

Model Assignment

Issued September 2013

OCR Level 2 Cambridge Technicals in Science

Unit1: Science of the Earth

Ofqual unit L/505/3092

Please note:

This OCR Cambridge Technical model assignment may be used to provide evidence for the unit identified above. Alternatively, centres may ‘tailor’ or modify the assignment within permitted parameters (see Information for Teachers). It is the centre’s responsibility to ensure that any modifications made to this assignment allow learners to meet all the assessment criteria and provide sufficient opportunity for learners to demonstrate achievement across the full range of grades. The assessment criteria themselves must not be changed.

The OCR entry codes and Ofqual numbers associated with these qualifications are:

Qualification title	Entry code	Ofqual number
OCR Level 2 Cambridge Technical Certificate in Science	05783	601/0578/1
OCR Level 2 Cambridge Technical Extended Certificate in Science	05785	601/0577/X
OCR Level 2 Cambridge Technical Diploma in Science	05788	601/0576/8

This OCR Cambridge Technical model assignment remains live for the life of these qualifications.

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Model Assignment: Tutor information

OCR Level 2 Cambridge Technicals in Science

Unit 1: Science of the Earth

General guidance on using this assignment

1 General

- 1.1 OCR Cambridge Technical model assignments are issued free to centres on approval and are available to download from our website: www.ocr.org.uk.
- 1.2 Centres may choose to:
 - use OCR Cambridge Technical model assignments for formal summative assessment of learners
 - tailor OCR Cambridge Technical model assignments for formal summative assessment of learners
 - use OCR Cambridge Technical model assignments as a benchmark for devising their own assignment.
- 1.3 This assignment has been designed to allow learners access to all assessment criteria across the grades in this unit. Learners will need to take part in a planned learning programme that covers the underpinning knowledge and skills of the unit.

2 Before carrying out the assignment

- 2.1 Learners must be provided with a copy of the *Information for Learners* section of this assignment.
- 2.2 If learners carry out any preparation prior to undertaking the tasks; there is no time limit.

3 When completing the assignment

- 3.1 Learners must be allowed sufficient time to complete all of the tasks. The amount of time may vary depending on the nature of the tasks and the ability of individual learners. It is suggested that evidence is produced in several sessions.
- 3.2 Each learner must produce individual and authentic evidence for each task within the assignment.
- 3.3 Centre staff may give support and guidance to learners. This support and guidance must focus on checking that learners understand what is expected of them and giving general feedback that enables the learner to take the initiative in making improvements, rather than detailing what amendments should be made. It is not acceptable for tutors to provide model answers or to work through answers in detail or to detail specifically what amendments should be made.
- 3.4 Learners may use information from any relevant source to help them with producing evidence for the tasks. They must be aware of the need to cite and reference any sources and of the risk of plagiarism.
- 3.5 It is acknowledged that learners in their responses may refer to situations in the scenario but as the scenario is fictitious this does not break any rules of confidentiality. However, learners must be guided on the use of information from other sources to ensure that confidentiality is maintained at all times.

- 3.6 We have specified what evidence the learner is expected to produce. Usually, the type of evidence provided may be modified, with the exception of certain types of evidence listed below under '*Scope of permitted model assignment modifications*'. It is important to note that it is possible to generate the evidence in a variety of formats. Centres must advise learners as to the most appropriate format of evidence. The nature of this assessment means that learners are free to use the format that they feel is most appropriate for the purpose and target audience for each individual task.

4 After completing the assignment

- 4.1 Learners' evidence is assessed by the centre's assessor against the qualification specification contained in the *Centre Handbook*. When grading learners' work centres **must** use the assessment and grading criteria in the unit. For further information about assessment please refer to the section on *Assessment* in the *Centre Handbook*.
- 4.2 Assessors' decisions must be quality assured across the centre through an internal moderation process. For further information about internal moderation please refer to the section on *Assessment* and *Centre assessor and quality assurance personnel requirements* in the *Centre Handbook*.

5 Presentation of work

- 5.1 Learners may use the *Learner checklist* provided to ensure that they submit evidence for **all** tasks. They can do this by using the *Learner checklist* as a contents page inserting references/page numbers in the boxes provided.
- 5.2 Centres may wish to discourage learners from excessive use of plastic wallets for presentation of their evidence as this may hinder the assessment process. Instead centres may wish to encourage learners to present their work so that it is easily accessible, e.g. spiral bound, stapled booklet, treasury tag, or digital media.

6 Acceptable evidence

- 6.1 For guidance on generation and collection of evidence please refer to the section on *Assessment* in the *Centre Handbook*.

7 Reworking the assignment

- 7.1 If learners do not meet all of the assessment criteria at the **pass** grade further work will be required.
- 7.2 Tutors may give feedback to learners to support and guide them in producing evidence to the required standard. This support and guidance must focus on checking that learners understand what is expected of them and giving general feedback that enables the learner to take the initiative in making improvements, rather than detailing what amendments should be made. It is not acceptable for tutors to provide model answers or to work through answers in detail or to detail specifically what amendments should be made.
- 7.3 If learners need to do further work they can continue to use the same model assignment.

8 Scope of permitted model assignment modification

8.1 The model assignment is self-contained in its present form. The set of tasks form a coherent whole addressing all the assessment criteria and allowing access to the full range of grades.

You must not change the following:

- the assessment criteria
- the grading
- the requirements for supervision and authentication as described in the *Centre Handbook (section 5 - Assessment)*.

8.2 The model assignment can be modified in terms of the areas described below at the permission of OCR but centres must be sure that learners still have the opportunity to cover all of the assessment criteria and to access the full range of grades.

- A logical approach is suggested, however, centres may wish to change the order or method of delivery of the tasks depending on learners' individual requirements.
- The learner's assignment can be contextualised or amended to suit local needs. Both the scenario and tasks may be adapted to fit with local applications of science in the environment or workplace.
- Each specific task may be appropriately contextualised to match with any permitted changes you have made to the scenario. The scenario does not have to be media based. A more traditional report type format is equally acceptable for assessment.
- The type of evidence and the format it takes: a more traditional report would be acceptable if the scenario was adapted. As long as the necessary breadth and level of content is addressed, a variety of evidence could be presented e.g. PowerPoint with slide notes, spider diagrams, memory maps, annotated large-scale diagrams, timelines, flowcharts, annotated graphs or tables of data, diaries or blogs, scripts for documentary voiceovers, mock-ups of magazine articles or books, website page designs or pages for online 'wiki' type encyclopaedias. It is important that the work submitted for assessment can be clearly identified as the individual work of each learner. Collaborative work is useful in preparation for assessment, but the assessment submitted should be individual. In all cases, it is important that learners provide a bibliography so that there is evidence for their ability to research using multiple sources.
- It is acceptable for learners to work in groups while they are researching and collecting information relevant to their assignment. However, it is important that the written account submitted for assessment is individual to the learner.
- The level of demand of the content needs to be appropriate to level 2. Learners should develop content in their assignment which addresses the Learning Outcomes and Assessment Criteria at an appropriate level of depth and breadth. The 'Teaching content' section of the unit should be used to support judgment of the level of demand in terms of depth and scope.
- Sources used should be acknowledged. A bibliography is sufficient, but learners may be encouraged to use a simple formal system such as the Harvard, Vancouver or Oxford. For web-pages, sources should give the title of the site and page as well as the URL. Learners should be discouraged from only using online encyclopaedias and should seek to use reliable sites. Where a contentious issue is raised in the assignment, learners should consult sources that represent different viewpoints.

OCR has ensured that in the language used, and the tasks and scenario provided, we have avoided discrimination, bias and stereotyping and support equality and diversity. In the development of qualifications and assessments we use the guidance given in the Ofqual publication *Fair access by design*; notably this includes:

- using language and layout in assessment materials that does not present barriers to learners
- using stimulus and source materials in assessment materials (where appropriate) that does not present barriers to learners.

If centres wish to modify the model assignment we strongly advise that staff responsible for modifying the model assignment and the quality assurance of it refer to the publication *Fair access by design*.

If modifications are made to the model assignment, whether to just the scenario or to both the scenario and individual tasks, it is up to the centre to ensure that all assessment criteria can still be met and that learners can access the full range of grades.

Notes for tutors

Introduction to the tasks

The tasks have been designed to enable learners to demonstrate...

- an understanding of the science behind the structure of the Earth, its lithosphere, atmosphere, hydrosphere and biosphere.
- the ability to research and present information for a general audience.
- the ability to evaluate theories relating to explanations for the changing surface of the Earth..
- an understanding of the importance of the work of scientists in collecting data about Earth movements and the composition of the lithosphere, atmosphere and hydrosphere and also in minimising the effect of changes to the Earth's surface in populated areas.
- an understanding of the development of the atmosphere and its importance in supporting life.
- an understanding of our use of the Earth for the extraction of natural resources and the ability to evaluate the sustainability of the long-term use of these resources.

We have provided a scenario about

the structure of the Earth in the context of communicating scientific information to the general public.

The Scenario:

The Science of the Earth is an area of science that is of interest to the general public. Many people with no scientific background are fascinated by the scale of the Earth, its changing nature and our place as humans living on the Earth.

Communicating science to the public is now 'big business'. Television companies, publishers and other media companies all work to produce programmes, published material and online media to meet the public demand for information.

Your tasks will be to produce presentations to communicate to the general public the marvels of the Earth's changing surface, its atmosphere, its seas and water systems and its living things.

Through the unit you will use a range of styles and types of media to present the scientific content, in as attractive and an accessible way as possible, for a general audience of adults who have little scientific background.

This scenario can be adapted, see *Scope of permitted model assignment modification* under *Guidance for centres*.

The tasks have been designed so that all of the assessment criteria in Unit 1 are addressed.

These guidance notes should be used in conjunction with the unit specification and Centre Handbook.

Notes on research and use of sources at pass, merit and distinction (see also section 8.2).

- Learners may work in groups to carry out research and collect information relevant to the assignment tasks.
- The final written evidence for the task should be individual to each learner.
- Sources used should be acknowledged (see section 8.2 for notes relating to the use and acknowledgment of sources).
- Learners working at **pass** level are expected to show evidence that they can collate information from one or more source and organise the information into a logical sequence.
- Learners working at **merit** level should show some further processing of the information, for example by adding their own scientific explanations, discussing the information, linking evidence and theory or making comparisons.
- Learners working at **distinction** level should show higher level processing of the information, for example by evaluating ideas, theories or courses of action, evaluating whether ideas are supported by evidence supports theories, evaluating the interpretation of data.

The Tasks

Task 1: Making a ‘storyboard’ for a television documentary about the structure of the Earth.

LO1: Understand the structure of the Earth and the development of ideas and theories about the processes that change the Earth’s surface.

Assessment Criteria P1, M1, D1 and P2, M2 are assessed in this task.

Learners are to produce a ‘storyboard’ for a television documentary about the structure of the Earth.

The task may either run parallel to the taught content of the unit, so that learners collect their research as they learn, or may be issued as a final task when the teaching is completed.

The ‘Teaching content’ section of the unit should be referred to in order to define the appropriate level of demand. This section should inform both the content to be addressed during the teaching of the unit and the depth and scope of content that learners need to include in their assignments as evidence for awarding each assessment criterion.

The ‘storyboard’ format is not prescriptive. It is important that all aspects of the Learning Objectives and Assessment Criteria are addressed in the task. However, a variety of other reporting styles could be used. Some examples are given above in 8.2 (e.g. PowerPoints with slide notes, spider diagrams, memory maps, annotated large-scale diagrams, time lines, flow charts, annotated graphs or tables of data, diaries or blogs, scripts for documentary voiceovers, mock-ups of magazine articles or books, website page designs or pages for online ‘wiki’ type encyclopaedias).

The research and collection of information may be carried out in small groups (2-3) or in larger groups, with sub-groups working to collect information to be collated and shared. It is important, however, that the groups are structured such that every learner is active in the research.

Each learner must produce an individual written assignment for assessment.

Learner task 1: Making a 'storyboard' for a television documentary about the structure of the Earth.

LO1: Understand the structure of the Earth and the development of ideas and theories about the processes that change the Earth's surface.

Assessment Criteria P1, P2, M1, M2 and D1 are assessed in this task.

Your task is to:

Produce a 'storyboard' for a television documentary about the structure of the Earth.

The documentary is aimed at adults who are not scientists. You need to present the science of the Earth in a way that people will be able to understand and find interesting.

a) Research information and images to show:

- The **structure of the Earth**,
- The **rock cycle**
- **Tectonic plates** and the changes that they cause to the Earth's surface (e.g. volcanoes and earthquakes).

b) Research how **ideas about changes to the Earth's surface have changed over time**.

- Collect images and information about different ideas that people had in the past about how changes to the surface of the Earth happened (e.g. creation stories, whole world flood stories, the shrinking Earth theory, 'Medusa' and other myths to explain strange rock formations).
- Collect images and evidence for Wegener's theory of tectonic plates.
- Discuss what evidence supported each theory, the 'strong' and 'weak' points of each idea and why Wegener's theory is now accepted rather than the other ideas.

c) Research **changes to the Earth's surface**.

- Research how and why it is important to monitor the movements of tectonic plates to give 'early warnings' of natural disasters such as earthquakes, volcanoes or tsunamis.
- Research how scientists work to try to prevent or minimise the impact of natural disasters (e.g. how earthquake damage is minimised or prevented in highly populated areas such as San Francisco).

b) Your task for assessment (this should be your own, individual work).

Create a 'storyboard' to show the order that you would present your ideas in a documentary.

- Choose 'high impact' images and put them into an order that would make an interesting sequence in the documentary to cover all of the research you have done.
- Write notes to go with each image. Make sure your notes cover all the important scientific points. These notes should either be in the form of a finished 'voiceover' or be in note form for a writer to use to develop a script.

Your evidence will be:

- Your storyboard for the documentary.
- A bibliography to show the sources that you have used.
- See the 'Learner Checklist' to help you check that you have included everything you need.

Assessment criteria

IMPORTANT Please refer to notes on research and use of sources in Introduction to the Task (page 8) and section 8.2 (page 6).

The 'Teaching content' section of the unit should be referred to in order to define the appropriate level of demand. This section should the scope of content that learners need to include in their assignments as evidence for awarding each assessment criterion, which is shown below:

Learning Outcome (LO) The learner will:	Pass The assessment criteria are the pass requirements for this unit. The learner can:		Merit To achieve a merit the evidence must show that, in addition to the pass criteria, the learner is able to:		Distinction To achieve a distinction the evidence must show that, in addition to the pass and merit criteria, the learner is able to:	
LO1 Understand the structure of the Earth and the development of ideas and theories about the processes that change the Earth's surface.	P1	summarise the model for the structure of the Earth and describe current scientific theories about the processes that change the Earth's surface and lithosphere	M1	describe how ideas and scientific theories about changes to the Earth's surface and the lithosphere have developed and how each idea or theory was supported by the evidence available at the time	D1	evaluate the different ideas and theories about changes to the Earth's surface and the lithosphere in terms of their strengths and weaknesses in the light of accumulated evidence
	P2	identify reasons why it is important that scientists continually monitor changes to the Earth's surface and the lithosphere	M2	describe how scientists minimise the impact of changes to the Earth's surface and lithosphere in populated areas		

Task 2: 'Photo-book' about the atmosphere

LO2: Know how the Earth's atmosphere has evolved and how it supports life.

Assessment Criteria P3, M3 and P4, D2 are assessed in this task.

Learners are to produce a 'photo-book' about the atmosphere.

The task may either run parallel to the taught content of the unit, so that learners collect their research as they learn, or may be issued as a final task when the teaching is completed

The 'Teaching content' section of the unit should be referred to in order to define the appropriate level of demand. This section should inform both the content to be addressed during the teaching of the unit and the depth and scope of content that learners need to include in their assignments as evidence for awarding each assessment criterion.

The 'photo-book' format is not prescriptive. It is important that all aspects of the Learning Objectives and Assessment Criteria are addressed in the task. However, a variety of other reporting styles could be used. It would be equally appropriate to use a traditional report or PowerPoint with slide notes, a storyboard and script for a documentary (similar to Task 1), mock-ups of magazine articles or books, website page designs or pages for online 'wiki' type encyclopaedias.

Learner task 2: 'Photo-book' about the atmosphere

LO2: Know how the Earth's atmosphere has evolved and how it supports life.

Assessment Criteria P3, P4, M3 and D2 are assessed in this task.

Your task is to:

Research and present information that will be used to make a glossy 'photo-book' about the atmosphere.

Your 'book' should explain the science of the atmosphere in a style that is 'friendly', interesting and can be understood by adults who are not scientists.

a) Work with other members of your group to research the information you need. Your research needs to cover:

- The structure and composition of the Earth's atmosphere.
- Why the atmosphere is important to life.
- An explanation of the processes that happen in the atmosphere and are important to life.
- How the atmosphere developed over time.
- How scientists collect and interpret data about the atmosphere.

b) Your task for assessment (this should be your own, individual work).

Organise the research that the group collects to make an individual 'book' of images, diagrams and text about the science of the atmosphere.

Think about how you present the information e.g. you may use diagrams to show the parts of the atmosphere with annotations to highlight the important science. You may choose to represent the development of the atmosphere using a timeline with annotations to describe the science behind each change. You may show the work of scientists using photographs, data and graphs with short boxes of text. Remember to list the sources you use in a bibliography.

Your evidence will be:

- A 'photo-book' about the atmosphere with diagrams, photographs, data and graphs.
- Explanations of the science behind the images presented as annotations, boxes or text.
- A bibliography to show the sources that you have used.
- See the 'Learner Checklist' to help you check that you have included everything you need.

Assessment criteria

IMPORTANT Please refer to notes on research and use of sources in Introduction to the Task (page 8) and section 8.2 (page 6).

The 'Teaching content' section of the unit should be referred to in order to define the appropriate level of demand. This section should the scope of content that learners need to include in their assignments as evidence for awarding each assessment criterion, which is shown below:

Learning Outcome (LO)	Pass The assessment criteria are the pass requirements for this unit. The learner will:		Merit To achieve a merit the evidence must show that, in addition to the pass criteria, the learner is able to:		Distinction To achieve a distinction the evidence must show that, in addition to the pass and merit criteria, the learner is able to:	
LO2 Know how the Earth's atmosphere has evolved and how it supports life.	P3	describe the structure and composition of the Earth's atmosphere and the importance of the atmosphere to life	M3	explain some of the processes occurring in the atmosphere that are important to life		
	P4	outline the key stages in the development of the atmosphere			D2	describe how scientists collect data about the Earth's atmosphere and how the data is interpreted

Task 3: Online encyclopaedia - the hydrosphere

LO3: Understand the importance of the hydrosphere for supporting human life.

Assessment Criteria P5, P6, M4 and M5 are assessed in this task.

Learners are to produce pages for an online encyclopaedia about the hydrosphere.

The task may either run parallel to the taught content of the unit, so that learners collect their research as they learn, or may be issued as a final task when the teaching is completed.

The 'Teaching content' section of the unit should be referred to in order to define the appropriate level of demand. This section should inform both the content to be addressed during the teaching of the unit and the depth and scope of content that learners need to include in their assignments as evidence for awarding each assessment criterion.

The online encyclopaedia format is not prescriptive. It is important that all aspects of the Learning Objectives and Assessment Criteria are addressed in the task. However, a variety of other reporting styles could be used. It would be equally appropriate to use a traditional report or PowerPoint with slide notes, a storyboard and script for a documentary (similar to Task 1), mock-ups of magazine articles or books, posters, chapters for a book or series of annotated diagrams or images. Where learners have produced relevant individual work during their learning, (e.g. photo diaries or blogs of personal water use or tables of data relating to water use), these may be included as additional evidence.

Learner Task 3: Online encyclopaedia - the hydrosphere

Assessment Criteria P5, P6, M4 and M5 are assessed in this task.

Your task is to:

Produce pages for an online encyclopaedia about the hydrosphere.

a) Research images and information about the hydrosphere. Your research needs to cover:

- What is meant by the word 'hydrosphere' and how the hydrosphere supports life.
- The composition of sea water and what useful products are extracted from sea water.
- How water is treated before we use it.
- The science behind why it is necessary to treat water before and after we use it.
- Why it is important that we economise on the amount of water we use.

b) Your task for assessment (this should be your own, individual work).

- Organise your information into a series of separate pages for an online encyclopaedia.
- Think about how you present the information e.g. you may use diagrams to show the water cycle with boxes or annotations to explain the underlying science. You may use images with annotations to highlight the important science. You may choose to include a blog about your personal water use. Remember to list the sources you use in a bibliography.

Your evidence will be:

- Pages for an online encyclopaedia.
- A bibliography to show the sources that you have used.
- You may include additional evidence e.g. a blog or diary of water use.
- See the 'Learner Checklist' to help you check that you have included everything you need.

Assessment criteria

IMPORTANT Please refer to notes on research and use of sources in Introduction to the Task (page 8) and section 8.2 (page 6).

The 'Teaching content' section of the unit should be referred to in order to define the appropriate level of demand. This section should the scope of content that learners need to include in their assignments as evidence for awarding each assessment criterion, which is shown below:

Learning Outcome (LO) The learner will:	Pass The assessment criteria are the pass requirements for this unit. The learner can:	Merit To achieve a merit the evidence must show that, in addition to the pass criteria, the learner is able to:	Distinction To achieve a distinction the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
LO3 Understand the importance of the hydrosphere for supporting human life.	P5 identify ways the hydrosphere supports human life	M4 describe the composition of sea water and how useful products are extracted from sea water	
	P6 outline how and why water is treated before and after use	M5 explain why it is necessary to treat water before and after use and why it is important to economise on the amount of water we use	

Task 4: Case Study

LO4: Understand how we extract and use resources in the lithosphere, hydrosphere, atmosphere and biosphere, and the long-term effects on the Earth.

Assessment Criteria P7, M6 and D3 are assessed in this task.

This task is designed to be more 'open' than the other tasks. Learners may choose different resources to research and may choose a variety of formats to present their case study. To keep to the original scenario, the format should be one that could be used to communicate science to the general public.

The tutor may choose a limited number of suggested resources from which each group or each individual learner chooses one from which they then develop into a case study. See the teaching content and delivery guidance in the unit for suggestions of suitable areas.

Tutors may also limit or suggest a range of appropriate presentation methods for the finished task (e.g. an 'expose' type of magazine article, slides and notes for a talk or an online format).

The phrase 'extraction of a natural resource' may be interpreted as broadly as possible, for example in the biosphere this could be extended to consider essential oils for the perfume industry, natural products for pharmaceuticals etc.

This task lends itself particularly well to addressing local needs, particularly at pass level. Learners could base some aspects of their case study on a local company or context and take photographs to make an annotated 'virtual tour'. This could be used as evidence for how the natural resource is used or for issues of sustainability of the natural resource, for example recycled materials in a scrap yard or local waste disposal site or the range and sources of Rain Forest Alliance wood products in a DIY store.

Learner Task 4: Case Study

LO4: Understand how we extract and use resources in the lithosphere, hydrosphere, atmosphere and biosphere, and the long-term effects on the Earth.

Assessment Criteria P7, M6 and D3 are assessed in this task.

Your task is to:

Prepare a case study about the issues of extracting or producing a particular natural resource from the Earth. You may choose an example of a resource that is extracted from the Earth's lithosphere, atmosphere, hydrosphere or biosphere.

You should present your case study in a format that is attractive, interesting and accessible to adults who are non-scientists. You may choose to present your case study using one of the formats that you have used for Tasks 1, 2 and 3 or experiment with a new format such as a magazine article, an online web-based report or images in PowerPoint with slide notes.

a) Research the issues relating to the extraction and use of a natural resource. Your research needs to cover:

- How the resource is extracted or produced and how it is and used.
- Data about the availability, supply and use of the resource.
- How the long-term extraction of the resource affects the earth.
- Issues relating to the sustainability of long-term use of this resource.
- What future developments are needed to ensure that the use of the resource is sustainable?

b) Your task for assessment (this should be your own, individual work).

- Organise your information into a case study.
- Think about how you present the information. Your presentation should be suitable for adults who are non-scientists.

Your evidence will be:

- A case study into the use of a natural resource which is extracted from the lithosphere, atmosphere, hydrosphere or biosphere.
- A bibliography to show the sources that you have used.
- See the 'Learner Checklist' to help you check that you have included everything you need.

IMPORTANT Please refer to notes on research and use of sources in Introduction to the Task (page 8) and section 8.2 (page 6).

The 'Teaching content' section of the unit should be referred to in order to define the appropriate level of demand. This section should the scope of content that learners need to include in their assignments as evidence for awarding each assessment criterion, which is shown below:

Learning Outcome (LO) The learner will:	Pass The assessment criteria are the pass requirements for this unit. The learner can:		Merit To achieve a merit the evidence must show that, in addition to the pass criteria, the learner is able to:	Distinction To achieve a distinction the evidence must show that, in addition to the pass and merit criteria, the learner is able to:		
LO4 Understand how we extract and use resources in the lithosphere, hydrosphere, atmosphere and biosphere, and the long-term effects on the Earth.	P7	summarise information and research data about how a named natural resource is extracted and used	M6	discuss the effects on the Earth of the long-term extraction and use of the natural resource	D3	evaluate the sustainability of the use of the natural resource and outline future developments that are needed to ensure sustainability

Information for Learners

OCR Level 2 Cambridge Technicals in Science

Unit 1: Science of the Earth

LEARNER NAME: _____

General information for learners

Q *Do I have to pass this assignment?*

A Yes. This unit contributes to the achievement of the full qualification.

Q *What help will I get?*

A Your tutor will support you when completing the OCR Cambridge Technical model assignment and will make sure that you know what resources/facilities you need and are allowed to use.

Q *What if I don't understand something?*

A It is your responsibility to read the assignment carefully and make sure you understand what you need to do and what you should hand in. If you are not sure, check with your tutor.

Q *Can I copy other people's work?*

A No. The work that you produce must be your own work and you will be asked to sign a declaration to say that the work is your own. You should never copy the work of other learners or allow others to copy your work. Any information that you use from other sources, e.g. books, newspapers, professional journals, the Internet, must be clearly identified and not presented as your own work.

Q *Can I work in a group?*

A Yes. However, if you work in a group at any stage you must still produce work that shows your individual contribution.

Q *How should I present my work?*

A You can present your work in a variety of ways, e.g. hand-written, word-processed, on video, digital media. However, what you choose should be appropriate to the task(s). For some work, e.g. presentations, coaching sessions, role-play, work experience, you will need to provide proof that you completed the task(s). A witness statement or observation sheet could be used for this. If you are unsure, check with your tutor.

Q *When I have finished, what do I need to hand in?*

A You need to hand in the work that you have completed for each task. Do not include any draft work or handouts unless these are asked for. When you hand in your work make sure that it is labelled, titled and in the correct order for assessing.

Q *How will my work be assessed?*

A Your work will be marked by an assessor in your centre. The assessor will mark the work using the assessment and grading criteria.

Scenario

Scenario: Science of the Earth

The Science of the Earth is an area of science that is of interest to the general public. Many people with no scientific background are fascinated by the scale of the Earth, its changing nature and our place as humans living on the Earth.

Communicating science to the public is now 'big business'. Television companies, publishers and other media companies all work to produce programmes, published material and online media to meet the public demand for information.

Your tasks will be to produce presentations to communicate to the general public the marvels of the Earth's changing surface, its atmosphere, its seas and water systems and its living things.

Through the unit you will use a range of styles and types of media to present the scientific content, in as attractive and an accessible way as possible, for a general audience of adults who have little scientific background.

Your Tasks

Task 1: Making a 'storyboard' for a television documentary about the structure of the Earth.

LO1: Understand the structure of the Earth and the development of ideas and theories about the processes that change the Earth's surface.

Assessment Criteria P1, P2, M1, M2 and D1 are assessed in this task.

Your task is to:

Produce a 'storyboard' for a television documentary about the structure of the Earth.

The documentary is aimed at adults who are not scientists. You need to present the science of the Earth in a way that people will be able to understand and find interesting.

a) Research information and images to show:

- The **structure of the Earth**,
- The **rock cycle**
- **Tectonic plates** and the changes that they cause to the Earth's surface (e.g. volcanoes and earthquakes).

b) Research how **ideas about changes to the Earth's surface have changed over time**.

- Collect images and information about different ideas that people had in the past about how changes to the surface of the Earth happened (e.g. creation stories, whole world flood stories, the shrinking Earth theory, 'Medusa' and other myths to explain strange rock formations).
- Collect images and evidence for Wegener's theory of tectonic plates.
- Discuss what evidence supported each theory, the 'strong' and 'weak' points of each idea and why Wegener's theory is now accepted rather than the other ideas.

c) Research **changes to the Earth's surface**.

- Research how and why it is important to monitor the movements of tectonic plates to give 'early warnings' of natural disasters such as earthquakes, volcanoes or tsunamis.
- Research how scientists work to try to prevent or minimise the impact of natural disasters (e.g. how earthquake damage is minimised or prevented in highly populated areas such as San Francisco).

b) Your task for assessment (this should be your own, individual work).

Create a 'storyboard' to show the order that you would present your ideas in a documentary.

- Choose 'high impact' images and put them into an order that would make an interesting sequence in the documentary to cover all of the research you have done.
- Write notes to go with each image. Make sure your notes cover all the important scientific points. These notes should either be in the form of a finished 'voiceover' or be in note form for a writer to use to develop a script.

Your evidence will be:

- Your storyboard for the documentary.
- A bibliography to show the sources that you have used.
- See the 'Learner Checklist' to help you check that you have included everything you need.

Task 2: 'Photo-book' about the atmosphere

LO2: Know how the Earth's atmosphere has evolved and how it supports life.

Assessment Criteria P3, P4, M3 and D2 are assessed in this task.

Your task is to:

Research and present information that will be used to make a glossy 'photo-book' about the atmosphere.

Your 'book' should explain the science of the atmosphere in a style that is 'friendly', interesting and can be understood by adults who are not scientists.

a) Work with other members of your group to research the information you need. Your research needs to cover:

- The structure and composition of the Earth's atmosphere.
- Why the atmosphere is important to life.
- An explanation of the processes that happen in the atmosphere and are important to life.
- How the atmosphere developed over time.
- How scientists collect and interpret data about the atmosphere.

b) Your task for assessment (this should be your own, individual work).

Organise the research that the group collects to make an individual 'book' of images, diagrams and text about the science of the atmosphere.

Think about how you present the information e.g. you may use diagrams to show the parts of the atmosphere with annotations to highlight the important science. You may choose to represent the development of the atmosphere using a timeline with annotations to describe the science behind each change. You may show the work of scientists using photographs, data and graphs with short boxes of text. Remember to list the sources you use in a bibliography.

Your evidence will be:

- A 'photo-book' about the atmosphere with diagrams, photographs, data and graphs.
- Explanations of the science behind the images presented as annotations, boxes or text.
- A bibliography to show the sources that you have used.
- See the 'Learner Checklist' to help you check that you have included everything you need.

Task 3: Online encyclopaedia - the hydrosphere

Assessment Criteria P5, P6, M4 and M5 are assessed in this task.

Your task is to:

Produce pages for an online encyclopaedia about the hydrosphere.

a) Research images and information about the hydrosphere. Your research needs to cover:

- What is meant by the word 'hydrosphere' and how the hydrosphere supports life.
- The composition of sea water and what useful products are extracted from sea water.
- How water is treated before we use it.
- The science behind why it is necessary to treat water before and after we use it.
- Why it is important that we economise on the amount of water we use.

b) Your task for assessment (this should be your own, individual work).

- Organise your information into a series of separate pages for an online encyclopaedia.
- Think about how you present the information e.g. you may use diagrams to show the water cycle with boxes or annotations to explain the underlying science. You may use images with annotations to highlight the important science. You may choose to include a blog about your personal water use. Remember to list the sources you use in a bibliography.

Your evidence will be:

- Pages for an online encyclopaedia.
- A bibliography to show the sources that you have used.
- You may include additional evidence e.g. a blog or diary of water use.
- See the 'Learner Checklist' to help you check that you have included everything you need.

Task 4: Case Study

LO4: Understand how we extract and use resources in the lithosphere, hydrosphere, atmosphere and biosphere, and the long-term effects on the Earth.

Assessment Criteria P7, M6 and D3 are assessed in this task.

Your task is to:

Prepare a case study about the issues of extracting or producing a particular natural resource from the Earth. You may choose an example of a resource that is extracted from the Earth's lithosphere, atmosphere, hydrosphere or biosphere.

You should present your case study in a format that is attractive, interesting and accessible to adults who are non-scientists. You may choose to present your case study using one of the formats that you have used for Tasks 1, 2 and 3 or experiment with a new format such as a magazine article, an online web-based report or images in PowerPoint with slide notes.

a) Research the issues relating to the extraction and use of a natural resource. Your research needs to cover:

- How the resource is extracted or produced and how it is and used.
- Data about the availability, supply and use of the resource.
- How the long-term extraction of the resource affects the earth.
- Issues relating to the sustainability of long-term use of this resource.
- What future developments are needed to ensure that the use of the resource is sustainable?

b) Your task for assessment (this should be your own, individual work).

- Organise your information into a case study.
- Think about how you present the information. Your presentation should be suitable for adults who are non-scientists.

Your evidence will be:

- A case study into the use of a natural resource which is extracted from the lithosphere, atmosphere, hydrosphere or biosphere.
- A bibliography to show the sources that you have used.
- See the 'Learner Checklist' to help you check that you have included everything you need.

Model Assignment: Learner checklist

OCR Level 2 Cambridge Technicals in Science

Unit 1: Science of the Earth

LEARNER NAME: _____

TASK 1: Making a 'storyboard' for a television documentary about the structure of the Earth.

For PASS (AC P1 and P2) have you:	Completed (✓)
(P1) Included in your storyboard, images and notes about: <ul style="list-style-type: none"> ○ The structure of the Earth. ○ The rock cycle. ○ How tectonic plates cause changes to the Earth's surface. 	
(P2) Included in your storyboard, images and notes about: <ul style="list-style-type: none"> ○ Why monitoring the movement of tectonic plates on the Earth's surface is important. 	
For MERIT (AC M1 and M2) have you:	Completed (✓)
(M1) Included in your storyboard, images and notes about: <ul style="list-style-type: none"> ○ How ideas about the changes to the Earth's surface have changed over time. ○ the evidence that has supported each idea. 	
(M2) Included in your storyboard, images and notes about: <ul style="list-style-type: none"> ○ How scientists minimise the impact of changes to the Earth's surface (e.g. as caused by earthquakes). 	
For DISTINCTION (AC D1) have you:	Completed (✓)
(D1) Included in your storyboard, images and notes about: <ul style="list-style-type: none"> ○ The strengths and weaknesses of different ideas about the changes to the Earth's surface (linked to how the ideas fitted the evidence at the time). ○ How evidence to support the theory of tectonic plates gradually built up. 	
Evidence provided (please ✓):	Ref/Page no(s)
Storyboard for a documentary about the Earth.	
Bibliography of sources.	

Task 2: 'Photo-book' about the atmosphere

For PASS (AC P3 P4) have you:	Completed (✓)
(P3) Included in your photo-book, information about: <ul style="list-style-type: none"> • The structure and composition of the Earth's atmosphere. • Reasons why the atmosphere is important to life. 	
(P4) Included in your photo-book, information about: <ul style="list-style-type: none"> • How the atmosphere developed over time. 	
For MERIT (AC M3) have you:	Completed (✓)
(M3) Included in your photo-book, information about: <ul style="list-style-type: none"> • An explanation of the science behind the processes occurring in the atmosphere that are important to life. 	
For DISTINCTION (AC D2) have you:	Completed (✓)
(D2) Included in your photo-book, information about: <ul style="list-style-type: none"> • How scientists collect data about the atmosphere. • How the data they collect is interpreted. 	
Evidence provided (please ✓):	Ref/Page no(s)
Photo-book about the Earth's atmosphere.	
Bibliography of sources.	

Task 3: Online encyclopaedia - the hydrosphere

For PASS (AC P5 P6) have you:	Completed (✓)
(P5) Included in your encyclopaedia pages, information about: <ul style="list-style-type: none"> • What is meant by the word 'hydrosphere' and how the hydrosphere supports life? 	
(P6) Included in your encyclopaedia pages, information about: <ul style="list-style-type: none"> • How and why water is treated before and after we use it. 	
For MERIT (AC M4 M5) have you:	Completed (✓)
(M4) Included in your encyclopaedia pages, information about: <ul style="list-style-type: none"> • The composition of sea water and how useful products are extracted from sea water. 	
(M5) Included in your encyclopaedia pages, information about: <ul style="list-style-type: none"> • The science behind how and why water is treated before and after we use it. • Why it is important to economise on the amount of water we use. 	
Evidence provided (please ✓):	Ref/Page no(s)
Pages for an online encyclopaedia	
Bibliography of sources.	

Task 4: Case Study

For PASS (AC P7) have you:	Completed (✓)
(P7) Included in your case study: <ul style="list-style-type: none"> • How the resource is extracted or produced and how it is used. • Data about the availability, supply and use of the resource. 	
For MERIT (AC M6) have you:	Completed (✓)
(M6) Included in your case study: <ul style="list-style-type: none"> • How the long-term production of the resource affects the Earth. 	
For DISTINCTION (AC D3) have you:	Completed (✓)
(D3) Included in your case study: <ul style="list-style-type: none"> • A discussion about the sustainability of long-term use of this resource. • What future developments are needed to make sure that the use of the resource is sustainable? 	
Evidence provided (please ✓):	Ref/Page no(s)
Your case study	
Bibliography of sources.	