



Cambridge Assessment
International Education

Cambridge Upper Secondary Science Competition

Teacher Guide

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Foreword

Cambridge Assessment International Education is committed to helping schools develop varied, relevant, engaging educational programmes that help prepare students for higher education and the modern world of work.

Qualifications that assess performance in well-designed examinations can support the development of, and accurately measure, a wide range of cognitive skills and understanding. However, we know that examinations have their limitations. It is for this reason that our Cambridge IGCSE™ qualifications offer coursework options and we have developed courses like Cambridge Global Perspectives™ that require students to do both independent and collaborative work, and to research and communicate their findings to wider audiences. It is also why we developed our Cambridge learner attributes and support schools to develop these five highly desirable learning habits in students (see www.cambridgeinternational.org/teaching-and-learning).

The Cambridge Upper Secondary Science Competition encourages students to engage in real-world science and apply what they learn in the classroom. It is also intended to support the development of the Cambridge learner attributes, and it is for this reason that more than half of the available marks are for teamwork and communication and for the rest are awarded for the investigation itself.

I hope you encourage and support students in your school to take part. It should have tremendous educational value as well as be enjoyable.

Tristian Stobie

Director, Education

Welcome to the Cambridge Upper Secondary Science Competition

The Cambridge Upper Secondary Science Competition is a team competition for Cambridge IGCSE and Cambridge O Level students. It is designed to be a fun, motivating and educationally important part of extra-curricular science.

This is a team competition based on the way scientists work together in the real world. Science is a shared activity, often meaning that scientists in different places come together to work on a single problem. This involves true collaboration, not simply cooperation. This kind of teamwork also involves reflection on how to operate most effectively as a team. Scientists also need to communicate the outcomes of their work clearly to their peers. The Cambridge Upper Secondary Science Competition rewards not just the science investigated but also the way in which the team works together as true collaborators, and the way they present their work to others. It supports creative and innovative practical science, encouraging the scientific method and the 'free thinking' upon which science depends.

Those all-important learning habits for life which we encapsulate in the attributes of the Cambridge learner – confident, responsible, reflective, innovative and engaged – are all supported and developed in this competition.

The competition work is marked in school by teachers using mark schemes that we provide. Cambridge will review the marking of a sample of schools and then allow all schools to print certificates and present them at an appropriate school occasion.

What do learners do in the Cambridge Upper Secondary Science Competition?

The competition is for teams of three to six learners working on an investigation, either outside the normal curriculum time in the co-curricular programme or using some designated class time (at the discretion of the school). It is voluntary and need not include all learners in the age group.

Teams choose the topic of their investigation and complete it in around 20–25 hours.

Each team:

- records their investigation describing the problem or hypothesis they addressed, what they did, the outcomes of their experiments and the conclusions of their investigation
- provides a reflection on how team members worked together at all stages of the investigation
- presents the work to other learners in school.

The team will complete their work to the timetable provided by the school, and their work will be marked by a teacher.

The work may be awarded a gold, silver or bronze certificate. Gold standard projects (the investigation and reflection only, in a single Word document) may be submitted to Cambridge for entry in the regional and global prizes.

What do teachers do in the Cambridge Upper Secondary Science Competition?

Teachers have both a mentoring and an assessment role. We support teachers through a dedicated competition [inbox](#) and via the [School Support Hub](#).

The teacher:

- explains how the competition is set up and what the teams have to do
- helps set up teams of learners with similar interests who will work well together
- checks the proposed investigation and any project plans to ensure they are appropriate
- meets with the teams on a regular basis to mentor them, and to see how the team members are working together
- arranges for teams to present their investigation to others – as a poster, presentation etc
- marks the final investigation, reflection and presentation: see mark schemes on page 7
- ensures the gold standard work can be submitted in a single Word document to Cambridge, with the cover sheet supplied. This does not include the presentation; only the investigation and the reflection, together called the 'portfolio'.

The teacher should provide constructive feedback to students on their ideas and plans. They must not themselves become involved in designing the project.

An important aspect for the team to consider is safety, whether that means for laboratory experiments or investigations outside school or on the internet. You have the same duty of care towards your learners in competition activities as in teaching Cambridge qualifications.

Please note:

- If branded goods are used as part of the investigation, they should be anonymised in the writeup e.g. 'Coca Cola' becomes 'brand x'
- If people are used as part of the investigation please do not use their names – change the names or anonymise them. If photographs of subjects are used please obtain their permission.

Administration

We ask schools to appoint a 'lead' for the competition who can ensure the administrative tasks are completed. This is usually the teacher involved with entering the students for the competition.

Task	Deadline	Notes
Enter team/s for the competition	31 January 2020	<ul style="list-style-type: none"> Complete the entry form found here <p>Open for entries from 2 September 2019</p>
Receive an email from Cambridge International acknowledging entry	Within 5 working days of sending in the entry form	Re-send if no reply is received after 5 working days
<i>Teams carry out the competition work</i>		
Ensure work is marked by teachers	Before the 30 April 2020	<ul style="list-style-type: none"> Collect marks Identify any gold standard work for submission to Cambridge
Locate the cover sheet needed for submission of gold standard work	Before the 30 April 2020	This can be found in the competition support pack found on the School Support Hub
Submit gold portfolios each with a cover sheet and single mark sheet for all portfolios in the school.	Before 30 April 2020	The mark sheets, gold portfolios (investigation, team reflection and cover sheet) are sent in a single Word or PDF document to the competition inbox .
Cambridge may request other portfolios for review	May 2020	<ul style="list-style-type: none"> If requested, send the portfolios (investigation, reflection and coversheet) to the competition inbox within 5 working days Cambridge will acknowledge receipt but will only contact the school again if the work is incorrectly marked
Cambridge will email all schools to give permission to print and present certificates	13 May 2020	<ul style="list-style-type: none"> Certificate templates can be found in the competition support pack on the School Support Hub Cambridge encourages presentation of certificates at a school event such as an assembly or formal prize-giving.
Cambridge announces regional/global winners	On or before 1 st July 2020	Winners will be notified directly and posted on our public website.

How is the Cambridge Upper Secondary Science Competition marked?

Competition work is marked by the teacher using the mark schemes below. Enter your marks on the Mark Submission Sheet found in the competition support pack on the [School Support Hub](#).

Please only submit one Mark Submission Sheet per school, detailing the marks awarded to all teams.

There are three mark schemes: for the science investigation, for the team reflection and for the presentation.

The maximum mark is 15.

These are 'best fit' mark schemes. You decide which level best describes the characteristics of a particular team. Teams can be awarded different levels on each mark scheme.

If there are two or more markers it is good practice for each marker to mark a sample of the same projects and cross-check the marks awarded; differences can be resolved through discussion. If you are the only marker it is good practice to share some of your marking with a colleague to make sure it is standardised.

You can find gold standard examples in the competition support pack on the [School Support Hub](#).

Investigation mark scheme (Maximum mark: 7)

Descriptor	Mark
<ul style="list-style-type: none"> Innovative investigation of significance to the team Relevant practical work and management of data Well-presented conclusions Understanding of the applications and limitations of the investigation 	6-7
<ul style="list-style-type: none"> Appropriate and innovative investigations researched and planned with little input from the teacher Responsible execution of practical work; accurate observations made and recorded Logical and pertinent conclusions drawn from the experimental data 	4-5
<ul style="list-style-type: none"> Appropriate experiments researched, planned and executed with some help from the teacher; some innovation Mostly responsible execution of practical work; accurate observations made and recorded most of the time Appropriate conclusions drawn from the experimental data 	2-3
<ul style="list-style-type: none"> Teacher-directed experiments researched, planned and executed; little innovation Teacher-led responsibilities applied; observations made and recorded Conclusions drawn from the experimental data 	1

Team reflection mark scheme (Maximum mark: 4)

Descriptor	Mark
<ul style="list-style-type: none"> All members of the team are fully engaged and work collaboratively Reflections on teamwork are accurate and honest, respecting different perspectives of team members 	4
<ul style="list-style-type: none"> Some members of the team are not fully engaged with the project – a mix of collaboration and cooperation Reflections on teamwork are mostly accurate 	2-3
<ul style="list-style-type: none"> General lack of team engagement – cooperation not collaboration Reflections on teamwork are incomplete or inaccurate 	1

Presentation mark scheme (Maximum mark: 4)

Descriptor	Mark
<ul style="list-style-type: none"> Confidence in the investigation relayed through clear and comprehensive communication of outcomes, with appropriate background context Questions/explanations on the project work confident and accurate 	4
<ul style="list-style-type: none"> Investigation outcomes communicated with confidence in many areas Some lack of confidence in presenting or explaining the project work 	2-3
<ul style="list-style-type: none"> Investigation outcomes communicated with confidence in a few areas Presentation skills lacking in confidence, or project detail not confidently understood/know n 	1

TOTAL/ 15

What prizes do schools and learners receive?

We will email you certificate templates as part of the competition support pack which you may print and distribute to the teams **upon notice from Cambridge**.

Each student receives a certificate:

Participation	Bronze	Silver	Gold
1 to 5 marks out of 15	6 to 9 marks out of 15	10 to 12 marks out of 15	13 to 15 marks out of 15

We encourage you to hold an 'award ceremony' for handing out the certificates, such as in assembly or at a school prize giving, in recognition of the work and achievements of the learners and teachers in completing the competition.

Regional prize winners are chosen from the best of the gold submissions. We will remind you to submit any gold certificate work before the final submission deadline. The regional winners will receive individual medals and a letter of commendation.

We will consider which of the regional winners has demonstrated the most innovation and aptitude, and that team will win the Cambridge Upper Secondary Science Competition global prize. The global winner receive all of the above prizes, as well as a plaque of recognition for their school and special features on our website and in our [Cambridge Outlook](#) magazine.

Terms and Conditions

1. General

1. The 'Cambridge Upper Secondary Science Competition' (hereafter 'the competition') is organised and promoted by Cambridge Assessment International Education (hereafter 'Cambridge International'). 2. The 'Entrant' to the competition shall be the school, on behalf of its students. Each Entrant must ensure all students taking part in the competition are aware of and agree to these terms and conditions and freely consent to their work and personal data being submitted to Cambridge International under this competition. 3. Employees and contractors of the University of Cambridge and their immediate family members are not eligible to enter the competition as a team member. Only Cambridge International Schools, or Cambridge Associate Centres, may be Entrants to the competition. 4. By submitting an entry in accordance with the procedure set out herein ('an Entry'), the Entrant confirms they have read and agreed to these terms and conditions, and have obtained the permission of each relevant student to enter the student's work into this competition. 5. Cambridge International shall only accept one Entry per team of students, and each student may only sit on one team per competition. Should an Entrant be discovered to have submitted more than one Entry per team of students, or allowed any student(s) to sit on more than one team, the affected Entries shall be deleted at Cambridge International's sole discretion. 6. Each Entry must consist of teams containing a minimum of three (3) and maximum of six (6) Cambridge students usually between the ages of 14 and 16, attending the school of the Entrant and studying for Cambridge IGCSE(s) or O Level(s) at the time of submission of the Entry. 7. No student or person failing to comply with the criteria in clause 6 is permitted to join a team Entry.

2. How to enter

1. The competition is open from 2 September 2019 and all Entries should be received by Cambridge International by close of business on 31 January 2020. 2. Each Entry must be submitted electronically to Cambridge International using the entry form on the public website: www.cambridgeinternational.org/science-competition. Each Entry should be made in accordance with clause 1. 3. The Entrants shall be provided with a link to the support material, which includes a *Teacher Guide* and *Learner Guide*, which contain guidance for the creation of the Portfolios and a mark scheme for teachers, upon successful registration of an Entry. Entrants must ensure they mark their Entries' Portfolios accurately in accordance with the mark scheme. 4. Each team Entry shall be required to produce a Portfolio ('the Portfolio'), containing their Investigation and Reflection. Only one Portfolio may be entered per Entry. Portfolio requirements and subject matter guidelines are set out in this *Teacher Guide* and in the *Learner Guide*. 5. The Entrants must arrange for their teachers to mark all the Portfolios ahead of the final submission date of 30 April 2020. 6. Any Entry with a Portfolio awarded a 'Gold' grade (being a mark of 13/15 or above, internally marked by a teacher of the Entrant in accordance with the mark scheme in the *Teacher Guide*) can be submitted to Cambridge International for consideration for the best overall Portfolio and annual global winner of the competition. Cambridge International will also select regional winners. All Gold Portfolios must be submitted electronically to sciencecompetition@cambridgeinternational.org before 30 April 2020.
2. Any Entries where the Portfolio does not meet the required standard for Gold should not be submitted to Cambridge International. 8. Cambridge International will

acknowledge receipt of the submissions of Gold-graded Portfolios within 10 working days of receipt.9. Cambridge International reserves the right to reject any Entry at any time if it has reasonable grounds to believe the Entrant has breached any of these terms and conditions.10. The decision of Cambridge International to accept or reject an Entry is final, and Cambridge International will not enter into any further correspondence regarding their decision.

3. Format for Entries

1. Gold-graded Portfolios must be submitted along with a coversheet for each individual portfolio and mark sheet detailing all of the marks awarded to all teams entered for the competition.
2. Portfolios submitted to Cambridge International in accordance with clause 6 in the 'How to enter' section of this document must conform to the following specifications:
 - file format: Word document or PDF containing both the Investigation and Reflection.
 - file size: maximum of 10MB
 - file name: set out in the format **centrenumber_proposedtitle_date(yy/mm)**
3. If an Entrant is responsible for submitting more than one Gold Portfolio, please ensure each Portfolio is submitted individually or in separate folders within a Zip file, and each is clearly marked on the coversheet with the relevant team name given in the original Entry.4. All resources used in the creation of the Portfolio, including any visual material, must be the original creations of that team. Portfolios must not contain any third-party copyright materials and/or registered trademarks/logos from well-known brands. Any breach of this clause may result in an Entry being rejected.

4. General requirements

1. All Entries shall be marked internally by an appropriate science teacher of the Entrant.
2. All Portfolios must be the original work of each team.
3. No Portfolio may be used in whole or in part fulfilment of any student's assessment requirements for any Cambridge qualifications.
4. Portfolios must not:
 - include offensive or obscene language
 - use excessive/gratuitous violence or sexual images
 - show disrespect of personal, political or spiritual values, or contain offensive material or remarks about race, gender or religious beliefs.
5. Portfolios must not have been previously submitted or published in any media.
6. The Portfolio submitted must not have been entered for any other competition prior to submission for the Cambridge Upper Secondary Science Competition.

5. Judging and prizes

Competition categories

1. Cambridge International will award up to a total of nine regional winners, chosen from the Gold Projects submitted before the deadline outlined above. From the nine regional winners, one team shall be declared the overall winner. Cambridge International reserves the right to contact the Entrant(s) for additional information before selecting the overall winner.

2. The nine regions are: North America; Latin America; Europe (including UK); Sub-Saharan Africa; Middle East and North Africa; South Asia; Pakistan; East Asia; and South East Asia and Pacific.

How the judging will be conducted

1. A shortlist of up to 10 Entries per region will be selected from all Gold-graded Entries submitted before the deadline outlined above, by a team comprising senior Cambridge staff and independent science experts and consultants. 2. The competition judges (the 'Panel') judging the Entries shall be selected by Cambridge International. The Panel's decision is final and not open to appeal. 3. Judges may request additional portfolios from the Entrant for review to check the quality of internal marking. 4. The Panel will select one winner for each region and will also choose the overall winning team. They may invite shortlisted or regional winners to a video interview in order to select the overall winner. All winners will be notified by email on or before 1 July 2020.

Prizes

1. Each regional winner will receive:
 - individual medals for each team member
 - a letter of recognition from the Director, Education at Cambridge International.
2. The overall global winner will receive:
 - individual medals for each team member
 - a letter of recognition from the Director, Education at Cambridge International
 - a plaque of recognition for the school
 - the opportunity to feature in *Cambridge Outlook* magazine and/or on the Cambridge International website.
3. Prizes are granted at Cambridge International's sole discretion and may be subject to change at any time without notice. No cash or other alternative prizes may be requested by any winning Entrant.
4. Cambridge will contact Gold Entrants before 13 May to give permission to print certificates. Gold Certificates should not be printed before this notification is received from Cambridge.

6. Miscellaneous

1. Portfolios may be published on Cambridge International websites (to include but not limited to the Cambridge International public website, the School Support Hub and Cambridge International social media channels) as exemplar material or for use and viewing by other Cambridge students. 2. The regional winning Portfolios may be translated into other languages. 3. The team of students retain the copyright in their Portfolio submitted to Cambridge International but by submitting an Entry, the Entrant for and on behalf of their students grants Cambridge International a non-exclusive, transferable, sub-licensable, royalty-free worldwide licence in perpetuity to reproduce the Portfolios or any part thereof, in any medium and language, for assessment, educational, training and/or promotional purposes relating to Cambridge International's activities or to those related activities of which Cambridge International approves. Such licence shall become effective from the date of submission of the Portfolio to Cambridge International.