



UK Critical Minerals
Intelligence Centre

CRITICAL MINERALS

KS2 lesson plan: what are rocks, minerals and metals?

What are rocks, minerals and metals?

Introduction

Today, we are going to be looking at rocks, minerals and metals. We will be going over what they are, the differences between the three and what they can be used for in everyday objects. To start with, we are going to watch a video [available here: <https://www.bgs.ac.uk/discovering-geology/maps-and-resources/critical-raw-materials-resources/critical-raw-materials-classroom-activities/>], which will explain what rocks, minerals and metals are.

[Play video 'What are rocks, minerals and metals?' from start to 2:01.]

What is a mineral?

[Take answers]

A mineral is a solid substance that occurs naturally. Minerals can be made from one or multiple elements.

How do we know what we've found is a mineral?

[Take answers]

Minerals can be identified by testing certain properties [full list and definitions can be found in the Teacher's Notes pages 2 and 3] but the key ones for this lesson are hardness, colour and streak.

Can anybody name a mineral?

[Take answers]

Likely answers include copper, diamond, gold, iron, quartz or calcite. Detailed answers are given in the KS2 Teacher's Notes on page 4 under 'What minerals do the students know?'.

Activity 1: chocolate minerals

[KS2 Teacher's Notes pages 4 to 6]

Now we are going to be using what we know about rocks and minerals to try and identify the different parts of rock samples we might find. To do this, we are going to be using chocolate bars as rocks and having a look at what is inside them.

Suggested/optional demo

Use this as an introduction activity for what they will be looking for in the cross-sections in KS2 Worksheet 1. The aim of this is to show that a chocolate bar is made up of many ingredients, just like rocks.

Cut into a chocolate bar to show the class a cross-section and point out the key parts inside (for example, chocolate coating; caramel; nougat; nuts; biscuit; marshmallow, etc.). This could also be done by the students in pairs or small groups.

Equipment required

- A cutting device
- Selection of chocolate Bars (Mars, Double Decker, Boost and Picnic are used in Worksheet 1)

To start off we are going to be looking at three different chocolate bars and picking out the key parts.

Activity 1 part 1

Identify the key parts of the three chocolate bars in KS2 Worksheet 1. Once completed, we will move on to doing the same with three different rocks, except we will be looking for minerals within the rock itself. We will be looking for the minerals by looking at parts of the rock that are different to what surrounds it.

Activity 1 part 2

Identify where you think the different minerals are in each picture of the three rocks in KS2 Worksheet 1. Once completed, we will bring it all together by comparing a chocolate bar to a porphyritic basalt.

Activity 1 part 3

Match the parts of a rock with the comparable parts in the cross-section of the chocolate bar in KS2 Worksheet 1.

Activity 2: mineral treasure hunt

[KS2 Teacher's Notes pages 7 and 8]

[Play video 'What are rocks, minerals and metals?' from 2:01 to end.]

Many of the minerals from the rocks we've analysed (and the metals within them) are processed and refined to be used in various items. These household items will often have several different minerals making up their different parts.

For example, in a lamp:

- copper will be used for the wiring
- quartz as part of the bulb
- tungsten as the lamp filament
- brass (copper and zinc) generally on the outside

Activity 2 part 1

Students will have five minutes to look around the classroom and find common items that they think may have been made from minerals. Students will pick one item each; the teacher will go around the class asking what item they have picked and confirming whether it has been made from minerals.

Suggested extension

Go over items that are not made from minerals and clarify whether they originate from plants or animals.

Equipment list

General classroom items:

- books
- calculator
- chair (with metal legs)
- clock
- compasses
- computer/laptop
- glue
- paper
- pen
- pencil
- projector
- scissors
- sharpener
- stapler
- whiteboard

Note: answers to which have a mineral origin can be found in the KS2 Teacher's Notes pages 6 and 7.

Ask class: are minerals more common or less common in everyday items than you thought? [Take answers]

Activity 3: minerals in a lamp

[KS2 Teacher's Notes page 9 and 10]

Based on what we did in Activity 2, where do you think a lamp originates?

[Take answers]

A lamp has many minerals used within it: copper wiring, quartz bulb, brass (copper and zinc) casing and a tungsten filament.

Some minerals are more important than others, based on whether they are used in many items, used for a new technology or can be sourced reliably. Minerals that are key for emerging technologies and have a very limited supply are called 'critical minerals'. Each country will have its own list of what it considers a critical mineral, depending on which minerals they currently mine.

Tungsten, which is in our lamp as the filament for the bulb, is one of these critical minerals. Tungsten is sourced from a few countries, but the majority comes from China with the rest mostly from Vietnam and Russia.

Activity 4

Colour in the world's biggest tungsten suppliers on a blank world map (China, Vietnam, Russia, Bolivia, Rwanda, Austria and Spain). Colour in the countries according to their tungsten production.

Equipment list

- KS2 Worksheet 2
- Colouring pencils: green, orange and red
- A method to be able to identify where certain countries are on a map (atlas; globe, etc.)

Plenary

Make sure students are familiar with the following points:

- what is the difference between a rock, a mineral and a metal?
- can you identify minerals within a rock?
- what everyday items are made from minerals?
- what are critical minerals and where do we get them from?

This can be done by either taking answers for each point, giving them a quick summary (which can also be found in KS2 Teacher's Notes on page 10 and 11) or checking that they are happy with the content.

Homework

Students need to find and record five items at home that contain minerals. Suggestions for the types of items they should be looking for can be found in the KS2 Teacher's Notes on page 11.