

Important Concepts . . .

Preview Review



Science

Grade 7 TEACHER KEY

W3 - Lesson 3A: Materials Used in Structures

W3 - Lesson 3B: Rocks, Weathering, and Erosion -

The Rock Cycle

Important Concepts of Grade 7 Science

W1 - Lesson 1	Interactions and Interdependencies
W1 - Lesson 2	Nutrient Cycles, Energy Flows, and Changes in Ecosystems
W1 - Lesson 3A	Environmental Impacts of Human Activities
W1 - Lesson 3B	The Particle Model of Matter, Temperature, Heat, and Change of State
W1 - Lesson 4	Heat Transfer
W1 - Lesson 5	Understanding Heat and Temperature in Nature and Technology
W1 - Quiz	
W2 - Lesson 1	Life Processes and Structure of Plants
W2 - Lesson 2	Plant Propagation and Reproduction
W2 - Lesson 3	Plant Needs and Growing Conditions
W2 - Lesson 4	Role of Plants and Controlling Plant Growth
W2 - Lesson 5	Review of Plant Management
W2 - Quiz	
W3 - Lesson 1	Forces on and within Structures
W3 - Lesson 2	Structural Forms
W3 - Lesson 3A	Materials Used in Structures
W3 - Lesson 3B	Rocks, Weathering, and Erosion - The Rock Cycle
W3 - Lesson 4	Plate Tectonics and Related Events
W3 - Lesson 5	Fossils
W3 - Quiz	

Materials Required.

Textbook:
Science in Action 7

Science Grade 7

Version 5

Preview/Review W3 - Lesson 3 TEACHER KEY

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Preview/Review Concepts for Grade Seven Science

TEACHER KEY



*W3 - Lesson 3A:
Materials Used in Structures*

OBJECTIVES

By the end of this lesson, you should be able to

- name and explain various properties of materials
- discuss properties of materials in living organisms

GLOSSARY

brittle - easily broken

plasticity - ability to bend without breaking

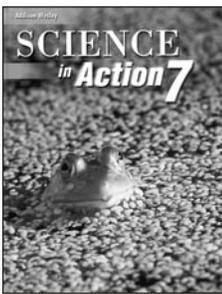
W3 - Lesson 3A: Materials Used in Structures

When we build something, we have to think about the material to use as well as the design. Different materials have different properties. These properties to a large extent help the user decide which material to use for a specific purpose.



Material Properties

Read pages 309 and 310 in *Science in Action 7*. Several properties must be taken into account when deciding which material to use. Read through the table on page 309 of the text.



1. If you were building a bike, what types of properties would you look for in potential materials for the frame?

Answers will vary but examples include strength, lightness, compressive strength.

2. For what purpose might you want a material that has a high level of plasticity?

Answers will vary; examples are toys, kitchen utensils

3. Would a brittle material be suitable for making into a car body? Explain.

No, it would break too easily when in an accident.



4. Give an example of where the aesthetics of a material might be important.

Answers will vary. Some examples are in clothing and furniture.

5. Define the term deformation.

It is a change in an objects shape caused by a load acting on it.

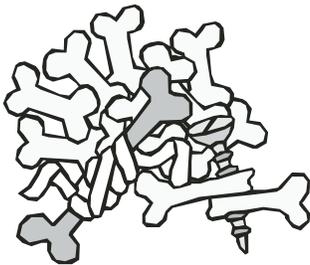
6. Why would you need to know how much deformation could occur in a material before you used it to build something?

If it could deform too much, the structure could eventually break/collapse.

7. When is flexibility important in a material?

One example is in buildings in areas where movement due to earthquakes or winds is likely.

Materials in Living Organisms



Read pages 319 to 321 in *Science in Action 7*. Materials make up not only manufactured structures; they are also what living organisms are made of. Materials in living organisms are made by the body of the organism, using raw materials from their food. Think of all the parts in your body. Many kinds of materials are in it.

8. What are some characteristics of materials in your body's skeletal system?

In adults, materials in the skeleton are hard and rigid – less so in children.

9. Why must connective tissue (ligaments, tendons) be flexible?

to allow movement at joints

10. What types of joints are in the human body?

A variety of types. For example, hinge - knees, ball and socket - shoulder and hip, pivot - spine, gliding - wrists, immovable - in an adult skull.

11. The skull of an adult has fixed joints, but a baby has moveable joints in its skull. Why does this difference occur?

The baby's head needs to squeeze through the birth canal. To do this, the bones need to be able to move. Also, this allows the brain to grow after birth.

12. What characteristics must skin have to keep a person healthy?

It must be tough, flexible, impermeable to bacteria, etc.

13. Give several examples of the use of manufactured materials in or on the human body.

Answers will vary. Examples are prosthetic limbs and eyes, hearing implants, pacemakers, pins for hips.

14. Plants such as trees have materials with different characteristics than those of humans. Read page 321 of *Science in Action 7*. What role does each tree layer have for the tree?

a. vascular cambium

It is the area of growth in the tree stem/trunk.

b. sapwood / xylem

Moves water and minerals through the tree.

c. heartwood

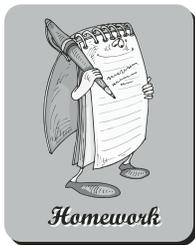
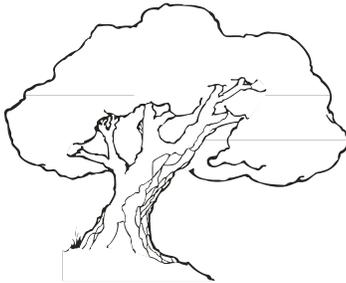
Provides support for the tree.

d. woody layer with phloem

Moves sugars through the tree.

e. bark

Protects the interior of the tree.



Homework

15. At home, find a manufactured structure and a living structure. Describe the characteristics of the materials in each structure. What do you think is the most important property of material for each structure?

Answers will vary.

Preview/ Review Concepts for Grade Seven Science

TEACHER KEY



*W3 - Lesson 3B:
Rocks, Weathering, and
Erosion - The Rock Cycle*

OBJECTIVES

By the end of this lesson, you should be able to

- list the characteristics of and identify examples of the three types of rock
- define various characteristics of rock
- use the Mohs Scale of Hardness to determine the hardness of a rock
- define and describe the processes of weathering, erosion, and deposition
- describe the Rock Cycle

GLOSSARY

crystal - a structure of a particular shape that forms as minerals harden from liquid form

igneous - rocks formed from melted rock that hardened

metamorphic - rocks formed from other rocks as a result of intense heat and or pressure

Mohs Scale of Hardness - a scale used to identify the hardness of rocks

rock cycle - the movement of minerals through various processes, among sedimentary, igneous, and metamorphic rock

sedimentary - rocks formed from pieces of other rocks that have been layered

W3 - Lesson 3B: Rocks, Weathering, and Erosion – The Rock Cycle



Rocks are found nearly everywhere. We see them in our gardens and even in some of our buildings. Rocks are made of building blocks called minerals. Read pages 368 to 370.

1. How many minerals are rocks made of?

Some are made of one mineral; others are made of a mixture of minerals.

2. What minerals make up the majority of the earth's crust?

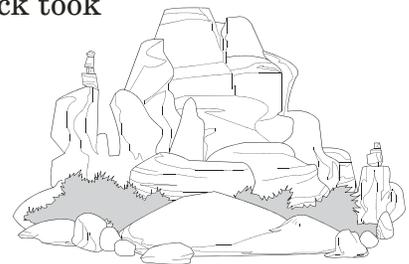
hornblende, feldspar, quartz, mica, calcite

Types of Rocks

All rocks can be classified as igneous, sedimentary, or metamorphic. Where they fit is determined by how they were made.

Igneous rock was solidified from melted rock. Most of these rocks have crystals in them. Each type of mineral produces a crystal with a specific shape. The longer the rock took to solidify, the larger the crystals in it.

Sedimentary rock was formed when particles were deposited in a location and cemented together. Layers of particles are visible in these rocks.



Metamorphic rock was heated (but not melted) and/or pressed to such an extent that it was changed into something else. A rock that has gone through this tends to have flattened and shiny crystals that occur in bands.

Find more details about types of rocks on pages 377-381 of *Science in Action 7*.

3. What is the difference between magma and lava?

They are both molten rock but magma is found

underground, lave is found above ground.

4. Give an example of each type of rock.

a. igneous *Answers will vary. Some examples*

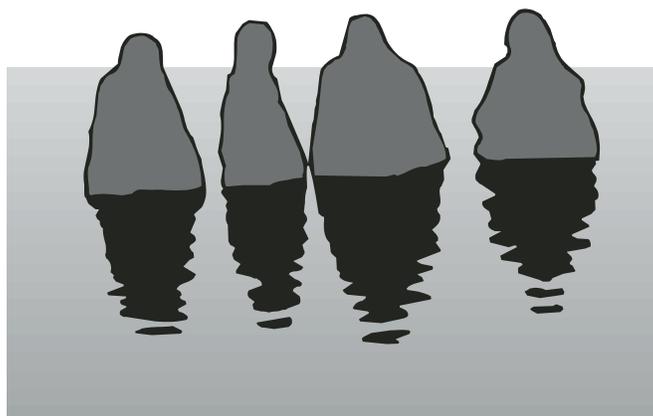
are quartz, basalt, and obsidian.

b. metamorphic *Answers will vary. Some examples are*

slate, mica, and marble.

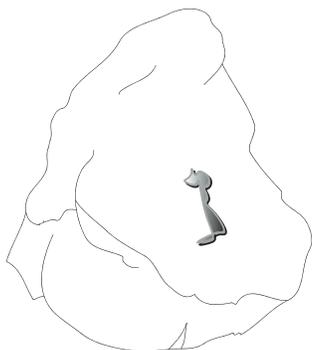
c. sedimentary *Answers will vary. Some examples are*

sandstone and shale.



5. If an igneous rock hardens on the surface of the Earth, what word is used to describe it?

Extrusive



Identifying Rocks

There are several reasons to want to identify rocks. Maybe it's just curiosity; maybe you want to find a valuable mineral. Whatever the reason, you must look at the rock's characteristics to identify it. Those characteristics include **colour, streak, lustre, hardness**, and how it breaks - **cleavage** and **fracture**. Read descriptions of these characteristics and the **Mohs Scale of Hardness** on pages 371 and 372 of *Science in Action 7*. The Moh's scale uses 10 increasingly hard minerals to try to scratch an unknown rock. If a scratch mark is produced on the unknown rock, it is softer than the mineral scratching it. By scratching a few known minerals on the unknown rock, hardness of the unknown rock can be determined. Crystal shape is also an important identifying feature.

6. What is the shape of crystals formed by the following minerals?

- a. quartz ***six-sided with a pointed end***
- b. sodium chloride (salt or halite) ***cubic***

7. Define the following terms.

- a. streak ***The colour produced when a mineral is rubbed on a streak plate.***
- b. lustre ***The appearance of the surface in light. For example, shiny, waxy.***
- c. hardness ***How easily the surface is scratched by other materials***

d. cleavage *breaking along flat lines*

e. fracture *Breaking into unpredictable, irregular surfaces*

8. How does mica cleave?

Into flat sheets.

9. Use the Moh's Scale of Hardness (page 372) to determine which mineral will be scratched when the following pairs of rocks are scraped together.

a. corundum and feldspar *feldspar*

b. calcite and fluorite *calcite*

10. An unknown mineral is being tested for hardness. It scratched fluorite, but was scratched by apatite. What is its hardness?

Between 4 and 5.



Weathering and Erosion

Many things can happen to rocks. For example, they can be broken down (**weathered**), moved to different places (**eroded**), and dropped once they get to the new location (**deposited**). On pages 363-366 of *Science in Action 7* more information is given on these topics.

11. Name the three types of weathering and an example of each.
- a. *Chemical - acid rain breaking down limestone*
- _____
- b. *Biological - plants growing through cracks in cement and making the cracks larger*
- _____
- c. *Mechanical - the tide washing rocks against each other on the shore*
- _____
12. What are some important forces that weather and erode rock?
- wind, water, glaciers, extremes of heat and cold*
- _____
13. A sedimentary rock bed was examined. Its particles were found to have come from a basalt mountain 100 km from the sediment. Describe the steps which might have caused the sedimentary rock from the basalt to be found in another location 100 km away.
- The basalt was weathered by wind and water. The*
- sediments were eroded by wind or running water. When*
- they reached a spot where the water slowed down, the*
- sediments were deposited. Over time the layers built up*
- and formed rock.*

14. Describe how a glacier can weather, erode, and deposit rock.

Weathering - The weight of the glacier can scoop up rocks from the land it moves over. It will grind them along other rocks.

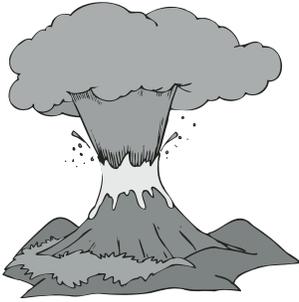
Erosion - The ground up particles can be carried along by the glacier and by meltwater from the glacier.

Deposition - As the glacier melts it can drop sediments. As meltwater slows down it does the same.

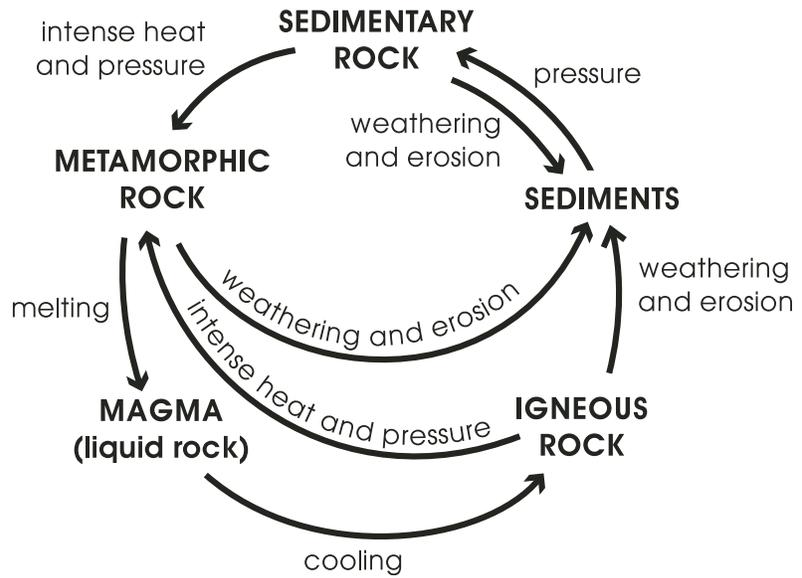
The Rock Cycle

Things change over time, and rocks are no exception. A sedimentary rock may get buried deep in the Earth and be subjected to intense heat. These conditions could be extreme enough to cause the rock to change. When that happens, it will become a metamorphic rock. Perhaps igneous rock is weathered and the particles are deposited in a lake. Those particles could become part of a sedimentary rock. This change from one type of rock to another because of physical and environmental changes is called the **rock cycle**. See pages 385 and 386 of *Science in Action 7*.





15. Draw a diagram of the rock cycle. Be sure to include the three basic types of rocks. Show the processes that make the rocks change from one type to another.



16. Would the rock cycle occur if Earth lacked an atmosphere? Explain.

There would be no weathering and erosion without an atmosphere to provide wind, water, and living organisms unless some form of chemical weathering can occur without these factors.

