NATURAL MATERIALS*

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1 NATURAL SCIENCES

2 Grade 5

3 QUALITIES AND USES OF MATERIALS

4 Module 28

5 NATURAL MATERIALS

5.1 Activity: To discuss the nature and uses of natural materials

5.2 [LO 1.1, LO 1.2.1, LO 1.2.2, LO 1.3.1, LO 3.2]

5.3 1.Wood

Wood comes from trees that grow all over the world either in natural forests or in plantations that are planted by man.

When trees are fully-grown, especially in plantations, they are chopped down. The branches and the trunks of weak trees are used to make pulp that is used to make paper. The tree trunks are taken to saw mills where they are cut into planks. The wood is then called timber.

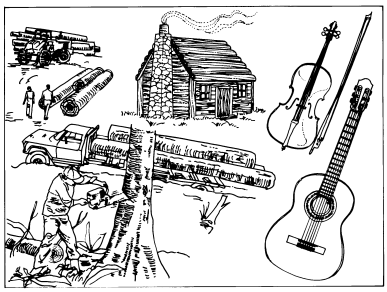

Figure 1

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Wood can be used for many things, for example, furniture, doors, boxes and toys. Musical instruments like the guitar and the violin are made of wood.

The pulping of wood happens in factories. The wood pulp is mixed with chemicals and water and then rolled out into thin sheets and dried to make paper.

Other uses of wood

Look at your pencil and pencil crayons. What are they made of?

Scrap planks are often used in informal settlements to build shelters and this is better than having no shelter at all.

In tropical countries where it rains a lot wooden houses are often built on poles so that the inhabitants stay dry during the rainy season and also so that unwelcome guests like snakes are kept out.

If wood is looked after properly it will withstand different weather conditions and will protect the inhabitants against heat and cold.

5.4 Research: Group work

Make a poster containing the following information.

How wood is used in the building industry.

OR

Products made from wood.

Pictures and drawings that illustrate your project will count in your favour.

5.5 2.Ceramics and Clay

There is a lot of clay available in the crust of the earth. There are different types of clay. Ceramics are made by baking clay. Different types of clay make different kinds of ceramics.

See which items are made from ceramics.

Figure 2

Ceramics is used to make electrical isolators. It prevents electricity from flowing into steel poles or frames.

Let's see how a ceramic pot is made from clay.

1. Clay that is moist can be easily moulded into a shape. This is the composition of wet clay:

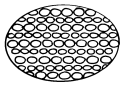

Figure 3

2. Once a clay pot has been made it is left at room temperature to become dry. The water molecules in the clay evaporate and the clay shrinks and gets hard.

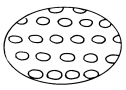

Figure 4

This is how the dry clay is composed.

3. When the clay is dry it is baked (fired) in a pottery kiln (pottery at ± 980 °C and ceramics at between 1 200 °C and 1 700 °C).

This is how the clay is composed now.

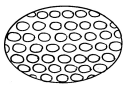

Figure 5

There is too little space between the clay molecules to allow water through.

5.6 Task:

5.7 Look at the ceramic vase with flowers and explain the following:

Figure 6

a) How do the flowers stay fresh?

a) Why doesn't the pot leak?

a) Do you think liquids can be stored in ceramic containers?

a) Give some examples of where ceramics are used every day.

a) What did people use clay for long ago?

6 Homes of clay: people and animals

- Termites build heaps or nests which can stand out a few meters above the ground. The hot tropical sun bakes the clay till it is hard.
- In Africa, Central America and in the southern states of the United States of America houses are still built from clay. Clay bricks and wood form the structure of the house. Then more clay is put onto the framework and left to bake in the sun. Clay houses can save between 30% and 40% of energy in areas where the days are hot and the nights cold. The clay absorbs heat during the day and releases it during the night, keeping a comfortable temperature in the house.
- Some birds use clay to make their nests.

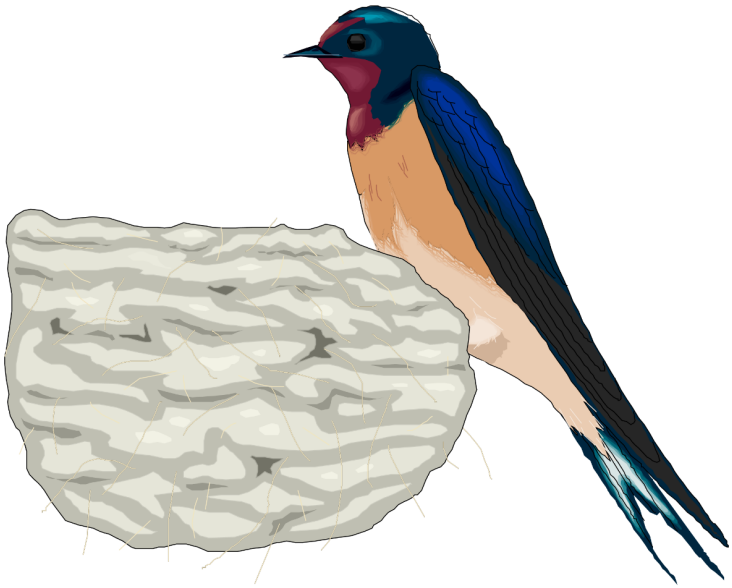

Figure 7

6.1 Task:

Find information and report in writing about a bird that uses clay to build its nest.

1. Type of bird:

2. In what country are these birds found?
3. Where does the bird build its nest?

1. Make a simple sketch of the bird and its nest

1. What advantage does a clay nest have?

Total: 10

6.2 3. Metals

Figure 8

Of all the materials used to make things metal is one of the most important. There are certain jobs that can only be done by using metal. Let's see how your life depends on metals from morning till night. Just think of transport and farming. The first metal items existed as long ago as 9500 BC: gold; silver; copper and iron.

Metals can be recognised from their appearance:

Metal is usually shiny.

Metals are good conductors of heat and electricity.

Many are suitable for making sounds. When you hit metal, it rings. Church bells are made of bronze.

Metal can be moulded into shapes. Lead is a soft, flexible metal. Sheets of lead used to be used on roofs, especially of churches and schools.

Steel is a mixture of iron and other ingredients. Coins are also made of a mixture of metals.

Interesting facts:

The bottom of a cooking pot must be a good conductor of heat.

Not all metals are suitable for cooking foods in.

Cast iron, stainless steel, aluminium, steel and copper are used to manufacture cooking pots.

When steel is left in the rain it rusts. Water and oxygen in the air have an effect on the iron in the steel and combine to form a new material, namely rust.

7 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONS The learner will be able to act confidently on curiosity about natural phenomena and to investigate relationships and solve problems in scientific, technological and environmental contexts.

We know this when the learner:

1.1 plans investigations: lists knowledge concerning familiar situations and materials and compiles inquiring questions together with fellow learners:

1.1.1 contributes interesting aspects to the situation;

1.1.3 responds to teacher's suggestions of 'what would happen if ...?'

1.2 conducts investigations and collects data: follows instructions and procedures comprising smaller sections:

1.2.1 follows instructions for setting up apparatus and executing observations;

1.2.2 collects data from observation by means of sketches and labels;

1.3 evaluates data and communicates findings: provides feedback on progress in group context, as well as the eventual result:

- presents data obtained from observation that are relevant to the target question;

describes before-and-after situations when they varied some factor in the situation

LEARNING OUTCOME 3: Science, SOCIETY and the environment Learners are able to show understanding of the underlying connections of technology, the community and the environment.

We know this when the learner:

3.1 understands science and technology in the context of history and indigenous knowledge:

3.2 understands the impact of science and technology: identifies the positive and negative effects of scientific developments or technological products

8 Memorandum

Assignment 1:

Questions:

a) The pot can hold water.

b) The space between the clay particles is now so small because it has been baked dry and water cannot pass through.
c) Yes
d) Dishes for ovens

Flower pots
Garden pots
Crockery – plates, cups, etc.

a) To build houses

To make clay pots for water etc.
Assignment 2:
Research: bird, e.g. swallows (see assessment rubric)
Rust: water + oxygen = rust