

Extracting and using metals

Introduction

Humans have been using metals for thousands of years, but which were the first metals to be discovered and used? And where did people get metals from?

In this activity you will be using your research skills to find out about:

- how metals occur in the Earth's crust
- the history of metal-use
- what ores are, where they are found, and how the metals are extracted.

You will be using your literacy skills to produce an information sheet for a local museum about metal-use and how metals are obtained.

Brief

You are going to make an information sheet for a local museum about how metals are found and extracted.

Your information sheet should:

- be informative and interesting for museum-visitors
- include a brief history (e.g. a timeline) of the discovery/use of different metals; you should link this to what you have learned about the reactivity series
- contain some examples of common ores and where they are found
- explain how metals are extracted from their oxides
- highlight some environmental issues related to mining for metals
- be aimed at the general public from students your age and upwards.

Step 1

Research and plan your introduction. This should include a short history of the use of metals in the past, and how more metals have been discovered over time. Think about the following questions: Where in the reactivity series do we find the metals that humans first used? Why was this? Why was aluminium, the most common metal in the Earth's crust, not discovered until 1827?

Step 2

Write down the definition of an ore, and find some examples of common ores and where they are found. Find some appropriate pictures.

Step 3

Research how metals such as iron and zinc are extracted from their oxide ores. Write a step-by-step description of the process.

Step 4 (extension)

Describe why some of the more reactive metals, such as aluminium, cannot be extracted in the same way as iron and zinc. Research some examples of how these more reactive metals are extracted from their ores (a brief list of examples is all you need here).

Step 5

Find out about some of the environmental impacts of mining for metals. Find a picture of waste left over from mining.

Step 6

Prepare your information sheet.

Sources**History of metal-use**

Detailed information about early metal-use and extraction:

<http://www.gcsescience.com/ex9.htm>

Ores and extraction

A basic overview of metal ores and methods of extraction:

www.bbc.co.uk/schools/gcsebitesize/science/aqa/metalsanduses/extractingmetalsrev1.shtml

Metal timeline

A historical timeline showing when different metals were discovered:

www.makin-metals.com/about/history-of-metals-infographic/

Metal ores

Details on different metal ores, including pictures:

<http://www.gwydir.demon.co.uk/jo/minerals/metals.htm>

Metal mining and the environment (extension)

General information about the impacts of metal mining:

<https://greentumble.com/how-does-mining-affect-the-environment/>

Information on the Rio Tinto mines:

<https://serc.carleton.edu/microbelife/topics/riotinto/index.html>

Writing frame

You are going to make an information sheet for a local museum about how metals are found and extracted.

Summarise your research findings on the key areas below.

History of metal-use
linked to the reactivity
series

Metal ores
Definition:

Examples of metal ores
and where they are found
(e.g. ores of iron, copper,
aluminium and lead):

Extracting metals such as
iron and zinc from their
oxide ores (make sure
you are clear on the
chemistry involved)

Extracting more reactive metals such as
aluminium (extension)

Environmental impacts of mining

Important points

- Make sure that your information sheet is informative and interesting for museum-visitors. Include some pictures, and think about the most helpful way of displaying your information.
- Make sure that your information sheet can be understood by the general public. Explain any scientific terms that you use.

Your work

You have made an information sheet for a local museum about how metals are found and extracted.

Look at the questions below and think about whether you have met the brief.

- Have you given information on the first metals to be used by humans and where these were found?
- Is your history of metal-use linked to the reactivity series?
- Have you identified some common ores and indicated where they are found?
- Have you included a clear explanation of how metals are extracted from their oxides?
- If you have done the extension task, have you given a brief outline of how a reactive metal such as aluminium is extracted?
- Have you referred to environmental issues involved in mining for metal ores?
- Is your information sheet informative and interesting for museum-visitors?