. There is minimal or no reference to specific examples or to the source material.	1–2
The response uses some terminology adequately. The response demonstrates adequate knowledge and understanding of content and concepts. Explanations are in need of further development. There are references to some appropriate examples, descriptions, explanations, and/or to material from the sources, although these may not be used appropriately.	3–4
The response uses a range of relevant terminology appropriately. The response demonstrates substantial knowledge and understanding of content and concepts. Explanations are developed. Specific examples, descriptions, explanations, and materials from the sources are used accurately but not always effectively.	5–7
The response uses a wide range of relevant terminology consistently and effectively. The response demonstrates detailed knowledge and understanding of content and concepts. Explanations are clear and well developed. Specific descriptions, explanations, examples and material from the sources are used effectively.	8–10

Criterion D: Thinking critically *[5 marks]*

Descriptor	Marks
The student does not reach a standard described by any of the descriptors below.	0
The response includes limited analysis of concepts, issues and theories. The candidate makes very limited connections between information to make arguments.	1
The response contains accurate analysis of concepts, issues and sources. The candidate summarizes information to make arguments, which may be valid.	2–3
The response contains clear and detailed discussion of concepts, events and sources. The candidate synthesizes information effectively to make valid, well-supported arguments.	4–5

Individuals and societies subject–specific grade descriptor

Grade	Subject-specific descriptor
1	The student: • demonstrates very limited knowledge and understanding of subject-specific content and concepts • formulates very limited research questions, which may lead to very limited action plans; collects and records very limited information; evaluates very little of the process and/or results of the investigation • communicates very limited information and ideas; may document limited sources of information, if any.
2	The student: • demonstrates limited knowledge and understanding of subject-specific content and concepts • formulates limited research questions, which may lead to limited action plans; collects and records limited information; evaluates little of the process and results of the investigation • communicates limited information and ideas, using a style and/or format that are very occasionally appropriate to the audience and purpose; documents limited sources of information in an unstructured way.
3	The student: • demonstrates some basic knowledge and understanding of subject-specific content and concepts • formulates basic research questions, which lead to limited action plans; collects and records basic information; evaluates some of the process and results of the investigation • communicates basic information and ideas, using a style and/or format that are sometimes appropriate to the audience and purpose; documents sources of information in a confusing or illogical way.
4	The student: • demonstrates adequate knowledge and understanding of subject-specific content and concepts, occasionally using terminology in context • formulates adequate research questions, which lead to suitable action plans; uses adequate research methods to collect and record information; evaluates the process and results of the investigation, but may lack depth or insight • communicates information and ideas, using a style and/or format that are appropriate to the audience and purpose; documents sources of information • analyses some sources with reference to terms of origin, purpose, value and limitation.

Grade	Subject-specific descriptor
5	The student: • demonstrates substantial knowledge and understanding, often using terminology in context • formulates and follows clear and focused research questions and clear action plans; uses a range of research methods to collect and record relevant information; evaluates the process and results of the investigation • communicates information and ideas effectively, accurately and appropriately; regularly documents sources of information using a recognized convention; discusses concepts, issues, models, visual representation and theories, and synthesizes information to make valid arguments • analyses and evaluates a range of sources/data in terms of origin, purpose, value and limitation; interprets different perspectives and some of their implications.
6	The student: • demonstrates clear and detailed knowledge and understanding, regularly using a wide range of terminology in context • formulates and justifies clear and focused research questions and follows comprehensive action plans; uses a range of research methods to collect and record relevant information; evaluates the process and results of the investigation in detail • communicates information and ideas accurately and appropriately; clearly documents sources of information using a recognized convention; discusses concepts, issues, models, visual representation and theories, and synthesizes information to make valid arguments • analyses and evaluates a range of sources/data in terms of origin, purpose, value and limitation; interprets different perspectives and their implications in some depth.
7	The student: • demonstrates a wide range of knowledge and deep understanding, consistently and effectively using terminology in context • formulates and justifies clear and focused research questions and follows detailed comprehensive action plans; uses a wide range of research methods to effectively collect and record relevant information; thoroughly evaluates the process and results of the investigation • communicates information and ideas effectively, accurately and appropriately; consistently and correctly uses recognized conventions to document sources; discusses concepts, issues, models, visual representation and theories in detail, synthesizing information to make valid, well-supported arguments • thoroughly analyses and evaluates a range of sources in terms of origin, purpose, value and limitation; interprets different perspectives and their implications effectively and thoroughly.

Biology

Biology topic list

- Cells (tissues, organs, systems, structure and function; factors affecting human health; physiology; vaccination)
- Organisms (habitat, ecosystems, interdependency, unity and diversity in life forms; energy transfer and cycles [including nutrient, carbon, nitrogen]; classification)
- Processes (photosynthesis, cell respiration, aerobic and anaerobic, word and chemical equations)
- Metabolism (nutrition, digestion, biochemistry and enzymes; movement and transport, diffusion; osmosis; gas exchange; circulation, transpiration and translocation; homeostasis)
- Evolution (life cycles, natural selection; cell division, mitosis, meiosis; reproduction; biodiversity; inheritance and variation, DNA)
- Interactions with environment (tropism, senses, nervous system, receptors and hormones)
- Interactions with organisms (pathogens/parasites, predator/prey, food chains/webs; competition, speciation and extinction)
- Human interactions with environments (human influences, habitat change or destruction, pollution/conservation; overexploitation, mitigation of adverse effects)
- Biotechnology (genetic modification, cloning; ethical implications; genome mapping and application; 3D tissue and organ printing)

Sciences examination blueprint

Overview

Assessments will model good unit planning practice for the subject. The assessment will be split into three tasks. The first and final tasks will have a suggested time of 30 minutes and will mainly assess criteria A and D respectively. The second task will focus on criteria B and C and will have a suggested time allowance of 60 minutes. Marks will be evenly distributed across the four criteria within a small variance of three marks.

The following table illustrates how a sciences assessment will be structured.

Task	Main criteria assessed	Marks
Knowing and understanding	A	30
Investigating task	B, C	60
Applying science	D	30
		120

Sources

A variety of sources will feature in each assessment and could include the following.

- Data tables
- Static images
- Videos
- Animations
- Simulations
- Graphs

Tools

A variety of response tools will be available to students, including but not limited to an onscreen calculator, measuring tool, drawing canvas, graph plotter and table drawing tool.

Tasks

Knowing and understanding

The first task assesses students' knowledge and understanding of science (criterion A); however, marks may be awarded against the other criteria when appropriate to the skills used in answering a question. For example, a question assessing knowledge and understanding may also involve interpretation of data. In this situation marks will be awarded against criteria A and C.

Investigation task

The second task assesses the skills in practical work that would have traditionally been assessed through practical investigations (criteria B and C). The task may involve a single investigation or it may assess specific skills in a number of discrete scenarios. A variety of rich media will be used to present different challenges. Students should expect to formulate hypotheses, plan investigations, collect data from simulations, present data appropriately and interpret and evaluate data and hypotheses.

Applying science

The third task will require students to explain how science is used to address a real-life issue. It is highly likely that the questions in this task will relate closely to the global context for the session. This task will be assessed against criterion D, but there may be occasions when marks are also awarded against the other three criteria when this is appropriate for the question.

MYP eAssessment

October 2013 Trial

BIOLOGY

- **Key concept:** relationships
- **Related concepts:** environment; interaction; function
- **Criteria**: A (Knowledge and understanding) and C (Processing and evaluating)

[30 marks max]

Background resources

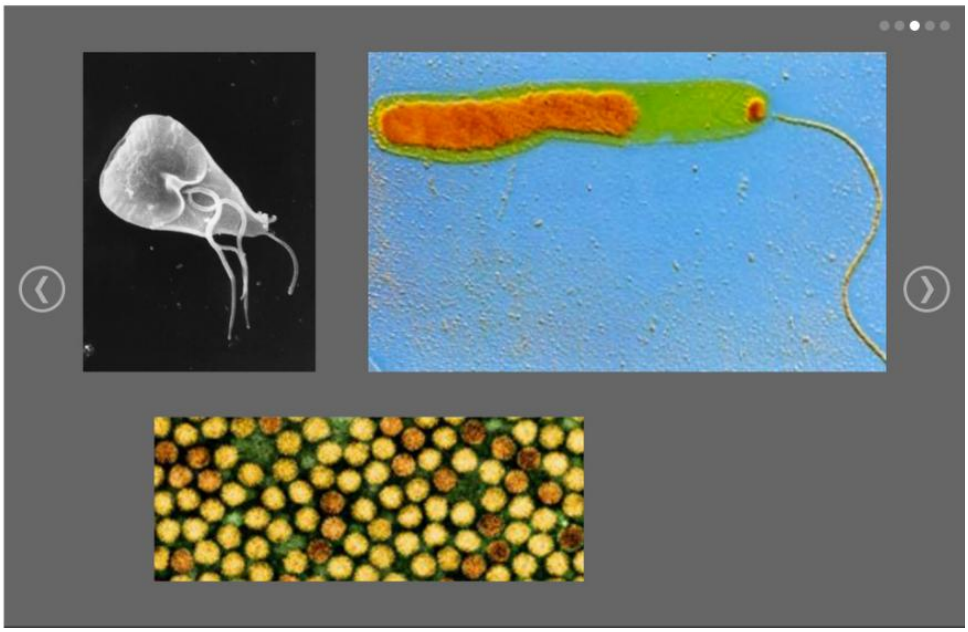
Waterborne pathogens are a major health risk. This task focuses on the key concept of relationships—the interaction between pathogen and host. Human impact on the environment is explored within the global context of globalization and sustainability.

[Source: Disaster Relief Hospital, Julie Dermansky/Science Photo Library]

A cholera epidemic followed the 2010 earthquake in Haiti. Cholera broke out in Haiti in October 2010. Since then there has been substantial medical research, including DNA analysis on the strain of cholera found in Haiti, which identified UN peacekeepers from Nepal as the source of the disease. Cholera is an infection in the small intestine caused by the cholera bacterium, *Vibrio cholerae*.

[Source: Photograph of Haiti, Alice Smeets/AS Photography]

A child walks through a water supply. Drinking water contaminated with microscopic pathogens results in the death of two million children every year. Most waterborne pathogens get into drinking water supplies by contamination with human or animal faeces (hover term: excrement), these pathogens do not reproduce in the water but begin to reproduce when they reach the human intestine following ingestion. The human health problems caused by waterborne pathogens vary in severity (hover: how serious or severe something is) from mild gastroenteritis to severe and sometimes fatal diarrhoea, hepatitis, and typhoid fever. Contaminated water can be the source of large outbreaks of disease, including cholera.



[Source: *Giardia*, CDC/Janice Haney Carr
Vibrio cholerae bacterium, CNRI/Science Photo Library
Hepatitis, Copyright Dennis Kunkel Microscopy, Inc.]

A pathogen is a disease-causing organism. Examples of pathogens found in drinking water contaminated with human waste are *Giardia*, cholera and hepatitis.

[Source: Woman collecting rainwater, Shree Padre]

There are several different methods of preparing drinking water for people without improved sanitation.

[Source: Shutterstock/Pavel Vakhrushev]

Boiling water is another method of preparing safe drinking water. Boiling kills the micro-organisms in the contaminated water by denaturing the proteins in microbe cells.

1. **(a)** Look at this photograph of a water supply. There are a number of feeding relationships and interactions between organisms.

[Source: Photograph of Haiti, Alice Smeets/AS Photography]

State one feeding relationship that can be seen in this photograph. You must draw a diagram to illustrate the flow of energy between the two organisms. ***[1 mark]***

(b) Cholera is a disease in humans caused by a bacterial infection. Humans become infected, mainly by drinking contaminated water. Bacterial infections can be treated using antibiotics. Fluoroquinoline is an antibiotic that blocks the activity of an enzyme in a cholera bacterium, which plays a central role in the replication of DNA.

Explain why blocking DNA replication is harmful to the bacterium. ***[3 marks]***

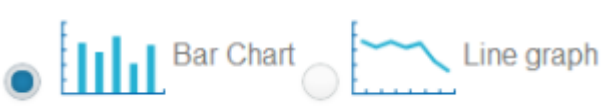
2. **(a)** The following video shows bacteria dividing.

[Source: Oxford Scientific Video/Getty Images]

Construct a table to record time and population data. **Count** and **record** the number of bacteria cells present at suitable time intervals during the growth of this population. ***[2 marks]***

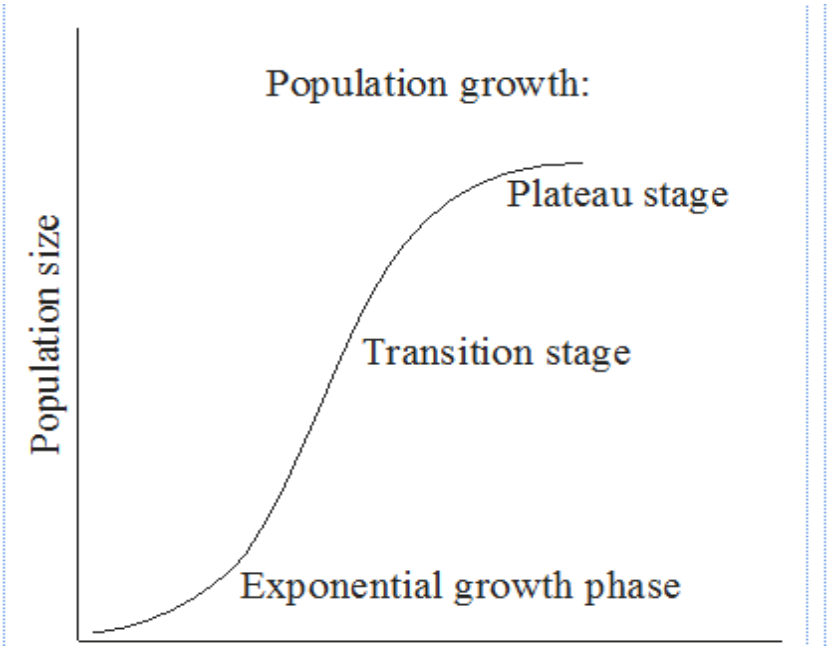
Time	Number of bacteria
1	4
2	
3	
4	

(b) **Select** the most appropriate method from the following choices and present your data. **Label** your graph and give it an appropriate title. ***[2 marks]***



Question 2 continued

(c) The following graph shows a population growth curve model. This predicts the expected **change** in the population size over time.



Compare the graph you drew in part (b) to the growth curve, indicating where it is similar. ***[2 marks]***

(d) **Outline** one advantage and one disadvantage of using a model to understand relationships. ***[2 marks]***

3. The following video shows some simple methods of water purification.

[Source: Created by Scientific Animations Without Borders (SAWBO), an organization founded at the University of Illinois at Urbana-Champaign by Dr Barry Pittendrigh and Dr Julia Bello Bravo.]

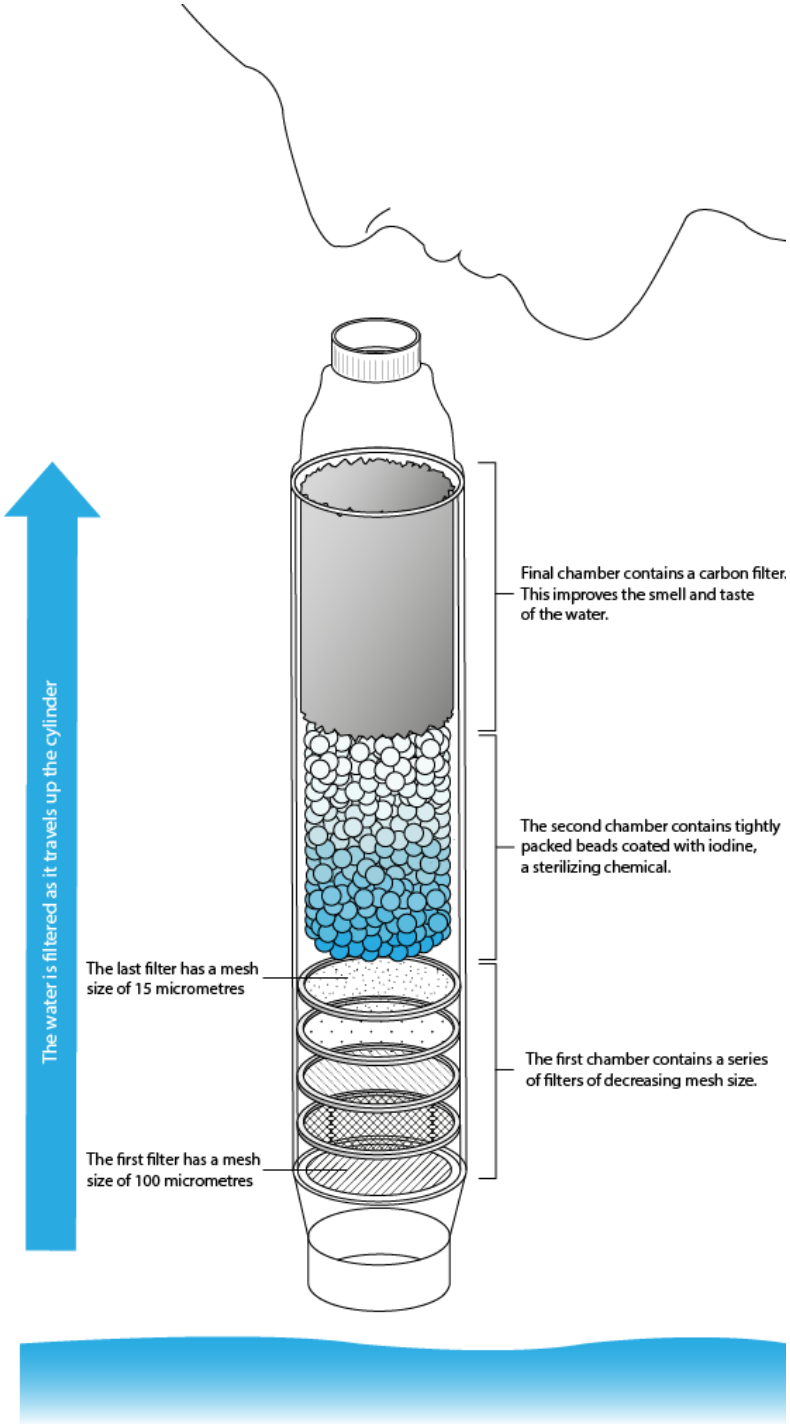
Describe how two of the methods depicted in the video make water safe for drinking.

[2 marks]

Method 1:

Method 2:

4. **(a)** A company is designing a portable personal water filter. Click on the diagram to enlarge the image. The designers need to consider whether waterborne pathogens will be removed by this water filter.

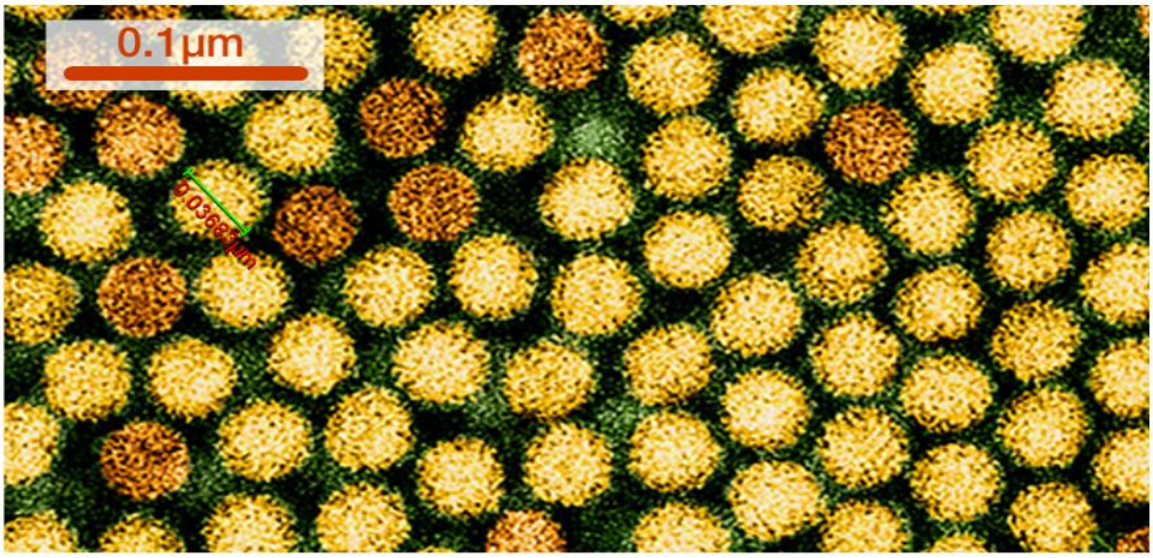


Question 4 continued

The following photograph shows hepatitis viruses.

Measure the diameter of 10 viruses and **determine** the mean diameter of a virus, using the scale provided. ***[2 marks]***

(Note: The measuring tool is manipulated by clicking from one point to another. The readings appear in the working box below.)



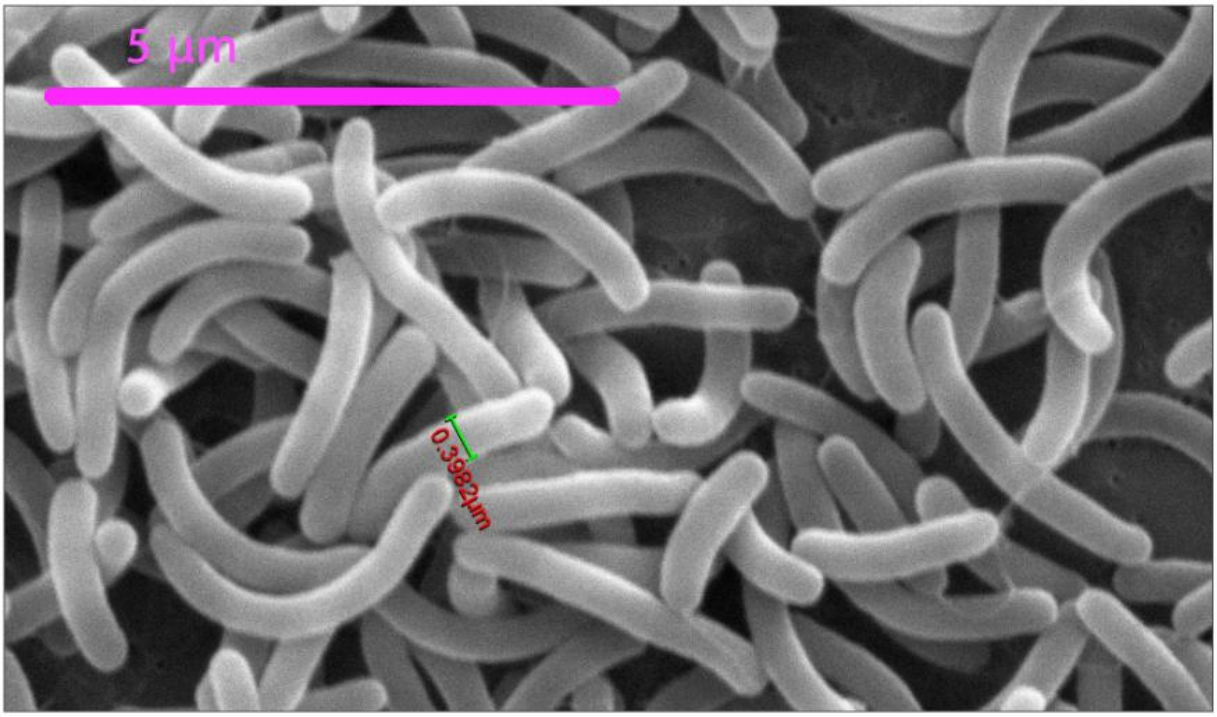
Working Box:

0.03683µm

[Source: Hepatitis, Copyright Dennis Kunkel Microscopy, Inc.]

Question 4 continued

(b) The following photograph shows cholera bacteria. ***[2 marks]***



Working Box:

0.3504µm
0.3566µm
0.3982µm

[Source: Dartmouth College Electron Microscope Facility]

Determine the mean diameter of a cholera bacterium.

(Note: The measuring tool is manipulated by clicking from one point to another. The readings appear in the working box below.)

(c) The designers of the water filter claim that particles up to 0.2 μm (micrometres) in size will be removed.

From your measurements in parts (a) and (b) **deduce** whether the filter will remove both viruses and bacteria. ***[2 marks]***

(d) **Examine** the structure of the water filter. **Outline** other mechanisms, besides direct filtering, that are used by the filter to remove pathogens. ***[2 marks]***

5. Review all of the materials used in this task before answering the question below.

Evaluate two of the methods for preparing drinking water explored in this task. ***[8 marks]***

In this extended piece of writing, you need to:

explain how these are effective methods of purification

explain the strengths and limitations of each method

use scientific knowledge and understanding to support your answer.

MARKSCHEME

MYP eAssessment

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BIOLOGY

1. **(a)** **State** one feeding relationship that can be seen in this photograph. You must draw a diagram to illustrate the flow of energy between the two organisms. ***[1 mark]***

*Award **[1 mark]** for "pigs eating detritus" or any other reasonable alternative visible in the photo **and** a diagram showing energy flow.*

(b) **Explain** why blocking DNA replication is harmful to the bacterium. ***[3 marks]***

*Award **[1 mark]** each for the points below.*

before cell divides, DNA replication must take place

stopping DNA replication prevents cell division

reproduction cannot occur

Accept words to that effect throughout.

2. **(a)** **Construct** a table to record time and population data. **Count** and **record** the number of bacteria cells present at suitable time intervals during the growth of this population. ***[2 marks]***

*Award **[1 mark]** for at least two data values recorded.*

*Award **[2 marks]** for five or more data values recorded.*

All data values must be sensible.

(b) **Select** the most appropriate method from the following choices and present your data. **Label** your graph and give it an appropriate title. ***[2 marks]***

*Award **[1 mark]** for appropriate heading and labelling.*

*Award **[1 mark]** for line graph selected.*

(c) **Compare** the graph you drew in part (b) to the growth curve, indicating where it is similar. ***[2 marks]***

*Award **[1 mark]** for "gradient increases gradually at the start".*

*Award **[1 mark]** for "then increases sharply".*

Accept "slope" for gradient.

Accept words to that effect throughout.

(d) **Outline** one advantage and one disadvantage of using a model to understand relationships. ***[2 marks]***

*Award **[1 mark]** for "useful standard for comparison" or similar.*

*Award **[1 mark]** for "model may not fit all species/conditions" or similar.*

3. **Describe** how two of the methods depicted in the video make water safe for drinking. ***[2 marks]***

*Award **[1 mark]** each for any two answers from the following list.*

filtering—removes particles

boiling—destroys pathogens

settling— large particles are removed

chlorine—destroys pathogens

other pill (iodine)—destroys pathogens

4. **(a)** **Measure** the diameter of 10 viruses and **determine** the mean diameter of a virus, using the scale provided. ***[2 marks]***

*Award **[1 mark]** for 10 measured values recorded in the working box.*

*Award **[1 mark]** for reasonable average calculated.*

All values will vary depending on virus particles chosen.

(b) **Determine** the mean diameter of a cholera bacterium. ***[2 marks]***

*Award **[1 mark]** for 10 measured values recorded in the working box.*

*Award **[1 mark]** for reasonable average calculated.*

All values will vary depending on bacteria chosen.

(c) From your measurements in parts (a) and (b) **deduce** whether the filter will remove both viruses and bacteria. ***[2 marks]***

*Award **[1 mark]** for correct inference from 4(a).*

*Award **[1 mark]** for correct inference from 4(b).*

(d) **Examine** the structure of the water filter. **Outline** other mechanisms, besides direct filtering, that are used by the filter to remove pathogens. ***[2 marks]***

*Award **[1 mark]** for "iodine" or "sterilizing chemical".*

*Award **[1 mark]** for "sticking to beads/sides of straw".*

5. **Evaluate** two of the methods for preparing drinking water explored in this task. ***[8 marks]***

Use the lists below to award a mark for any reasonable, clearly explained and worded statement. Underlined words must be used to gain the mark.

*Award any two methods **[4 marks maximum]** each.*

If more than two methods have been evaluated, award the marks to the methods with the highest number of marks.

filtering:

large particles removed eg: twigs, stones
easy to use, can be done with easily available materials
microscopic particles not removed
no specialist equipment/training needed
viruses **OR** bacteria **OR** pathogens not removed
(pathogens not removed but) could be used in combination with other techniques

boiling: ***[4 max]***

particles not removed
water purified
limited availability/cost of wood
viruses **OR** bacteria **OR** pathogens destroyed
time needed to cool down to usable temperature
recontamination possible on storage

settling: ***[4 max]***

deals with heavy large particles eg: stones
easy to use, can be done with easily available materials
inefficient method
fine particles remain eg: silt/twigs etc would float
viruses **OR** bacteria **OR** pathogens not removed
(pathogens not removed but) could be used in combination with other techniques

chlorine: ***[4 max]***

availability of chemicals
chlorine harmful to living organisms
can affect taste of water
viruses **OR** bacteria **OR** pathogens destroyed
hazards associated with storage of chemicals

other pill (iodine): ***[4 max]***

availability of chemicals
iodine harmful to living organisms
can affect taste of water
viruses **OR** bacteria **OR** pathogens destroyed
hazards associated with storage of chemicals

portable water filter: ***[4 max]***

availability/cost
portable
need to suck hard
combination of physical/chemical methods used
viruses **OR** bacteria **OR** pathogens destroyed/not destroyed ✓
water safe to drink/not safe to drink

Sciences subject-specific grade descriptor

Grade	Subject-specific descriptor
1	The student: • has a very limited understanding of scientific concepts; rarely selects or applies knowledge to solve simple familiar problems • incorrectly states a problem or question; cannot identify variables or hypotheses; attempts to design experimental methods, incomplete and of limited quality • presents or interprets data incorrectly; cannot comment on outcomes of investigations; states no improvements or extensions to experiments • very occasionally outlines basic understanding to address how science is used in to solve problems or issues; applies scientific language with very limited success.
2	The student: • has a limited understanding of scientific concepts; sometimes selects or applies knowledge to solve problems in familiar situations; makes simple judgments, without scientific support • states a problem or question simply; outlines hypotheses and variables in a limited simple way; designs experimental methods with limited success • collects, presents and interprets data in a very simple way; comments simply on methods or outcomes of investigation; occasionally states irrelevant or incorrect improvements or extensions to experiments • outlines simple understanding to address how science is used to address problems or issues, with little or no reference to the implications; occasionally applies scientific language to communicate understanding but does so with limited success.
3	The student: • has a basic understanding of scientific concepts; selects and applies knowledge to solve problems in familiar situations; interprets information to make simple scientific judgments • outlines a problem or question with some misunderstandings; formulates simple hypotheses; designs simple experimental methods to collect data, with materials and equipment clearly chosen • sometimes collects, presents and interprets data; comments on methods, hypotheses or outcomes of experiments, occasionally with significant misunderstandings; outlines basic improvements or extensions to experiments, with increasing relevance • uses basic understanding to address how science is applied and used to address problems or issues; simply describes the implications, with significant gaps; sometimes applies scientific language to communicate understanding, although frequently incorrect.

4	The student: • has a good understanding of scientific concepts; selects and applies scientific knowledge to solve problems in a familiar situations; interprets information to make scientifically supported judgments • outlines problems or questions, with minor gaps; formulates hypotheses using scientific reasoning; designs safe experimental methods to collect relevant data with materials and equipment clearly chosen • collects, presents and interprets data, although frequently disorganized; correctly discusses hypotheses and methods based on the outcomes; describes simple relevant improvements or extensions to experiments • summarizes the ways in which science is applied and used to address problem or issues with success; attempts to discuss the implications of using science; sometimes applies scientific language to communicate understanding correctly.
5	The student: • consistently understands scientific concepts; selects and applies scientific knowledge to solve problems in familiar situations, requiring support in unfamiliar situations; analyses information to make scientifically supported judgments • describes problems or questions in detail; explains hypotheses using scientific reasoning; designs safe experimental methods with appropriate materials and equipment to collect sufficient relevant data • correctly generates relevant data to transform and interpret in a useful way; discusses validity of hypotheses and methods in detail; describes beneficial improvements or extensions to experiments • describes the ways in which science is applied and used to address problems or issues including its implications; usually applies scientific language to communicate understanding clearly and precisely.
6	The student: • demonstrates a broad and extensive understanding of scientific concepts; regularly selects and applies scientific knowledge to solve problems in both familiar and unfamiliar situations; evaluates information to make scientifically supported judgments • explains problems or questions clearly; explains hypotheses using correct scientific reasoning; designs complete and safe methods with appropriate materials and equipment to collect sufficient relevant data • correctly generates relevant data to transform and interpret in a correct and useful way, with scientific reasoning; evaluates validity of hypotheses and methods in depth and in detail; describes detailed beneficial improvements or extensions to experiments • explains the ways in which science is applied and used to address specific problems or issues with its correct implications; consistently applies scientific language to communicate understanding clearly and precisely.

7	The student: • thoroughly understand scientific concepts; independently selects and applies sophisticated scientific knowledge to solve a variety of problems, with independence and expertise; evaluates information to make complex scientifically supported judgments • explains problems or questions in a comprehensive way; explains hypotheses using high-quality correct scientific reasoning; designs a logical, complete and safe method with appropriate materials and equipment to collect relevant sufficient data for sophisticated analysis • correctly and clearly generates relevant data; accurately interprets data and explains results using sophisticated scientific reasoning; clearly evaluates the validity of hypotheses or methods; provides detailed valid and beneficial improvements and extensions to the method • clearly explains the ways in which science is applied and used to address problems or issues; discusses the implications in a sophisticated way; consistently applies complex scientific language to communicate understanding clearly and precisely.

Mathematics

Mathematics topic list

Refer to the "Mathematics skills framework" section of the MYP *Mathematics guide* (May 2014). **For eAssessment, schools are expected to address all four branches of mathematical study and all topics and skills in the framework**

Mathematics examination blueprint

Overview

Assessments will model good unit planning practice for the subject. Each assessment will be split into three tasks, each of which have a suggested time of 40 minutes. Marks will be evenly distributed across the four criteria within a small variance of three marks. The marks for criterion C will be distributed across all three tasks.

The following table illustrates how a mathematics assessment **could** be structured. The number of marks for each task will be approximately 40.

Task	Main criteria assessed	Marks
Knowing and understanding	A, C	40
Applying mathematics in real-life contexts	D, C	40
Investigating patterns	B, C	40
		120

Sources

A variety of sources will feature in each assessment and could include the following.

- Data tables
- Static images
- Videos
- Animations
- Simulations
- Graphs

Tools

A variety of response tools will be available to students including but not limited to an onscreen calculator, measuring tool, drawing canvas, mathematics canvas, graph plotter and table drawing tool.

Tasks

Knowing and understanding

The first task assesses students' knowledge and understanding of mathematics (criterion A) but marks may be awarded against the other criteria when appropriate to the skills used in answering a question. For example, a question assessing knowledge and understanding may also require students to move between different forms of mathematical representation. In this situation marks will be awarded against criteria A and C.

Applying mathematics in real-life contexts

The second task assesses students' ability to apply mathematics in a real-life context, which is likely to be connected to the global context for the session. Students may be required to produce pieces of extended writing to evaluate and justify the validity of mathematics models.

Investigating patterns

Investigative skills in mathematics will be assessed in the final task. The abstract questions in this task will contain a greater degree of scaffolding than would be appropriate in the classroom to allow students of different abilities to access the task..

MYP eAssessment

October 2013 Trial

MATHEMATICS

- **Global context:** globalization and sustainability
- **Key concept:** relationships
- **Related concepts:** model; representation; measurement
- **Criteria:** C (Communicating) and D (Applying mathematics in real-life contexts)

[50 marks max]

In this real-world problem, you will explore urban planning and infrastructure by studying the flow of traffic in cities around the world.

1. The following video shows traffic at a junction (hover: intersection) in Glasgow (Scotland) for a 12-second period.

[Source: http://footage.shutterstock.com/clip-1463575-stock-footage-elevated-view-of-junction-of-m-in-scotland.html]

(a) **Write down** the number of cars passing through the junction (hover: intersection) in this time period. ***[1 mark]***

(b) **Estimate** the number of cars that would pass through this junction in the next five minutes. Show your working. ***[2 marks]***

2. The table below shows the number of cars passing through this junction between 8:00 and 9:00 am each day for a week-long period.

Day and date	Monday 20 May	Tuesday 21 May	Wednesday 22 May	Thursday 23 May	Friday 24 May	Saturday 25 May	Sunday 26 May
Number of cars	1,272	1,130	1,213	1,149	1,187	626	324

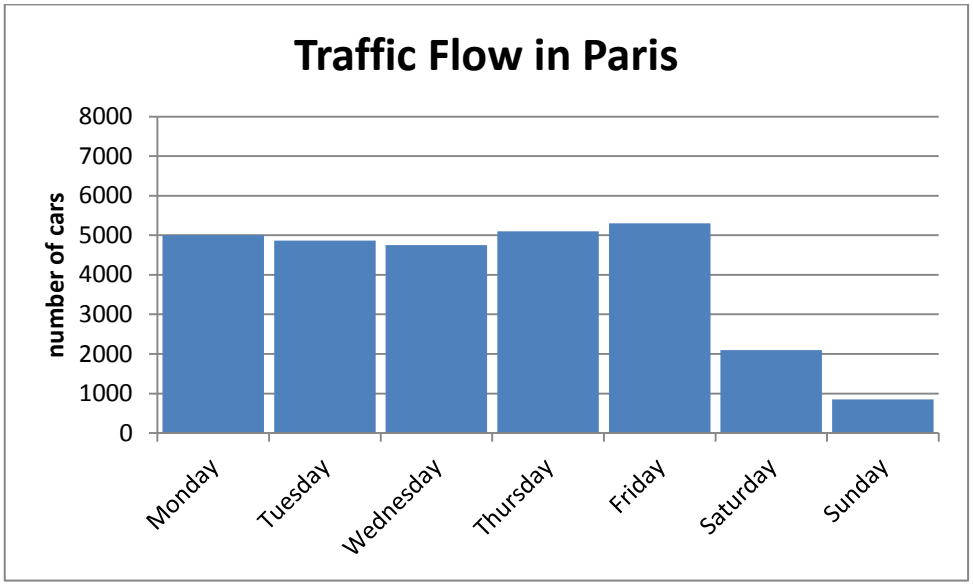
(a) **Select** a graph to fully present this information. ***[4 marks]***

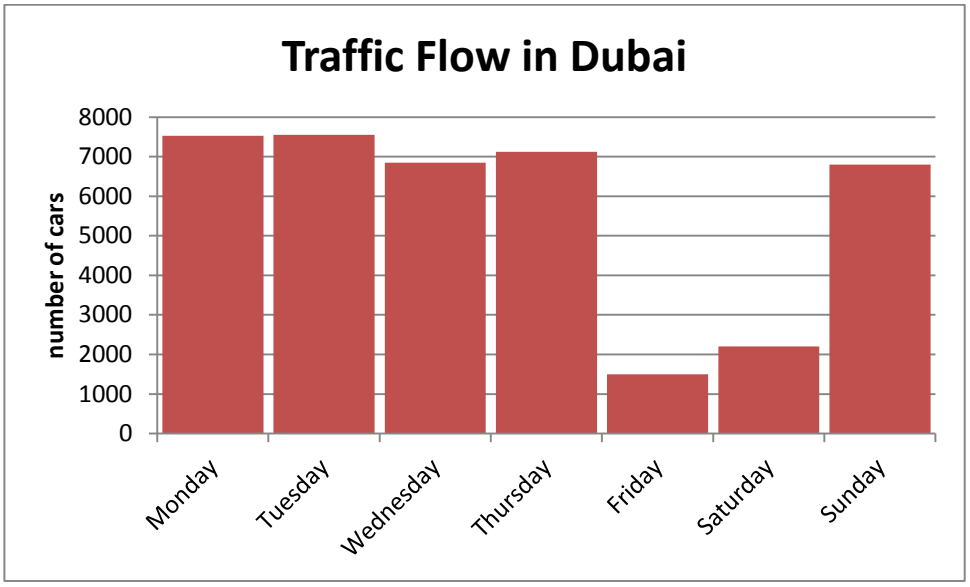
Bar chart **Line graph** **Scatter graph** **Pie graph**

(Note: The choice of graph is auto-populated and displayed. The axes can be changed, manipulated and labelled.

(b) **Explain** your choice of graph. ***[2 marks]***

3. The following graphs show the number of cars passing through busy junctions in Paris (France) and Dubai (UAE), again between 8:00 am and 9:00 am for the same seven-day period.





(a) **Compare and contrast** the data for Paris and Dubai. ***[3 marks]***

(b) **Identify** two factors that might affect the number of cars passing through the junctions on any given day. ***[3 marks]***

Factor 1:

Factor 2:

4. Traffic data from a junction in Mexico City, Mexico

A researcher counts the number of cars passing through a junction (hover: intersection) in Mexico City. As each car passes, the researcher registers the event with a click on an electronic counter. The counter automatically stores the number of clicks at the end of each one-minute period. The researcher began recording at 8:36 am (hover: Time Period 1) and completed collecting data at 9:11 am (hover: Time Period 36).

The following table shows the data that the researcher collected.

Time period registered on counter	Number of cars
1	64
2	66
3	67
4	69
5	68
6	69
7	71
8	70
9	72
10	70
11	71
12	69
13	67
14	68
15	67
16	68
17	69
18	66

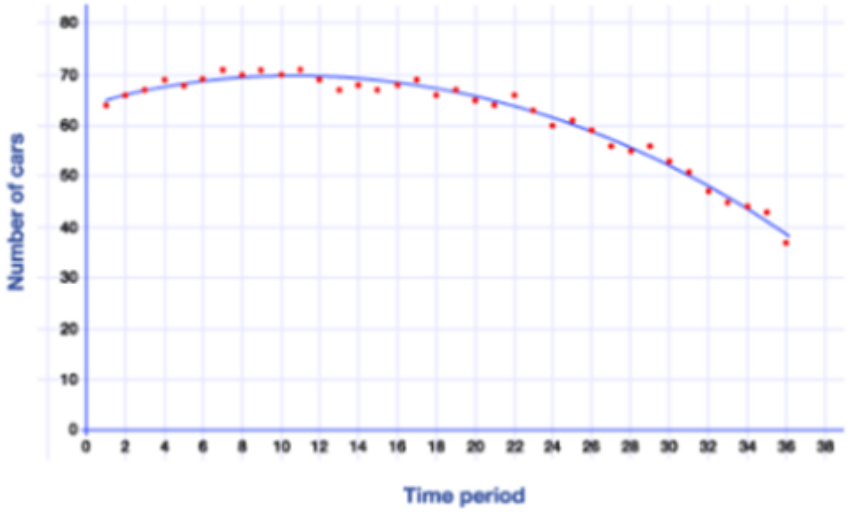
Time period registered on counter	Number of cars
19	67
20	65
21	64
22	66
23	63
24	60
25	61
26	59
27	56
28	55
29	56
30	53
31	51
32	47
33	45
34	44
35	43
36	37

Question 4 continued

(a) Calculate the mean, the median and mode (hover: modal class, modal time) for the number of cars in the datasheet. ***[5 marks]***

(b) Look at the graph

The researcher represents the data on a graph showing the number of cars against time period. She models the data using a function. The following graph shows the data and the researcher's model.



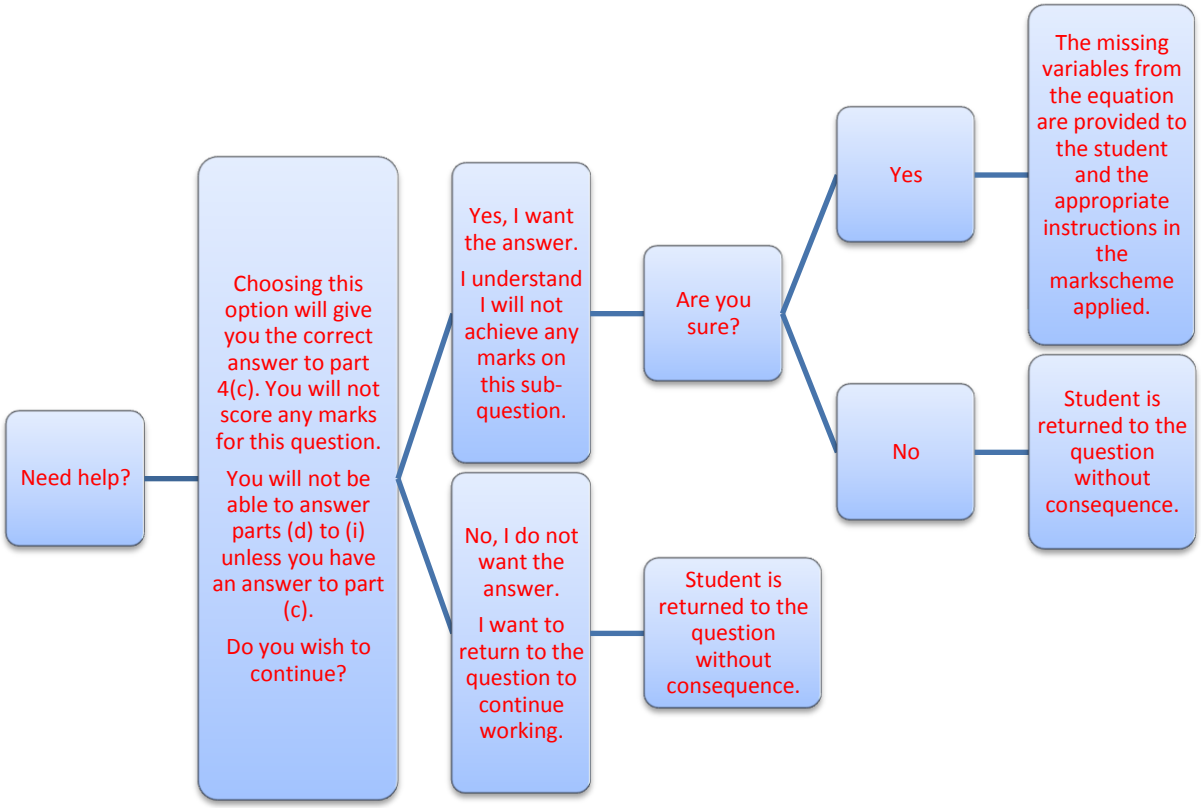
State the type of function the researcher has chosen. ***[1 mark]***

(c) Complete the missing sections of the equation below so it represents the function shown.
[2 marks]

$$y = -0.05\square + 1\square + 65$$ (hover: f(x) =)

You may use the symbols below to help enter your function.
(Students will have a working canvas with symbols provided in a toolbar.)

(HINT option: The following diagram shows how the hint option can be used in part 4c). The student is guided through the choice and given the opportunity to escape from the hint without forgoing any marks.)



Need help?

Choosing this option will give you the correct answer to 4(c). You will **not** score any marks for this question.

You will not be able to answer parts 4(d) to 4(i) unless you have an answer to part (b)

Do you wish to continue?

Yes, I want the answer | No, I want to return to the question

Are you sure?

Click **yes** to confirm you understand that you will not receive the 2 marks available for question 4(c)

Click **no** to return to the question and continue working.

Yes, I want the answer | No, I want to return to the question

If students choose to take the HINT option, the following equation will appear in the place of that above.

$$y = -0.05\,x^2 + 1x + 65$$

(d) **Use** the equation to **calculate** the number of cars passing through the junction during time period 40 (ending at 9:15 am). ***[3 marks]***

(e) **Use the** equation to **calculate** the number of cars passing through the junction during time period 50 (ending at 9:25 am). ***[3 marks]***

(f) **Comment** on the validity of your answers to (d) and (e). ***[2 marks]***

(g) Using the equation, **solve** for x. ***[6 marks]***

You may choose any reasonable method.

(Note: Symbols are available in the toolbar to allow for a variety of methods including attempts to factorize, completing the square, using quadratic equations or other.)

(h) **Explain and justify** whether the solution(s) to this equation make sense in the context of this situation. ***[5 marks]***

(i) **Reflect and comment** on the researcher's model. **Describe** possible improvements and/or alternatives to this model. ***[8 marks]***

MARKSCHEME

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MATHEMATICS

Question		Answers	Mark	Total	Criteria (Strand)
1	**(a)**	7	***1***	**1**	***D (i)***
	(b)	7×25 175 *For correct multiplication of incorrect values, award **[1 mark]**.*	***1*** ***1***	**2**	***D (ii), D (iii)***

Question		Answers	Mark	Total	Criteria (Strand)
2	(a)	column **OR** line **OR** scatter *Any except pie score here.* **EITHER** Column *x* axis: day or date *y* axis: number of cars all data correctly plotted **OR** line **OR** scatter *x* axis: date *y* axis: number of cars all data correctly plotted	***1*** ***1*** ***1*** ***1*** ***1*** ***1*** ***1***	**4**	***C (ii)***
	(b)	good rationale for choice of column or line graph *Scatter plot or pie chart **cannot** score here.* *Two distinct points of explanation required for rationale.*	***2***	**2**	***C (i)***

Question		Answers	Mark	Total	Criteria (Strand)
3	**(a)**	ref to similar pattern—5 busy days, 2 quieter days ref to quiet periods on different days correct use of at least one appropriate mathematical term	***1*** ***1*** ***1***	**3**	***D (i)***
	(b)	any **two** sensibly argued explanations *eg*, *different weekends/traffic calming measures/roadworks* correct use of at least one appropriate mathematical term	***2*** ***1***	**3**	***C (i), D (i)***

Question		Answers	Mark	Total	Criteria (Strand)
4	**(a)**	Mean: 61.8 (accept 61.75 or 62) *Appropriate degree of accuracy* Median: 66 cars Mode: (8:43 to) 8:44	***2*** ***1*** ***1*** ***1***	**5**	***C (iv), C (v), D (ii), D (iii)***
	(b)	Quadratic function *Do not accept "parabolic"*	***1***	**1**	***C (i),***
	(c)	First box: x^2 *Do not accept x^2 or x2* Second box: *x*	***1*** ***1***	**2**	***C (ii), D (i)***

Question		Answers	Mark	Total	Criteria (Strand)
	(d)				**C (iv), D (ii), D (iii)**
		25 cars	***3***		
		ALL METHODS			
		correctly calculated coefficients for *a*, *h* and *k* using *their* points	***3***		
		OR			
		correctly calculated coefficients for *a*, *b* and *c* using *their* points	***1***		
		correctly substitutes into *their* function or hint function	***1***	**3**	
		calculates number using *their* function (or 28.8(2) if hint is used)	***1***		
		gives answer as an integer			
		*One incorrect data point used, award **[2 marks max]**.*			
		*Two incorrect data points used, award **[2 marks max]**.*			
		*However, three incorrect data points used to **correctly** calculate coefficients can score **[1 mark]**.*			

Question		Answers	Mark	Total	Criteria (Strand)
	(e)	**10 cars** correctly substitutes into *their* function or hint function calculates number using *their* function (or –4 if hint is used) gives answer as an integer **OR** comments that the value is not reasonable	 ***1*** ***1*** ***1***	**3**	***C (iv), D (ii), D (iii)***
	(f)	comments that the answers are not valid as the extrapolation is outside the data set **OR** comments that a negative value is predicted which is not a valid prediction *Or words to that effect*	***1*** ***1*** ***1*** ***1***	**2**	***D (iv)***
	(g)	From any method: $x = -27.4$ $x = 47.5$ clearly indicates method chosen correctly substitutes into *their* chosen method clearly and correctly communicates calculation steps correct answers Use of appropriate degree of accuracy	 ***1*** ***1*** ***1*** ***2*** ***1***	**6**	***C (iv), C (v)***

Question		Answers	Mark	Total	Criteria (Strand)
	(h)	Understanding that solution gives *x*-intercepts Implication that intercepts at approx 8:07:30 and 9:22:30 Indicates no traffic at these times Implications of the model Use of appropriate mathematical terms	***1*** ***1*** ***1*** ***1*** ***1***	**5**	***D (v)***
	(i)	See table of indicative content below *Mark holistically using a best fit approach.* *Consider the mathematical sophistication and complexity of discussion when awarding marks.* *Highlight or underline sections of text that support the award of marks.*		**8**	***D (i) to (v)***

	1–2	3–4	5–6	7–8
	The student:			
Identify the relevant elements of the authentic real-life situation.	• makes general comments about "rush hour" being particularly busy.	• makes more specific comments about validity ("How do they get home?", "Is every day like this?").	• makes well-reasoned comments about validity of data for modelling.	• suggests more data • comments on discrete/continuous • uses the data.
Select appropriate mathematical strategies to model the authentic real-life situation.			• attempts to find quadratic.	• finds quadratic • comments further on periodicity.
Apply the selected mathematical strategies to reach a solution to the authentic real-life situation.	• provides qualitative description of trends shown by model.	• extends qualitative description to discuss how well model matches data.		• uses quadratic accurately • sketches a periodic curve/sine curve • suggests step-wise solution.
Justify the degree of accuracy of the solution.			• model predicts number of cars continues to decrease.	• **negative** value predicted • suggests periodic curve avoids that • comments on one single day/hour's data.
Justify whether the solution makes sense in the context of the authentic real-life situation.		• comments that model does work for a whole day.	• states that model is only **valid** for time period studied.	• states that parabola does not make sense • that periodic curve would • states that sine curve might not work either.

Mathematics subject–specific grade descriptor

Grade	Subject-specific descriptor
1	The student: • has a very limited understanding of mathematical concepts; rarely selects or applies appropriate mathematics to solve simple familiar problems • recognizes simple mathematical patterns but does not investigate • very rarely uses appropriate mathematical language or notation; cannot construct arguments or draw conclusions • attempts to create simple models to solve real-life problems, with very limited success.
2	The student: • has a limited understanding of mathematical concepts; sometimes selects and applies appropriate mathematics to solve simple familiar problems • uses limited strategies to investigate simple mathematical patterns • occasionally uses appropriate mathematical language and moves between forms of notation and representation; draws conclusions that are difficult to interpret • creates models to solve real-life problems, with limited success.
3	The student: • has a basic understanding of mathematical concepts; selects and applies appropriate mathematics to solve simple familiar problems, with frequent mistakes • selects and uses strategies to investigate simple mathematical patterns • uses some appropriate mathematical language and begins to move between forms of notation and representation; constructs incomplete arguments and occasionally draws conclusions • creates and explains models to solve real-life problems, with some success.
4	The student: • has a good understanding of mathematical concepts; selects and applies appropriate mathematics to solve simple familiar problems, requires support for challenging problems • selects and uses appropriate strategies to investigate mathematical patterns • usually uses appropriate mathematical language and moves between forms of notation and representation • constructs basic logical arguments and draws conclusions; creates and explains relevant models to solve real-life problems.

Grade	Subject-specific descriptor
5	The student: • consistently understands mathematical concepts well; selects and applies appropriate mathematics to solve challenging familiar problems; requires support for unfamiliar problems • develops and uses a range of strategies to investigate mathematical patterns • uses appropriate mathematical language and frequently moves between forms of notation and representation • constructs arguments and draws conclusions, sometimes containing mistakes; creates and explains relevant models to solve real-life problems.
6	The student: • demonstrates a broad and extensive understanding of mathematical concepts; regularly selects and applies appropriate mathematics to solve challenging familiar and unfamiliar problems, often with independence • develops and uses a range of strategies to investigate complex mathematical patterns • consistently uses appropriate mathematical language and frequently moves between forms of notation and representation; constructs detailed arguments and draws conclusions • creates and justifies sophisticated models to solve real-life problems.
7	The student: • thoroughly understands mathematical concepts; independently selects and applies appropriate mathematics to solve challenging familiar and unfamiliar problems • develops and uses a wide range of strategies to investigate complex mathematical patterns • consistently uses appropriate mathematical language and flexibly moves between forms of notation and representation; constructs rigorous arguments and draws sensible conclusions • creates and justifies sophisticated models to solve real-life problems.

Interdisciplinary learning

Interdisciplinary learning examination blueprint

Overview

Assessments will model good unit planning practice for the subject. In advance of the examination session, students will be given access to pre-release material (PRM). The PRM will feature a range of sources, which offer an insight into the theme of the assessment, inspiration for which will have been drawn from the stated global context for the examination session.

The assessment will be split into three tasks. The first and third tasks will have a suggested time of 30 minutes each; the second task will have a suggested time of 60 minutes. Each criterion will be assessed once. Marks will be evenly distributed across the four criteria within a small variance of three marks. The following table illustrates how an interdisciplinary assessment **could** be structured.

Task	Criteria	Marks
Disciplinary grounding	A	30
Synthesis of interdisciplinary understanding	B, C	60 (30 + 30)
Reflective journal	D	30
		120

Sources

A variety of sources will feature in both the assessment and the PRM and could include the following.

- Primary/secondary
- Fiction/non-fiction
- Articles
- Journals
- Blogs
- Data tables
- Static images
- Photomations
- Videos
- Animations
- Charts
- Graphs

Task details

Disciplinary grounding

The first task will assess students' ability to demonstrate relevant disciplinary factual, conceptual and/or procedural knowledge (criterion A). It will make reference to key concepts and related concepts from language and literature, individuals and societies, mathematics and sciences as appropriate.

Synthesis of interdisciplinary understanding

The second task will assess students' ability to synthesize disciplinary knowledge to demonstrate interdisciplinary understanding (criterion B) and their ability to use appropriate strategies to communicate interdisciplinary understanding effectively (criterion C).

Reflective journal

The final task will assess students' ability to reflect on the development of their own interdisciplinary understanding and evaluate the benefits and limitations of disciplinary and interdisciplinary knowledge and ways of knowing specific situations (criterion D). The task will be presented in the format of a journal to encourage reflecting thinking. Questions in this task could require students to:

- recall learning experience from two relevant subject groups
- justify choice of disciplines
- describe what each discipline brings to bear, how they challenge/complement each other
- outline nature of new understanding
- evaluate their own strengths and weaknesses as a learner
- identify areas for future growth.

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- **Key concept:** Relationships
- **Related concepts:** environment; interaction; function
- **Criteria:** B (Synthesizing) and C (Communicating)

[20 marks max]

Background resources

About 600,000 people in Kenya's capital live in the Kibera neighbourhood, East Africa's largest informal settlement.

Congestion is a major problem. There is not even the space to build toilets.

Some frustrated residents use polythene bags commonly known as "flying toilets" to dispose of human waste.

[Source: Getty images/Tony Karumba]

Some workers earn only US$42 a month and can hardly afford the commercial toilet services offered at the densely settled area.

One local said: “It’s not safe to go out at night as the toilets are far, so often we are forced to use a polythene bags to relieve ourselves and dump them outside.”

[Source: Getty images/Tony Karumba]

Due to the lack of a solid waste management system, flying toilets become a hazard during the rainy season, as water sources get contaminated.

Children and women are most vulnerable to infections. A report by the aid agency Amref Health Africa says incidents of cholera, typhoid and other waterborne diseases are very common.

Amref Health Africa has constructed safe water points within Kibera. At the moment, there is an average of one toilet for more than 2,000 people.

[Source: iStockphoto/J Webb]

Waste coming from Kibera has now choked up the nearby Nairobi dam.

Most of the water has dried up and the large grass patches have become makeshift toilets for the nearby residents.

Residents used to fish there but now the area is covered by vegetation.

[Source: Getty images/Tony Karumba]

Pit latrines are moved when one is filled up with waste.

This pit latrine is made of old iron sheets and tree stems, and is not safe.

The toilet serves about 40 people and is locked to keep outsiders away.

[Source: iStockphoto/Gordon Dix]

Soweto Usafi Group, a community-based organization, built this modern toilet and charge users US$0.03 per visit.

“About 400 people use this toilet every day. It’s clean and we give them tissue paper. Since we started the project, diseases like malaria, cholera and typhoid have reduced,” says the group’s organizing secretary.

The group built the toilet with the support of a local non-governmental organization (NGO), Maji na Ufanisi, which funds water and sanitation projects in Kibera.

[Source: iStockphoto/Roll6]

Amref Health Africa has constructed a total of 286 pit latrines across Kibera.

All the units are in use and are contributing to the reduction of the “flying toilets” menace.

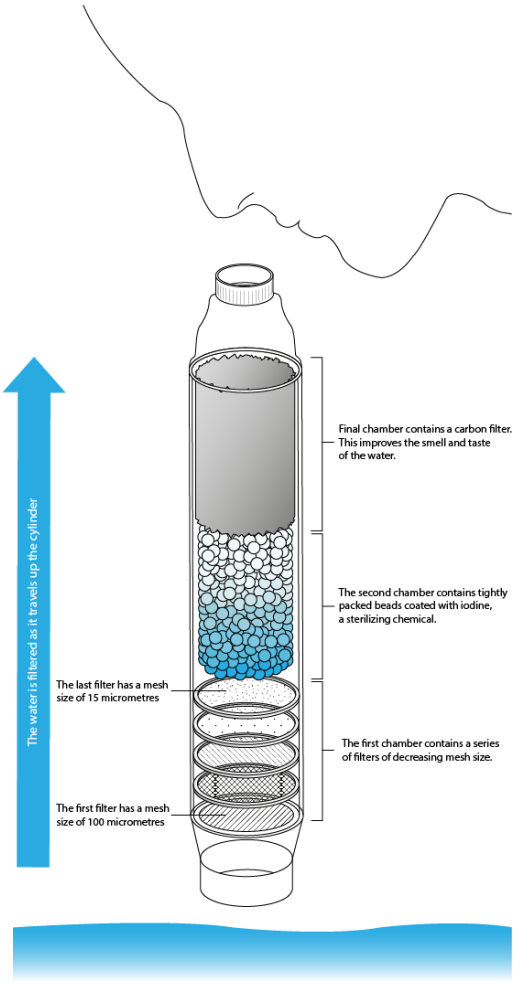
And residents are now leading a campaign to convince the landlords to provide at least the space of a room per renting block for the construction of toilets.

[Source: Carren Otieno, Amnesty International
http://www.slumstories.org/episode/kenya-%E2%80%93-going-toilet]

Deaths resulting from diarrheal cases per region

Region	Cases of diarrhoea	Deaths
South Asia	174,300,271	168,234
East Asia	195,800,035	125,073
Middle East	26,500,000	26,981
Sub-Saharan Africa	246,300,000	250,123
Latin America and Caribbean	25,100,000	20,861

[Source: WHO/UNICEF Joint Monitoring Programme for Water Supply & Sanitation (statistics show situation in 2011)]



Portable personal water filters such as this enable users to remove contaminants, debris and bacteria from water making it safe to drink. These devices do not require batteries or electricity and so are well suited to use in deprived areas.

[Source: Sodis http://www.sodis.ch/methode/anwendung/ausbildungsmaterial/dokumente_material/flyer_kenia_e.pdf]

The following are female sanitation priorities – mostly connected to dignity and convenience rather than health

Privacy: no-one witnessing you going to the toilet or bathing.

Security: separate M and F facilities, in public and school toilets.

Soap and water: to wash hands, bodies, clothes, utensils, nappies/diapers and pads.

Disposal facilities: for sanitary cloths, wastewater and garbage.

Potties: to help deal with infants' excreta.

Proximity to home: so that visiting the toilet doesn't mean leaving children unaccompanied and there is easier access for the sick, elderly and disabled (all cared for by women).

Easily cleanable designs: women are invariably responsible for toilet maintenance.

[Source: Reprinted by kind permission of New Internationalist.
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40-minute task

You are the subject expert responsible for organizing information that developers will use to create a website for a new not-for-profit organization. The organization aims to improve the quality of life for residents of densely populated urban zones in low-income countries.

1. Using the task background material and your MYP sciences and individuals and societies courses, **describe** how **four** problems experienced by residents of the Kibera neighbourhood could be resolved by using multiple disciplines. ***[8 marks]***

1: ***[2 marks]***

2: ***[2 marks]***

3: ***[2 marks]***

4: ***[2 marks]***

2. Write a 6–12-word home page headline that will engage readers and encourage them to read more of your website. **State** why developers should use this headline in their web page design. ***[2 marks]***

3. **(a)** Using the task background material and your MYP sciences and individuals courses, **suggest two** courses of principled action that could improve the quality of life for people living in low-income urban environments. ***[4 marks]***

1: ***[2 marks]***

2: ***[2 marks]***

(b) **Justify** your **two** suggestions in part 3(a). ***[2 marks]***

4. **Evaluate one** of your proposed courses of action in terms of its strengths and limitations.

[4 marks]

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1. Using the task background material and your MYP sciences and individuals and societies courses, **describe** how **four** problems experienced by residents of the Kibera neighbourhood could be resolved by using multiple disciplines.

(4 × 2 marks, criterion C: Communicating—by describing results of inquiry)

Descriptor	Mark
The student does not reach a standard described by any of the descriptors below.	0
The student uses some basic disciplinary terminology from one discipline only.	1
The student uses sophisticated terminology from multiple disciplines.	2

*Award up to **[2 marks]** for each clearly described problem experienced by the residents living in the Kibera neighbourhood and a possible resolution. A description without any suggested resolution should be awarded **[1 mark]**.*

The problems may include (this list is neither prescriptive nor exhaustive):

- congestion
- lack of safe toilets
- "flying" toilets
- low-income jobs
- hazards of going out at night
- contaminated water/food sources
- diseases

2. Write a 6–12-word home page title that will engage readers and encourage them to read more of your website. **State** why developers should use this headline in their web page design.

(2 marks, criterion C: Communicating—by innovating forms and strategies)

Descriptor	Mark
The student does not reach a standard described by any of the descriptors below.	0
The student presents a limited statement.	1
The student presents a clear statement.	2

*Award **[2 marks]** for a clear statement; award **[1 mark]** for a vague statement.*

*The statement **may** include:*

- language used—disciplinary terminology, emotive, persuasive, passive/active, formal/informal
- engagement and creativity
- appropriate key words/terminology
- connections with task background material

Any reasonable statement is acceptable.

3. **(a)** Using the task background material and your MYP sciences and individuals and societies courses, **suggest two** courses of principled action that could improve the quality of life for people living in low-income urban environments.

(2 × 2 marks, criterion B: Synthesizing—through action)

Descriptor	Mark
The student does not reach a standard described by any of the descriptors below.	0
The student uses interdisciplinary understanding to suggest a vague or simplistic course of action.	1
The student uses interdisciplinary understanding to suggest a clear and principled course of action.	2

*Award up to **[2 marks]** for each clearly proposed principled course of action. Identification of any reasonable course of action should be awarded **[1 mark]**.*

Suggestions may include (this list is neither prescriptive nor exhaustive):

- improving sewage systems
- increasing availability of LifeStraw®
- raising global awareness
- increased numbers of safe toilets
- improved availability of medicinal supplies
- campaigning for improvement of conditions
- fundraising
- women's safety campaign

Any reasonable suggestions are acceptable.

Question 3 continued

(b) **Justify** your **two** suggestions in part 3(a).

(2 marks, criterion B: Synthesizing)

Descriptor	Mark
The student does not reach a standard described by any of the descriptors below.	0
The student's justification is limited by basic interdisciplinary understanding.	1
The student's interdisciplinary understanding is evident though a clear and detailed justification.	2

*Award **[2 marks]** for fully justified choices; award **[1 mark]** for a limited justification.*

Justification may include:

- well articulated reasoning
- a developed argument
- evidence from the task background material and/or knowledge from the student's MYP sciences or individuals and societies courses

4. **Evaluate one** of your proposed courses of principled action in terms of its strengths and limitations.

(4 marks, criterion B: Synthesizing—through inquiry into relevant challenges)

Descriptor	Mark
The student does not reach a standard described by any of the descriptors below.	0
There is basic disciplinary and interdisciplinary understanding. There is some attempt at synthesis/evaluation.	1–2
There is clear disciplinary and interdisciplinary understanding. There is effective synthesis/evaluation.	3–4

"Evaluate" requires candidates to make an appraisal by weighing up strengths and limitations.

Candidates should offer an evaluation of their proposed course of principled action.

Interdisciplinary learning subject-specific grade descriptor

Grade	Subject-specific descriptor
1	The student: • demonstrates very limited disciplinary grounding • suggests few or superficial connections between disciplines • communicates interdisciplinary understanding with little structure, clarity or coherence • demonstrates limited reflection on personal development of interdisciplinary understanding.
2	The student: • demonstrates limited disciplinary grounding • suggests connections between disciplines • communicates interdisciplinary understanding with some structure, clarity and coherence • demonstrates limited reflection on personal development of interdisciplinary understanding, superficially describing the limitations or benefits of disciplinary and interdisciplinary knowledge in specific situations.
3	The student: • demonstrates some disciplinary grounding • describes connections between disciplines • communicates interdisciplinary understanding with some organization and coherence, listing sources • demonstrates some reflection on personal development of interdisciplinary understanding, superficially describing the limitations and benefits of disciplinary and interdisciplinary knowledge in specific situations.
4	The student: • demonstrates some relevant disciplinary grounding • describes significant connections between disciplines • communicates interdisciplinary understanding with some organization and coherence, listing sources and recognizing appropriate forms or media • demonstrates adequate reflection on personal development of interdisciplinary understanding, describing some benefits and limitations of disciplinary and interdisciplinary knowledge in specific situations.

Grade	Subject-specific descriptor
5	The student: • demonstrates most necessary disciplinary grounding • synthesizes disciplinary knowledge to demonstrate interdisciplinary understanding • communicates interdisciplinary understanding that is generally organized, clear and coherent, documenting sources and using appropriate forms or media • demonstrates significant reflection on personal development of interdisciplinary understanding, explaining some benefits and limitations of disciplinary and interdisciplinary knowledge in specific situations.
6	The student: • demonstrates all necessary disciplinary grounding • synthesizes disciplinary knowledge to demonstrate consistent and thorough interdisciplinary understanding • communicates interdisciplinary understanding that is organized, clear and coherent, documenting relevant sources using a recognized convention and beginning to use selected forms or media effectively • demonstrates thorough reflection on personal development of interdisciplinary understanding, evaluating benefits and limitations of disciplinary and interdisciplinary knowledge and ways of knowing in specific situations.
7	The student: • demonstrates extensive disciplinary grounding • synthesizes disciplinary knowledge to demonstrate consistent, thorough and insightful interdisciplinary understanding • communicates interdisciplinary understanding that is consistently well structured, clear and coherent, documenting relevant sources using a recognized convention and consistently using selected forms or media effectively • demonstrates thorough and nuanced reflection on personal development of interdisciplinary understanding, evaluating thoroughly and with sophistication the limitations and benefits of disciplinary and interdisciplinary knowledge and ways of knowing in specific situations.

Research and evaluation of MYP eAssessment

The introduction of the externally assessed MYP eAssessment follows a careful plan including technical and user evaluation, as well as analysis to establish the quality of the assessments. Early in 2013, the experiences of around 30 MYP students participating in a very small pre-trial informed the development of the onscreen examinations for five subjects. A set of five 40-minute tasks, one for each of five subjects were trialled in October and December 2013. Some 80 schools and over 2,300 English and French language students participated in the trial and provided a wealth of feedback. These trial outcomes were summarized in an MYP schools report published in April 2014.

The pilot examinations scheduled for May 2015 will also provide vital data for the evaluation of MYP onscreen assessments. The onscreen examination pilot will involve the collection of feedback from students, teachers and coordinators regarding the implementation, content and alignment with MYP principles and practices. Further, student performance will be benchmarked against an existing summative assessment for the age group.

Collecting student experience and performance data is crucial to the evaluation of the pilot and the submission for recognition of the new MYP certificate. Data collected during the pilot, future onscreen examinations and ePortfolio will help to improve the MYP external assessments and to ensure the IB has permission to use these data for internal reporting, as well as for external academic research. Schools participating in the live pilot examinations will need to secure the necessary student and guardian permissions. The IB will provide procedures and forms well in advance of any data collection.

Resources for additional reading

These resources provide background knowledge regarding implementation, design and development of MYP eAssessment.

Pedagogy and theoretical frame for eAssessment with links to the MYP

Carpenter, S. 2012. "Testing enhances the transfer of learning". *Current Directions in Psychological Science*. Vol 21, number 5. Pp 279–83. [Available online]

This article describes the positive effects of testing during learning and offers a rationale for the design of MYP eAssessment. The MYP's focus on conceptual learning allows students to organize ideas within and across subject areas, which is at the heart of learning transfer. This article describes a recently growing body of research that has examined how testing can promote knowledge retention over time (temporal transfer), across testing formats (same knowledge, different testing situations) and across knowledge domains. The MYP eAssessment designs seek to promote learning transfer that will extend beyond the classroom and beyond the summative testing point to future learning.

Davies, R. 2011. "Understanding technology literacy: A framework for evaluating educational technology integration". *TechTrends*. Vol 55, number 5. Pp 45–52. [Available online]

This article provides an introduction to technology integration using *frameworks* or systematic approaches based on good educational theory and practice. The author advocates *technology literacy*, which he argues needs to be taught rather than assumed among students. The article contains a concise overview of the reasons for needing technology education (primarily in the US context), then outlines the case for a framework based on "(1) awareness, (2) praxis (i.e., training), and (3) phronesis (i.e., practical competence and practical wisdom)" (p 45). The framework is presented as a series of levels, where phronesis indicates mastery of technology-related tasks and full understanding of the technology's value to learning to both students and teachers. The author also includes a discussion of TPACK (technological pedagogical content knowledge), a framework that helps to identify where particular types of knowledge may be lacking in a given context.

Pellegrino, JW, Wilson, MR, Koenig, JA and Beatty, AS (eds). 2013. *Developing Assessments for the Next Generation Science Standards*. Washington DC, Maryland, USA. National Academies Press. [Available online]

This report outlines assessment implications from two recent documents (both can be found online): "A Framework for K-12 science education" and "The next generation science standards (NGSS)". These important recent works indicate science learning across three dimensions: a) core discipline ideas; b) science practice; and c) key cross-cutting concepts that link the science disciplines. This tripartite represents an important alignment with MYP written and taught curriculum, and calls for assessment design that includes multiple interconnected items, an interpretive system for evaluating a range of student products, and the ability to locate students on a continuum of abilities starting from core ideas to progressively more complex understandings. This report includes examples within specific domains.

Pellegrino, JW and Hilton, ML (eds). 2012. *Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century*. Washington DC, Maryland, USA. National Academies Press. [Available online]

This report outlines emerging research on teaching and assessing transferable knowledge. Transferable knowledge can be applied in various situations and goes beyond the situated nature of typical instructional practice. Of particular relevance for MYP onscreen assessments are the sections on teaching and assessing for transfer, and systems for supporting deeper learning. The report details key elements of assessment design incorporated into MYP onscreen assessments, including the importance of tasks that give students an opportunity to solve complex problems through exposure and manipulation of varied representations of information (multimedia). The report underscores the challenges of teaching and learning for transferable knowledge and skills.

Onscreen assessment implementation and design

Deutsch, T, Herrmann, K, Frese, T and Sandholzer, H. 2012. "Implementing computer-based assessment – A web-based mock examination changes attitudes". *Computers & Education*. Vol 58, number 4. Pp 1068–75. [Available with subscription]

This article investigates students' attitudes and reservations about computer-based assessment and the potential for attitudinal change. This article describes the benefit of providing a web-based or mock examination or user interface try-out before implementation of a summative or formative computer-based assessment to aid students in alleviating reservations. Barriers to acceptance include student concerns about security and the possibilities of cheating. Other influencing factors to acceptance of computer-based assessments include the systems' perceived ease of use, perceived usefulness, perceived playfulness, computer self-efficacy (see Terzis et al 2013 in this section for definitions of these constructs) and gender. This study reports how the implementation of a mock examination or user interface try-out in preparation for onscreen assessments moderately changed attitudes. The researchers found that computer self-efficacy had a significant effect on attitude with female students being less likely than their male counterparts to claim computer self-efficacy but that the mock examination and user interface try-out helped to change their attitudes. Overall student attitudes towards computer-based assessment changed positively after use of the mock examination and user interface. It is a useful article for teachers and schools to determine what barriers students might face in preparation for the onscreen assessments and a possible method for alleviating concerns.

Ifenthaler, D, Eseryel, D and Ge, X (eds). 2012. *Assessment in Game-based Learning: Foundations, Innovations, and Perspectives*. New York, New York, USA. Springer. [Book]

Emerging game-based learning technologies are giving rise to new and alternative ways to assess learning that is taking place in virtual worlds and informal settings. This volume looks at the current state of research, methodology, assessment, and technology of game-based learning in three parts: (1) foundations of game-based assessment, (2) technological and methodological innovations for assessing game-based learning, and (3) realizing assessment in game-based learning. This book is a useful volume for orienting to emerging assessment research with new technologies, providing examples and guided practice to situate research in applied settings.

Quellmalz, ES, Timms, MJ, Silberglitt, MD and Buckley, BC. 2012. "Science assessments for all: Integrating science simulations into balanced state science assessment systems". *Journal of Research in Science Teaching*. Vol 49, number 3. Pp 363–93. [Available with subscription]

This state-of-the-art research study investigates the potential for the use of simulations in science assessment systems. The project looked at "the psychometric quality, feasibility and utility of simulation-based science assessments designed to serve formative purposes during a unit and to provide summative evidence of end-of-unit proficiencies" (p 363). The study is helpful for understanding how technology-rich assessment can both scaffold inquiry learning and help students to build their conceptual understanding with technology. It includes specific examples of the use of simulations in science learning linked to assessment.

Sharpe, R, Beetham, H, Benfield, G, DeCicco, E and Lessner, E. 2009. *Learners Experiences of E-learning Synthesis Report: Explaining Learner Differences*. London, UK. JISC (JISC Learner Experience of E-learning Programme Report). [Available online]

This report describes research by project funded under the JISC Learner Experience of E-learning Programme. The report describes students' experience with e-learning over time both in formal and informal settings and use of technology. It identifies some key supports that students need to learn in order to demonstrate their learning through digital media and in the digital world. The report concludes with a list of enablers and barriers to teaching and learning with technology. These enablers and barriers are organized by theme in a developmental framework. The themes include: access, skills, practices, and creative appropriation. It is a useful report for understanding how digital learners use technology both formally and informally, and aspects within an environment that promote or inhibit its use.

Terzis, V, Moridis, CN and Economides, A. 2013. "Continuance acceptance of computer based assessment through the integration of user's expectations and perceptions". *Computers & Education*. Vol 62. Pp 50–61. [Available with subscription]

This study investigates student expectations before and after interaction with learning management systems (LMSs) and computer-based assessments (CBAs). It discusses six factors in students' continued acceptance of an LMS or CBA: a) playfulness—student perceptions about how well an LMS or CBA stimulates curiosity and exploration; b) usefulness—how well the system enhances job/study performance; c) ease of use—how much effort it takes to be capable of using the system; d) facilitating conditions—how effectively online help and cues, as well as help from teachers, facilitate ease of use; e) goal setting—how well a system helps students to set and track goals; f) content—the difficulty, usefulness or interest in the academic content of an LMS or CBA. Similar to the Deutsch et al (2013) study this article is useful for understanding how students can be aided in preparing for the MYP onscreen assessments.

Warburton, B. 2013. "CAA—Whither and Whence? The last decade and the next decade". *Proceedings for 17th CAA Conference*. Loughborough, UK. Loughborough University. [Available online]

This paper analyses a decade of Computer Assisted Assessment (CAA) conference papers. The papers were analysed according to five conference themes: 1) evaluation of CAA; 2) reporting in CAA; 3) innovation in CAA; 4) assessing skills/enhancing learning in CAA; and 5) strategic development of CAA. The article presents a higher order review of the state of CAA, identifying the drivers, obstacles and design principles for the uptake of CAA by learning organizations. It is a useful article to aid in orientation to the complexities of adopting an onscreen assessment approach.

Teaching with technology and digital literacy

Eyal, L. 2012. "Digital assessment literacy: The core role of the teacher in a digital environment". *Educational Technology & Society*. Vol 15, number 2. Pp 37–49. [Available online]

This article discusses digital assessment literacy, a construct that encompasses many competencies: interpreting test results, choosing assessment methods, and increasing student motivation. In the digital world, this article argues for teachers who understand their role as assessors in a technology-rich environment. Building on digital literacy, teachers can think about how student express themselves through technology media and how that expression affords an artefact that can stand as a point of assessment. This article discusses how online tasks, digital portfolios, forums, online peer assessment, blogs, and wikis as collaborative writing provide opportunities for learning and perspectives from which to draw both formative and summative assessments for complex problem-solving and self-regulation.

Littlejohn, A, Beetham, H and McGill, L. 2012. "Learning at the digital frontier: A review of digital literacies in theory and practice". *Journal of Computer Assisted Learning*. Vol 28, number 6. Pp 547–56. [Available with subscription]

This article describes a large-scale three-phase research project that included an extensive literature review, institutional audit, and analysis of practice in the provision for digital literacy within the UK. It highlights key practices to develop lifelong digital learners including: a) provision of authentic tasks in multiple domains; b) inclusion of digital technology; c) explicit enactment of academic and professional tasks in digital environments; d) time and opportunity for the staff of learning organizations to develop expertise; e) inclusion of critical affordance of various media types and how they can be used to persuade, argue, and make claims; and f) recognition of learners' existing knowledge and practice as resources for their own learning. This is a useful article for examining how organizations can support the use of technology in teaching and learning.

Voogt, J, Erstad, O, Dede, C and Mishra, P. 2013. "Challenges to learning and schooling in the digital networked world of the 21st century". *Journal of Computer Assisted Learning*. Vol 29, number 5. Pp 403–13. [Available with subscription]

This article describes the implications and challenges of a digitally literate curriculum implementation with regard to 21st century competencies. It gives an overview of current international frameworks for describing these competencies with special attention to digital literacy. An analysis of current approaches, which are considered appropriate for these competencies, is also provided. The article concludes that, in spite of consensus building activities, research shows globally that digital teaching strategies are often not implemented in educational practice. Reasons include the lack of curriculum and assessment alignment and integration with 21st century competencies, insufficient teacher preparation and "the absence of any systematic attention for strategies to adopt at scale innovative teaching and learning practices" (p 403). Recommendations to address these challenges include: a) 21st century competencies and digital literacy should not be disjointed from core school subjects and should be discussed within and across curriculum; b) the potential for new technologies for informal learning and how young people engage with these technologies should be utilized in formal learning situations; c) new assessment frameworks for 21st century competencies such as *Assessment and Teaching of 21st Century Skills* (Griffin, Care and McGraw 2012) need further development and attention. This article is useful for teachers and schools to examine how and in what ways they can integrate 21st century competencies within curriculum planning and policy.