one stop clil

Comparisons: Science
by Keith Kelly

YOUR CLIL WORKSHEET

Content focus
Water pollution

WARM-UP

a. **Your teacher will give you a sample of soil. Feel the soil in your fingers. What words can you think of to describe it? Share them with a partner.**

b. **Do you think this is good soil for growing crops? Why? Why not? Share your ideas with the class.**

ACTIVITY 1

Read the article below. How close are your ideas about what makes soil good for growing crops to those in the text? Share your ideas with the class.

Different soils and their properties

Soils from different parts of the country will almost certainly be different colours. Soils can be black, red, yellow, white, brown and grey. They will also have different structures and textures. Soils are formed from the breaking down of rocks; because different rocks contain different types of minerals, they generate different types of soils.

There are three main mineral components of soil: sand, silt and clay. Different soils contain different amounts of these components, which affects the properties of the soil, such as:

- the amount of water the soil can hold;
- how easily water can pass through the soil;
- the nutrients found in the soil;
- how fertile the soil is;
- possible uses for the soil.

Sandy soils
The particles in sandy soils tend to be large, so there are big spaces between them. The spaces between the particles trap a lot of air but also allow water to drain away easily. We say these soils are *porous*. Sandy soils have low nutrient content, because the nutrients that are dissolved in the soil water are lost as the water drains away. This is known as *leaching*. Only certain plants can grow in very sandy soils.

Silty soils
Silt particles are medium-sized, so silty soils hold more water than sandy soils. This means they also contain more dissolved nutrients that plants can use. Silty soils are good for growing crops.

Clay soils
Clay soils have tiny particles and so the spaces between the particles are also tiny. This makes it more difficult for water and air to move through the soil. Clay soils hold a lot more water than sandy soils and drain very slowly. Clay particles swell and stick together when they become wet, making a sticky, heavy soil. As the soil dries, the clay shrinks, leaving large cracks, down which water can flow quickly, without wetting the soil. This makes clay soil difficult to grow crops in.

Soils also contain other components, for example *humus*, organic material formed when leaves and other plant materials are broken down by micro-organisms.

Although silt is a fertile soil, *fertility* increases when it contains a mixture of clay, sand and silt as well as plenty of humus. This mixture is called *loam* and is the best kind of soil for growing plants.

The colour of a soil is generally a good indication of its composition. Black or dark soils are rich in humus; an indication that the soil is very fertile. Red soils are rich in iron compounds, while light-coloured soils may be rich in sand or some kinds of clay.

Adapted from *Macmillan CXC Science Series*, Integrated Science by Tania Chung-Harris pp. 352-353

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ACTIVITY 2

Your teacher will give you a paired speaking activity. Turn over your worksheet, so that you cannot see the *Different soils and their properties* text. Read the paired speaking activity to each other out loud and work together to fill in the gaps in each text.

ACTIVITY 3

Working on your own, look again at the *Different soils and their properties* article and use it to help you complete the table. Compare your answers with the class.

	sandy	silty	clay
particles			
water			
crop-growing			

ACTIVITY 4

Work in groups of three to complete the experiment below.

Comparing the water-holding capacity of sand, loam and clay soils

Equipment needed:

a retort stand and clamp
a measuring cylinder
three soil samples: sand, loam and clay
three plastic cups
cotton cloth
scissors
a large beaker

Procedure:

1. Poke several small holes in the bottom of each cup and line the bottom with a piece of cotton cloth. (Look at Figure 1.)
2. Pack each container with the same amount of each soil.
3. Take one of the cups and set up the apparatus as shown in Figure 1.
4. Measure 50ml of water in a measuring cylinder and pour it onto the soil sample.
5. When the water has stopped coming through the soil, measure how much water has collected in the beaker.
6. Calculate the amount of water left in the soil.

   volume of water left in soil = volume of water poured on to soil – volume of water collected