

Good morning 7K Science Students!

- 1) Please read the 2 pages about 'Uses of Minerals'.
- 2) List 3 types of minerals and describe a use for each.
- 3) Most birthstones are minerals. What is a birthstone? Which is your birthstone?

DidYouKnow?

Titanium is a silvery grey metal that resembles polished steel. It is the ninth most abundant element on Earth (0.63 percent of Earth's crust), but it is far more abundant on the Moon (almost 12 percent!). Although it was first discovered in 1791 by William Gregor, titanium was not obtained in its pure metal form until 1910. It could not be used on a wide scale until 1946, when scientists discovered an economical (affordable) purification process.

Uses of Minerals

Why are minerals so important? As you have seen so far, minerals have certain properties that make them valuable and useful.

For example, gems are highly prized minerals because they are rare and beautiful. Many gems, which are brighter and more colourful than common samples of the same mineral, are cut and polished for use in jewellery (see Figure 10.6).

Diamond, a very valuable gem, also has practical uses. Because diamonds are the hardest of all minerals (no naturally occurring minerals can scratch a diamond except another diamond), they are used on drill bits and other instruments to cut through hard substances, such as steel and rock. Scientists are able to apply tiny rows of diamonds on the edges of surgical scalpels, razor blades, dental drills, diamond-tipped phonograph needles, and diamond-coated computer parts.

Metals are among the most useful minerals (see Figure 10.7). We use them in cars, appliances, and many household utensils. Metals are single elements, such as gold, silver, copper, aluminum, nickel, and iron. Metal deposits occur naturally in rocks, where they are mixed with other mineral deposits. Rocks that are rich in metals and metal oxides are called **metallic ores**.



Figure 10.6 Polished and unpolished amethyst



Figure 10.7 Titanium is as strong as steel and 45 percent lighter, making it especially suitable for use in aircraft and spacecraft.

DidYouKnow?

The difference between a gem and the common form of the same mineral can be slight. Amethyst is a gem form of quartz. It contains traces of manganese in its structure. Iron is what gives amethyst its desirable purple colour.

More Uses of Minerals

Iron, zinc, copper — you might think of these in terms of appliances and utensils, but what do they have to do with your body? They are important for your health. In order to survive, your body needs over 20 different kinds of elements found in minerals. For example, iron, from such minerals as magnetite and pyrite, helps blood carry oxygen. Calcium, found in calcite and dolomite, helps to make bones and teeth strong. Sodium, found in halite, helps to regulate water in the body's cells. Some of the vegetables and grains that we eat are rich in minerals.



Figure 10.8 This soybean crop is rich in calcium. Calcium in the soil dissolves in water and passes into the roots of the plants.



Figure 10.9 Some minerals can fluoresce (glow) under ultra-violet light or X-ray beams, and some can continue to glow (phosphoresce) for a short while after the light is removed.

Pause & Reflect

Imagine that you are on a camping trip and you find a cave that looks as though it has recently opened up because it has only a crevice for an opening. Small enough to squeeze inside, you are immediately bedazzled by a wall of shimmering gemstones. In your Science Log, make up a myth to explain something about this special wall. Include a description of the gems in the cave, using the terms "lustre," "hardness," "colour," and "streak."

Like you, crops need minerals to survive and stay healthy. Farmers must find ways to return minerals that crops have used up to the soil. A common method is to apply fertilizers. Organic fertilizers are made from plant and animal remains and waste. Inorganic fertilizers are made from essential elements and minerals.

Another method of preserving or returning minerals to the soil is crop rotation. Farmers plant a different crop in each field each year. This ensures that the minerals used by one crop are replaced the following year by a different crop. For example, soybeans will replace nitrogen that a previous corn crop has used up (see Figure 10.8).

Minerals have many other practical uses. When quartz is stimulated with an electric charge from a battery, it vibrates more than 30 000 times each second. Because the vibrations are so regular, they keep time very accurately. Today tiny pieces of quartz are used in most watches and timepieces.

Minerals that fluoresce have been used in the hands and numbers on clock and watch faces (see Figure 10.9).

Find Out **ACTIVITY**

What a Gem!

You probably know your own birthstone. Here is an opportunity to find out about others.

What to Do

Most birthstones are minerals. Work with a group of students who have the same birthstone as you. Research your birthstone, and use what you learn to make a greeting card for another person with the same birthstone.

