

ACTIVITIES TO ENHANCE THE STUDY OF ROCKS AND MINERALS

Junior Primary

THE EARTH

Study the structure of the Earth and compare it with the structure of an egg.

Think of it this way: The Earth's core is the egg yolk. The mantle is the egg white. The crust is the egg shell.

The **core** is a solid inner sphere of nickel iron surrounded by a fluid outer layer. The heat and pressure in the core are intense.

The **mantle** is actually 2 layers. The lower mantle is rather solid, but the upper mantle is molten rock. The molten rock is a thick liquid, sort of like hot plasticine. When molten rock finds a weakness in the Earth's crust, it bubbles up through and finally erupts from a volcano.

The solid crust forms the outer layer of the Earth.

Experiment: Volcanic Egg Experiment

To see how molten rock in the mantle can break through the Earth's crust.

You need; a raw egg
Stove
Small pot
Cold water
Knife

You need to; Carefully tap raw egg to make a crack in the shell.
Insert the knife blade into the crack and break the thin membrane between the shell and the egg white.
Place egg into cold water and bring to the boil.
Watch and see the egg white erupting.

Conclusion; As the egg white heats up, it expands and pressure builds up inside the egg shell. The egg white breaks through the weak spot. The lava, or molten rock, in the mantle acts the same way. When pressure inside the Earth becomes great enough, volcanic eruptions occur.

ROCK STUDY

There are 3 types of rocks that cover the Earth; igneous, sedimentary and metamorphic.

Igneous: Igneous rock was once hot liquid inside the Earth. Igneous rocks are made from liquid rock that has erupted from volcanoes and cooled down. Refer to the Volcanic Egg Experiment.

Sedimentary: Sedimentary Rock started out as sand and smashed up sea-shells. The tiny bits settled and built up in thick layers. Minerals from water seeped into the spaces between the particles and cemented them together into solid rock.

Sedimentary Rock in a Cup Experiment:

You need: Mixing bowl
 Coarse sand
 Epsom Salt
 Spoon
 Small paper cup
 Water.

You need to: Mix 1 cup of water and $\frac{1}{2}$ cup of Epsom Salt in bowl.
 Stir until most of the salt dissolves.
 Place about 1 inch of sand in paper cup.
 Add enough salt solution to just cover the sand.
 Mix well and let mixture stand until dry (about 2-3 days)
 Cut off paper.

Conclusion: The salt has dissolved and filled the gaps between the grains of sand. When the mixture dried, the salt cemented the grains of sand together.

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Metamorphic: Metamorphic rock used to be igneous or sedimentary rock that was changed by extreme heat or pressure or both.

Metamorphic Rock Experiment:

You need: Modelling clay
Waxed paper
3 or 4 books

You need to: Make about 2 dozen pea-sized balls from modelling clay of various colours to represent rock particles.

Place the clay balls close together on a piece of waxed paper and place a second sheet of waxed paper on top of the clay balls.

Put a book on top of the waxed paper. Then another, then another. Imagine that the books are layers of rock building up on top of the rock particles.

Remove the books and peel away the waxed paper. Look at the clay. An entirely new kind of rock has been formed.

Conclusion: The pressure on the rock particles increases as you add each layer. Heat builds as rock particles are pushed deeper into the Earth's crust.

COLLECTING AND CLASSIFYING ROCKS

Collect a variety of rock samples from school and home. Make the following observations:

- Similarities/differences
- Colour
- What do their surfaces look and feel like?
- Interesting or unusual patterns, designs or markings.
- Pick up the rocks and feel their temperature
- Weight
- Do the rocks float or sink?
- Are the rocks attracted to a magnet?

MAKING A CAKE

A rock is like a cake and minerals are like the ingredients which make up the cake. Just like cooking with different ingredients, minerals from the Earth combine to make a rock. Make a cake in class and use this analogy to help the students understand the relationship between rocks and minerals.

PET ROCKS

Create a pet rock.
Write the life story of a rock.

FOSSIL MAKING

See attached sheet.

MINERALS IN EVERYDAY USE

Brainstorm items used everyday that contain minerals. After discussion students draw the items and label what minerals they contain. Used attached sheets for ideas of what items contain what minerals.

MINING - EXPLORATION

Geologists use drills to take core samples of rock and test them to find out whether to mine an area or not.

Try simulating this process by using;

- Layered sandwich and a cardboard tube, or
- Marble cake and clear plastic straw, or
- Layers of modelling clay and clear plastic straws.

Drill core samples and observe the core samples. This is one way geologists find out what lies beneath ground.

In a small, unused sandy area of the school grounds, bury a number of different sized magnetic objects just below the surface of the ground. Use magnets to scan the area and detect where the objects are located. This activity can be extended to include map interpretation and exploration activity.

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MINING - EXTRACTION AND PROCESSING

Most rocks that are mined are a mixture of useful or economically important minerals and unwanted or waste minerals. These mixtures must be separated to get the minerals that can be used.

Panning: Panning is an old fashioned method used to separate gold and other heavy metals from creek gravel or other soil. Try panning your own substances outside the classroom, using a large shallow dish with a handful of sand and some lead sinkers, nuts and bolts or coins placed in it. Try the dry blow method as well as the washing method.

Crushing: Collect a variety of rock samples from the school grounds or from home. Experiment with a number of different types of tools to hand break the rocks, grind or pulverise them.

Floatation: Mix a small amount of soap or detergent with some water in a bowl and froth up the mixture with an egg beater. Add some fine soil to the mixture and stir in carefully. The fine particles should float to the surface and can be skimmed off. It is this process that enables base metals to be separated from waste rock.

Separating Substances: Challenge students to design a way to separate the \se mixtures of different substances, each in a separate container:

- (a) salt and sugar
- (b) styrofoam balls and gravel
- (c) steel bits and sand
- (d) all six substances combined

Provide the following equipment to help solve the problem:

- (a) magnets
- (b) 2 different sized sieves
- (c) some water
- (d) clean bowls and containers

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FASCINATING FOSSILS

Mineral deposits often contain fossils of the organisms that once lived there. In this activity you will make your own fossils.

Purpose: To determine how fossils are preserved.

What You Need:

- Plastic cup
- Plastic plate
- Plastic spoon
- Modelling clay
- Sea shell
- Vaseline
- Plaster of paris
- Water from the tap
- Tooth pick



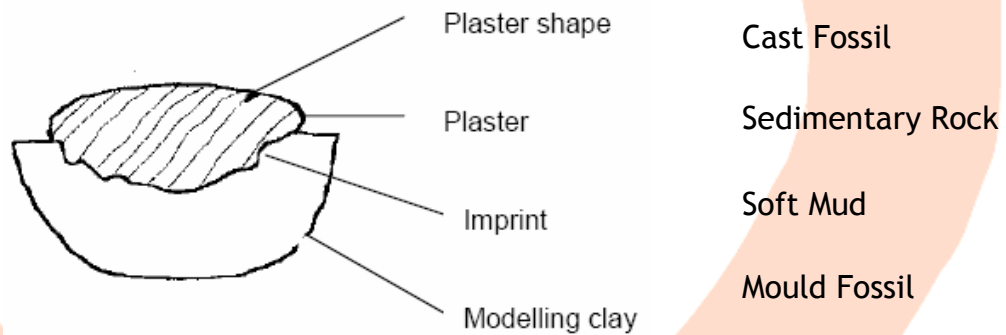
What To Do:

1. Place a piece of clay on the plastic plate.
2. Rub the outside of the sea shell with a little bit of vaseline.
3. Press the sea shell into the clay.
4. Carefully remove the sea shell so that a clear imprint of the shell remains in the clay (if it doesn't work, smooth the clay and try again).
5. Mix 4 spoons of plaster of paris with 4 spoons of water in the plastic cup. Stir the mixture until it looks like thick cream. (Carefully add a little more water if it is too dry).
6. Fill the imprint in the clay with plaster mixture.
7. Carefully use a toothpick to write your initials on the modelling clay.
8. Leave the plaster to harden (it will take about 15 to 20 minutes).
9. Clean up the mess while you are waiting!
 - Rinse the plastic cup and spoon in water in the Rinse Bucket. Then leave them to soak in the Soak Bucket. (Buckets are behind you on the floor).
 - Wipe the vaseline off the shell with paper towel.
 - Wipe down the bench.
10. When the plaster is hard, carefully separate the clay from the plaster mould.

Challenge:

The modelling clay and the plaster are both examples of fossils. The clay represents the soft mud of ancient times. Living organisms made imprints in the mud. If nothing collected prints, the mud dried, forming what is now called a CAST FOSSIL. When sand or other sediments filled the imprint, a sedimentary rock formed with the print of the organism on the outside. This type of fossil is called MOULD FOSSIL.

- Look at the picture below. The different parts of your model have been labelled.
- Can you match these labels with the list on the right by drawing a line to join them?



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