

Science 2.4 Investigate how organisms survive in an extreme environment

Earth and Space Science AS: 91190v2 Level 2 Credits 4 Internal

Achievement criteria

The type of achievement you will reach is decided by the way you answer each question. From your answers the assessor will assess your understanding of the topics of the achievement standard.

- You need to select and process information on conditions of an extreme environment and the technology needed by organisms to survive there.
- Information is to be presented in a format suitable for an audience of Year 12 students. This could involve writing a report, showing a PowerPoint presentation or producing a poster. Diagrams, images and data should be used to illustrate relevant survival techniques and technology.
- The presentation should include integrated links between the conditions of the extreme environment and the technology needed to survive. You should also justify how the technological modifications allow organisms to survive the conditions of the extreme environment.
- Collect information for your investigation from a range of resources, such as class notes, the Internet, photographs, videos, DVDs, reference books, and interviews.



Achievement

Investigate how organisms survive in an extreme environment.

This involves:

- selecting and processing information
- using the processed information:
 - describing why the conditions of the extreme environment require special biological adaptations or technological modifications for survival
 - describing how the biological adaptations or technological modifications allow the organism(s) to survive in the extreme environment
- recording sources of information used in a traceable format.
- Organisms can be the same or different species including humans
- An extreme environment can be selected from, but is not restricted to: outer space, deep oceans, deep sea trenches, extremes of temperature or salinity, anaerobic conditions, excess exposure to radiation or toxic chemicals, geothermal vents.

Achievement with Merit

Investigate in depth how organisms survive in an extreme environment.

This involves

- selecting and processing information that provides links between conditions of the extreme environment and biological adaptations or technological modifications
- explaining, using the processed information, how the biological adaptations or technological modifications allow the organism(s) to survive the conditions of the extreme environment.

Achievement with Excellence

Investigate comprehensively how organisms survive in an extreme environment.

This involves:

- selecting and processing information that provides integrated links between conditions of the extreme environment and biological adaptations or technological modifications
- justifying, using the processed information, how the biological adaptations or technological modifications allow the organism(s) to survive the conditions of the extreme environment.

Key Tips

1. Select and process information on

- the conditions of the extreme environment and how these would affect organisms
- why the conditions of the extreme environment require special technological modifications for survival
- how the technological modifications work together to allow organisms to survive the conditions of the extreme environment
- reasons why the technological modifications allow organisms to survive the conditions of the extreme environment
- anything else that would be relevant to survival of organisms, such as how organisms might cope psychologically and how long they could stay in the extreme environment.

Keep all notes and copies of sources of information. These may be on paper or on a computer and they must be handed in with the final report/presentation. Do this by keeping:

- a logbook which records period by period progress on your information gathering.
- a workbook which records in order which information you have selected to include. This shows you processing the information.
- rough notes and photocopied resources kept in chronological order in a folder.

2. Prepare the report/presentation

Using your processed information, prepare your report/presentation. In this you should:

- Describe the conditions of the extreme environment that require special technology for survival of organisms.
- Describe the technology required for survival of organisms in this extreme environment.
- Explain how the technology works to allow organisms to survive in this extreme environment.
- Explain and justify anything else that would be relevant to survival of organisms, such as how organisms might cope psychologically and how long they could stay in the extreme environment.
- It is very important that the final assessment is in your own words, as this shows that you have understood the work and have not just copied information from the sources.
- Acknowledge all sources of information, including images, diagrams (not generated by you) and data.

3. How to acknowledge sources in your report/presentation

You should always record your sources of information, including images, diagrams (not generated by you) and data. This includes recording:

- full web addresses for internet sources
- full referencing of information from books and journals
- details of any interviews, such as time and date.

Get into the habit of doing this each time you find new information. This will save you time when you are doing preparing your report/presentation.

Acknowledgement of sources should be in the form of:

- footnoting or referencing within your text any diagrams, tables of data, images, information that you have directly quoted (quotes should only be one or two sentences long) and ideas that are not your own even if they are in your own words
- a bibliography giving full web addresses for internet sources, full referencing of information from books and journals and details of interviews, such as times and dates.
- All sources of information must be recorded in a traceable format, which means that someone else could go straight to where the information came from.

Assessment

This achievement standard is internally assessed.

- You must present the information you gather during your investigation and communicate it successfully to an audience of Year 12 students. To do this you could write a report, show a PowerPoint presentation or produce a poster. You should use diagrams, images, and data to illustrate relevant survival techniques and technology.
- You must also hand in a logbook, workbook and all of your rough notes and collected resources for assessment.

- You will be assessed on the quality of your investigation, which includes how well you have selected and processed the gathered information and how well you have justified how humans can survive in extreme environments in your report/presentation. You will not be assessed on how well you do the presentation.
- Collect information for your investigation from a range of resources, such as class notes, the Internet, photographs, videos, DVDs, reference books, and interviews.
- The presentation should include integrated links between conditions of the extreme environment and biological adaptations needed by selected organisms to survive. You should also justify how the biological adaptations allow the organisms to survive the conditions of the extreme environment.
- Supporting evidence must be handed in if appropriate to the form of presentation to ensure validity. Your teacher may also make other checks to ensure the authenticity of your work.
- You may be allowed to work with other students to gather information. However, you must work individually to process, interpret, and produce the final report.