



# Rock Cycling

## 1. The Rock Cycle

Read the information in the textbox below to get some background knowledge about how rocks just keep on changing.

The rock cycle describes the geological processes that form rocks. Igneous rocks can change into sedimentary rock or into metamorphic rock. Sedimentary rock can change into metamorphic rock or into igneous rock. Metamorphic rock can change into igneous rock or sedimentary rock.

- Let's start with magma.
- When magma cools it forms igneous rock.
- On the Earth's surface, wind and water can break the igneous rock into pieces. This process is called weathering and erosion. These pieces are called sediments.
- The sediments can be compacted to make a layer. The layer can be buried under other layers of sediments. After a long time the sediments can be cemented together to make sedimentary rock.
- Sedimentary rock can be weathered away to form sediments again.
- When sedimentary and igneous rocks are heated they change into metamorphic rock.
- Metamorphic rock can also be weathered away to make sediment.
- Metamorphic, igneous and sedimentary rock can also be melted back into magma.
- The rock cycle never stops.

## 2. Refer to the 'Rock Cycle Flowchart' attached to this sheet.

- Working in pairs, carefully cut out the cards.
- Next, organise the cards to represent the rock cycle. Keep rechecking the information box and talk about your decisions with your partner.
- When you have checked with your teacher, paste them down on a coloured A4 sheet of paper or in your workbook.
- Include the heading 'Rock Cycle Flowchart' on your A4 sheet or workbook.

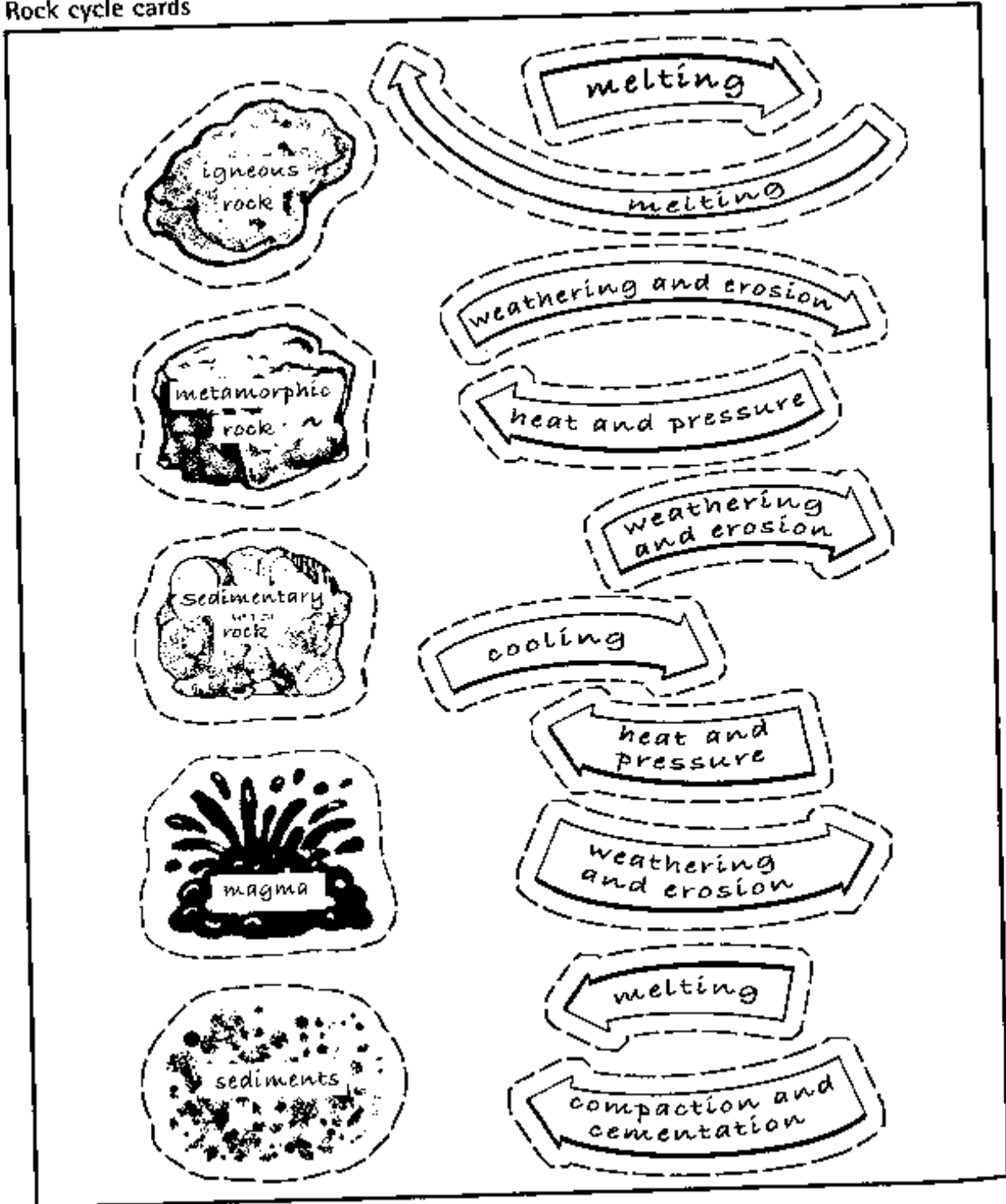


MINERALS  
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## Rock Cycle Cards

Rock cycle cards



Adapted from "Science Rocks" by Kathleen Gordon, p 7-8, 14, 28 (Queensland Resources Council and the Department of Natural Resources and Mines)



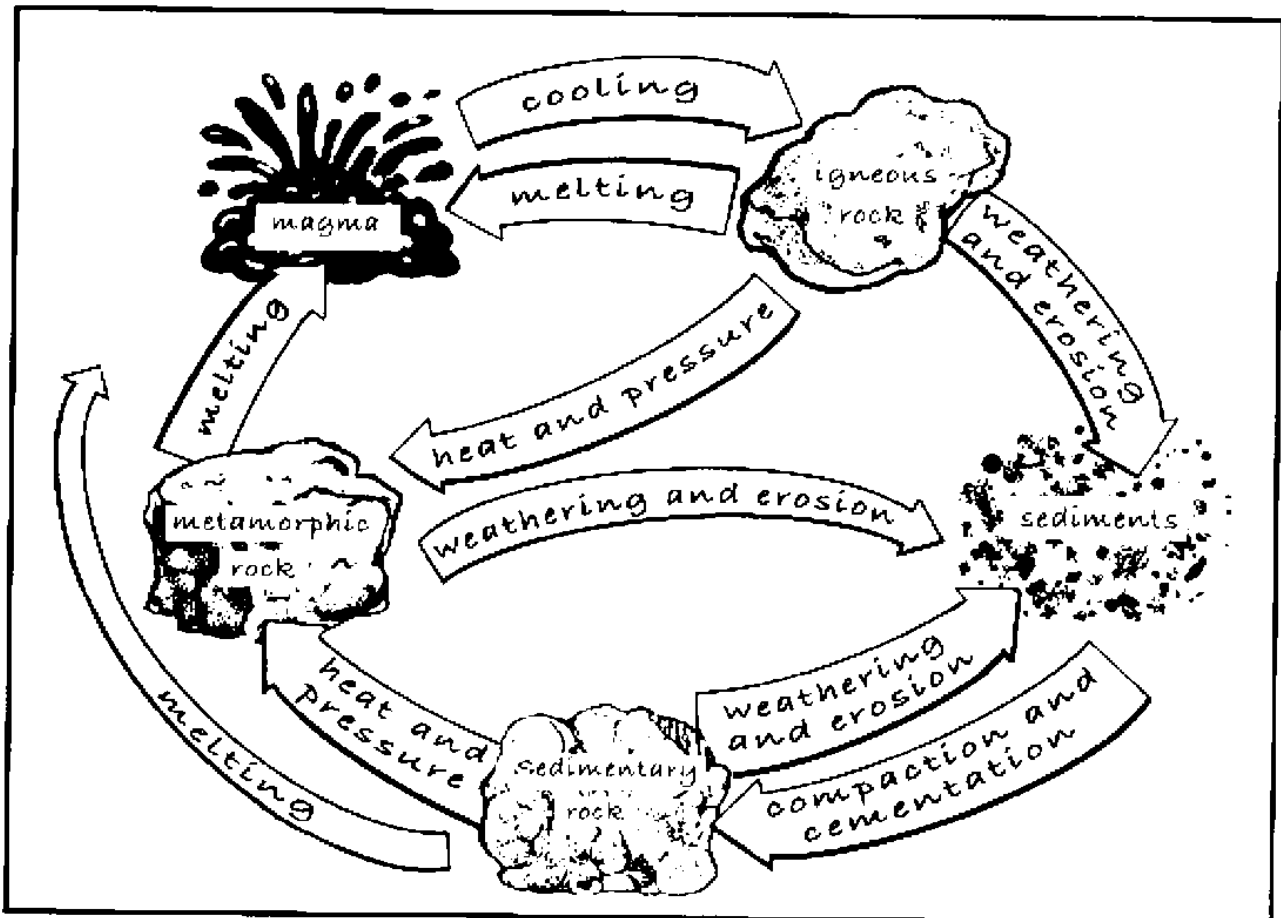
# Rock Cycling

## Background notes for teachers

### The Rock Cycle

The geological process that forms rocks is cyclical. Each type of sedimentary, igneous or metamorphic rock can be changed into each other type of rock. This is known as the rock cycle. The following explanation starts with igneous rocks.

Igneous rocks start as magma. When magma - molten rock under the Earth's surface - and lava - molten rock on the Earth's surface - cools and hardens, it forms **igneous** rock. The igneous rock is broken down over time through the weathering process. These particles of broken rock, or soil, are washed away by water and accumulate in lakes or oceans and harden into rock again - this time as **sedimentary** rock. As the sedimentary rock is buried under more and more sediments, or comes into contact with magma, the pressure and heat can cause metamorphism to occur. This transforms the sedimentary rock into a **metamorphic** rock. If metamorphic rock is buried more deeply, temperatures and pressures continue to rise. If the temperature becomes hot enough the metamorphic rock melts and forms the molten rock called **magma** and so the cycle continues.



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## ACTIVITY 24



# Rock Cycling

## Background notes for teachers

### Our amazing Earth

#### The Earth

The **crust** of the Earth is made up of rocks and minerals from the tallest mountains to the floor of the deepest ocean. It makes up less than 1% of the Earth's mass. The continental crust is up to 50km thick while the oceanic crust is, at most, 15 km thick. Most of the rocky crust is covered by either water, sand, soil or ice. The soil is a mixture of small, inorganic particles and organic material (plant and animal remains), which supports the growth of plants such as grass and trees. Most of the crust is made from only eight elements – oxygen, magnesium, aluminium, silicon, calcium, sodium, potassium and iron. These elements along with others are combined to form thousands of rocks and minerals that are very different.

The **mantle** is the solid casing of the Earth and is about 2900km thick making up almost 70% of the Earth's mass. It consists of silicon, oxygen, aluminium and iron.

The **core** is mainly made up of iron and nickel and makes up about 30% of the Earth's mass. The liquid **outer core** is approximately 2200km thick. The solid **inner core** is about 1220 km thick.

#### Rocks

A rock is made up of minerals that have been cemented together, squeezed and heated, or melted and cooled. Rocks are divided into three main groups:

- *igneous*
- *sedimentary*
- *metamorphic*

They are classified into these groups because of the way they were formed.

**Igneous** rocks are formed from melted rock that has cooled and solidified. When rocks are buried deep within the Earth, they melt because of the high pressure and temperature. If this molten rock (called magma) cools slowly, usually at depths of thousands of metres, coarse-grained rocks form with large crystals (for example, granite and gabbro). If the magma cools quickly, usually on the surface after a volcano erupts, the crystals are very small and fine-grained rocks are formed (for example, basalt, rhyolite and obsidian). Some examples of other igneous rocks are: pumice, tuff and andesite.

**Sedimentary** rocks are formed from the cementing together of small pieces of rocks or shells. They are formed at the surface of the Earth, either in water or on land. They are usually made up of many layers of sediments, which include fragments of rocks, minerals and animal or plant material. Sandstone, limestone, shale, gypsum, conglomerate, coal, chert and flint are all sedimentary rocks.

Sometimes igneous and sedimentary rocks are subjected to pressures so intense or heat so high they change. They become metamorphic rocks, which form while buried within the Earth's crust. The process of metamorphism does not melt the rocks, but changes them into denser, more compact rocks. Slate, marble and gneiss are metamorphic rocks. They are transformed from shale, limestone and granite respectively. shale ⇒ slate      limestone ⇒ marble      granite ⇒ gneiss

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