



Collect different rocks from your neighbourhood. Wash off the soil. Arrange them on a table and carefully look at the rocks you have collected. Are they the same size, colour or shape? There are many different kinds of rocks in the world but they can be basically classified (or divided) into three groups :

- Igneous rocks
- Sedimentary rocks
- Metamorphic rocks



Magma coming out of a volcano

IGNEOUS ROCK

Igneous rocks are formed by the cooling and crystallisation of molten rocks. The term igneous is derived from ignis, the Latin word for fire. Molten rock is called magma. It is found inside the Earth. When magma erupts at the Earth's surface, it is called lava. When this magma or lava cools down it becomes solid rock. Igneous rocks contain many minerals in them.

Types of Igneous Rock

There are two main types of igneous rock. They are called intrusive and extrusive igneous rocks.



Intrusive igneous rock forms when the magma cools slowly, usually deep underground. As the molten rock cools slowly, minerals inside it take on crystalline forms and shapes.

Very hard granite which is often used for kitchen counters (tops) or sometimes as flooring tiles is intrusive igneous rock. It is rich in feldspar and quartz.

Extrusive igneous rock forms when magma cools down very quickly, usually because it comes to the surface of Earth. When magma erupts, for example, as lava from a volcano, it cools very quickly. Basalt, pumice and obsidian are some examples of extrusive igneous rock.





Basalt rock

Basalt is the most common rock in the Earth's crust and it makes up most of the ocean floor. It is grey in colour. It is rich in magnesium and iron.

Pumice is a light ash-coloured rock formed by quick cooling of lava. It has many holes in it formed by the gases trapped in lava while it was cooling. It resembles a sponge and is very lightweight. It has long been used as an abrasive in cleaning and polishing. It is also used to make poured concrete, tile, and plaster. Feldspar and zircon are some minerals found in pumice.



Pumice rock



Obsidian rock

Obsidian is a shiny, smooth, black rock formed by cooling of lava. It is used for making jewellery.

SEDIMENTARY ROCKS

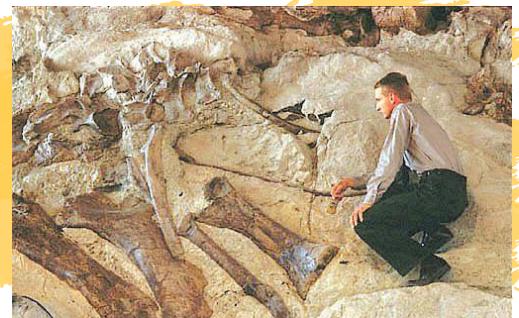
Earth's surface is always changing and weather conditions like wind, rain, snow, and water break away rocks. This is known as weathering. These broken rocks and stones flow down the rivers and streams. Rivers and streams flow to lakes and seas carrying tiny particles of rock, soil, and dissolved minerals with them. These particles make a layer at the bottom of lakes and seas. We call this settled matter sediment. As layers of sediment build up over thousands of years, they are compressed, or squashed, and become bonded together. Minerals found in the water cement the particles together resulting in solid sedimentary rock.

Sedimentary rock can also be formed when the shells of sea creatures fall to the floor of the sea after the creatures die. When the shells form a thick layer they become compressed and form rock.

In some places where there are shallow bodies of water another kind of sedimentary rock may be formed. In these cases, if the surrounding air is very dry the water may evaporate, or dry up, leaving behind minerals that harden into rock.

Do You Know?

Traces of animal and plant life can be found in sedimentary rocks? These are called fossils.





Sedimentary

Types of Sedimentary Rocks

Sedimentary rocks can be put into groups according to the way they are created and the size of the fragments that they contain.

Conglomerate is made of larger particles like pebble, gravel, boulders with minerals between them acting as cement to hold them together. It is a strong rock and used in construction work.



Conglomerate



Sandstone

Sandstone is made from grains of sand. It is a soft stone. Sandstones are resistant to saline air, which make them perfect for building exterior portions of sea-shore buildings. They are also heat resistant so they are used for making fireplaces.

Shale has tiny fragments of clay cemented together. Shale is used to make cement and bricks.



Shale



Limestone

Limestone contains the shells of sea creatures that are tightly packed together. Limestone is easy to cut into blocks and complex carving can also be done on it. It is used in making roads, buildings, and cement manufacture.

METAMORPHIC ROCKS

Metamorphic rocks are formed when other rocks are affected by great temperatures and pressures. They do not melt, but the chemicals they contain may change their forms or shapes. The name metamorphic comes from Greek words meaning “change of shape.”

Metamorphic rock can be formed from sedimentary or igneous rocks. Studying chemicals that make up Metamorphic rock can reveal the original rock type. Marble and slate are two examples of Metamorphic rocks.

Marble is made from sedimentary rock limestone. Limestone and marble are both formed from a chemical called calcium carbonate. Marble is used in making statues and ornaments. It is also used to make floors, pillars, slabs etc. in houses.



Marble rock



Slate

Slate forms when shale, a sedimentary rock is put under pressure with a high temperature. Both slate and shale can be split into layers. Slate is usually dark, but it can be colourful too. Black slates are used to make blackboards and handheld writing tablets (they are also called slates). Slates are also used for paving floors and roof tiles.

Activity

- Things required :** Limestone, marble, lemon juice or vinegar, hammer, two glass bowls.
- Method :** Break both the rocks in tiny pieces. Put small amounts of each in the bowls. Add lemon juice to both the materials.
- Observation :** The limestone starts bubbling.
- Conclusion :** Limestone is a sedimentary rock and will produce more bubbles. Marble is a metamorphic rock; it therefore produces fewer bubbles than limestone.

MINERALS—OUR NATURAL RESOURCES

All rocks are made up of minerals. We use minerals in many ways. Minerals can be either metallic or non-metallic (non-metals like feldspar, calcite, gypsum, mica) in nature.

Metallic Minerals

Metallic minerals give us metals. Metal is used in various ways in our daily life. Iron, gold, silver, copper and aluminum are some common metals.

Metallic are extensively used in making cycles, scooter, cars, buses, and aeroplanes our cooking pots and pans are made up of metal. The tawa on which we roast our chapatis is made up of a metal called iron. Stainless steel is made up of a mixture of iron and chromium. It is used for making utensils, vehicles, building materials etc.



Aeroplane



Cycle



Pan

Sometimes we wrap our sandwich in aluminum foil – that is also a metal. Look around you. Can you name five things in your class-room that are made of metal?

All metals except mercury are solid and have a shine. They make a ringing sound when you hit them. That is why bells with beautiful ringing tones are made of metal. Brass, a mixture of two metals copper and zinc, is used to make bells. A mixture of two or more metals is called an alloy.

All metals are made from ore. Ore is soil and rock with mainly one type of metallic minerals in it. Ores are dug out of deep mines.



Water bottle and tiffin box

Non-metallic Minerals

We get non-metals from non-metallic minerals. Non-metals can be solid, liquid, or gas. Check your water bottles and tiffin boxes. Are they made up of metal or Non-metals? Your plastic water bottles and tiffin boxes are made up of non-metallic minerals. Chlorine is non-metal which is used for water purification.

Coal and petroleum are also valuable non-metallic minerals. These are dug out of the Earth from deep underground mines and wells.

The Earth was covered with thick swampy forests which got buried underground. Due to pressure and heat it turned into coal. It takes millions of years to make coal from the decayed plants.

Petroleum is formed from the remains of tiny plants and animals that lived millions of years ago. When these living things died, they sank into mud. As layers of mud and rock piled up, they pushed down on the lower layers. Eventually this pressure and Earth's heat changed the plant and animal remains into petroleum.

Coal is the major source of fuel throughout the world. Coal when burned, produces heat. It is used for cooking and heating homes. We can also produce electricity in the electric power plants, with the help of coal.

Petroleum is mostly used as fuel in different forms such as petrol, diesel and compressed natural gas (CNG). These fuels are used to run scooter, car, bus and aeroplane. Petroleum is also used to make lubricating oil, paints, ink, fertilizer and medicines. Dry cleaning of clothes is also done with petroleum.



Coal and petroleum products

CONSERVING NATURAL RESOURCES

The minerals are natural resources. They take thousands of years to make and cannot be made immediately. If we do not use them properly, these will be exhausted very soon. We must use these natural resources very carefully.

- Reuse or recycle. Things made of different metals, plastic etc. can easily be recycled or reused.
- Use fuels (coal, petrol, and diesel) carefully. If we keep our stoves, scooters, and cars in good condition, they will use less fuel. This helps conserve fuel.
- Use more of the sun, wind, and water energy. These resources cannot be exhausted.

Go Green

It is better to come to school by a bus than a personal car, because the bus carries many children compared to a car. If you have to use a car, try car pooling with friends living in your area.



Know the Keywords :

Abrasive	: Harsh and unpleasant in manner.
Saline	: Containing salt.
Swampy	: Cause to fill with water and sink
Exhausted	: Tire out.

Point to Remember

- All rocks are made up of minerals.
- Our Earth is made up of three kinds of rocks – igneous, sedimentary, and metamorphic.
- Igneous rock is formed by cooling of magma.
- Sedimentary rock are formed by sediments brought down from mountains by rivers and streams.
- Igneous and sedimentary rocks can change into metamorphic rocks with pressure and/or heat.
- Rocks are made of minerals.
- Rocks / minerals are a source of metals and non-metals.
- Iron, gold, silver, copper, and aluminum are common metals.

- Coal, petrol, diesel, and natural gas are non-metallic minerals. They are used as fuels to drive vehicles and/or to make electricity.
- We should conserve and use both metallic and non-metallic minerals carefully.

EXERCISE TIME

A. Multiple Choice Questions (MCQs).

Tick (✓) the correct word :

- Chalk, sandstone, limestone are _____ rocks.
 - metamorphic
 - igneous
 - sedimentary
- Iron, gold, silver, copper are a source of _____.
 - non-metals
 - metals
 - common metals
- Fuels used in cars are _____.
 - metallic
 - non-metallic
 - none of these
- Rock that have changed toy heat and pressure are called rocks _____.
 - igneous
 - metamorphic
 - sedimentary
- _____ is one most common rock is one Earth's crust.
 - Pumice
 - Basalt
 - Obsidian

B. Write 'T' for true and 'F' for false statements :

- Sandstone is made from grains of sand.
- Metamorphic rock can be formed from sedimentary or igneous rock.
- Shale has tiny fragments of clay cemented together.
- Marble is used in making statues and ornaments.
- All rocks are made up of minerals.

C. Match the columns :

- | | |
|---------------|----------------------|
| 1. Steel | a. metamorphic rock |
| 2. Tar | b. igneous rock |
| 3. Non-metals | c. iron and chromium |
| 4. Magma | d. products of coal |
| 5. Marble | e. fuels |

D. Complete the sentences :

1. When magma erupts at the Earth's surface we call it _____.
2. Rocks are made of _____.
3. When magma cools down slowly, it becomes _____.
4. When magma cools down quickly, it becomes _____.
5. Breaking away of rocks by wind, rain, and snow is called _____.
6. A mixture of two or more metals is called _____.

E. Fill in the blanks :

1. Limestone changes into _____ and shale into _____ under heat and pressure.
2. _____ and _____ are commonly used fuels.
3. _____ and _____ are two examples of alloys.
4. _____, _____ and _____ are commonly used metals.
5. CNG is the short form of _____, _____, _____.

F. Answer the following questions :

1. What are the three types of rocks on the Earth ? Mention two examples for each.
2. How is extrusive igneous rock different from intrusive igneous rock ?
3. How is metamorphic rock formed ?
4. What are rocks made of ?
5. Where do we get metals and non-metals from? Write three uses of each.
6. How is coal made in nature ?
7. What are the uses of petroleum ?
8. Mention three ways in which we can conserve natural resources.



Creative Work

- Collect as many different types of stones as you can from your locality. Show your collection to your friends in the class and try to find the names of the stones and their kinds.
A lot of metals and non-metals are used in construction of houses and buildings. With the help of your teacher, make a list of all the metals and non-metals being used in the construction of a building. Using your imagination make a rough drawing of the building under construction and another drawing of the completed building.
Make groups of six. Bring little sticks, matchboxes, string, cardboard, adhesive tape, and other materials you can use to make the model of a building. Construct your building. Have a competition between groups for the best designed building or the strongest building.