Chapter 2: Rocks and minerals

Skills Lab 2.1: Identifying rocks

Experiment worksheet answers (pages 18–19 and 160)

Questions

1 How difficult was it to identify your rock samples?

Student answers will vary.

2 Were there any samples you could not identify?

Student answers will vary.

3 Compare your results with those of another group. Were there any differences between your results?

Student answers will vary.

Skills Lab 2.2: Testing the hardness of common substances

Experiment worksheet answers (pages 20–21 and 160)

Questions

1 Did your results match the results of other groups? Use examples as evidence to support your answer.

Student results will vary.

2 Explain the phrase, ‘Hardness of a rock is a relative measurement’.

Hardness is always measured in comparison to another substance. Therefore it is a relative measurement.

Experiment 2.3: Testing the minerals in toothpaste

Experiment worksheet answers (pages 22–23 and 161)

Discussion

1 Why did you repeat each measurement three times?

Once is random. Twice is coincidence. Three times is evidence. Repeating a measurement three times ensures any random result is identified and explained.

2 Which brand of toothpaste was most effective in cleaning the mark off the tiles?

Student answers will vary.

3 Many false teeth are made of porcelain. What recommendations would you make to a person with teeth of this type?

Student answers will vary according to the toothpastes they tested.

4 What role does fluoride play in toothpaste?

Fluoride prevents tooth decay by slowing the breakdown of tooth enamel and aiding in the re-enamelling process.

5 Excess fluoride ingestion causes fluorosis – a condition in which developing teeth become discoloured. Describe how young children may be vulnerable to this condition.

Young children are more likely to swallow the toothpaste instead of spitting it out. This means they are more vulnerable to fluorosis.

Conclusion

Describe the role of each of the following minerals in toothpaste.

a Fluorite

b Mica

c Sand/silica

d Sodium carbonate

a aids in remineralisation and prevents decay

b increases the physical appearance (the shine or sparkle) of the toothpaste

c makes the toothpaste thicker

d acts as a whitening agent for teeth

Experiment 2.4: What affects crystal size?

Experiment worksheet answers (pages 24–25 and 162)

Discussion

1 What was the independent variable for this experiment?

the rate at which the solution was cooled

2 What was the dependent variable?

the size of the crystals formed

3 Name three variables you needed to control. How were these controlled?

Student results will vary. They may include the concentration of alum; the initial temperature of the alum solution; the amount of time taken for crystals to form.

4 Each of these crystals grew over a different time span. How does the time allowed for the crystal to form affect the size of the crystals?

The longer the crystals are allowed to cool, the larger they will be.

Conclusion

What do you know about the factors affecting crystal size?

Factors that affect crystal size include time, temperature and cooling time.

Experiment 2.5: Making sedimentary rocks

Experiment worksheet answers (pages 26–27 and 162)

Discussion

1 In what ways were your rocks similar to real sedimentary rocks?

Samples are similar in that they were formed when loose particles were pressed together.

2 What were the differences between your samples and the real rocks?

Differences are likely to be texture, lustre, hardness, time taken to form and particles used.

Conclusion

What have you discovered about sedimentary rocks?

Student answers will vary. However, students should understand that sedimentary rock is formed when loose particles are compressed.

Experiment 2.6: Making a metamorphic rock

Experiment worksheet answers (pages 28–29 and 164)

Discussion

1 What differences do you notice about the two rock samples when they are dropped into the water?

The shale sample that was heated will become harder due to the extra heat applied.

2 Can strong heat change the properties of rocks over time?

Yes.

3 How different was your new metamorphic rock sample from the original shale sample? Was the method successful?

Student answers may vary. The new metamorphic rock sample is different from the original shale sample as it is stronger than the original material. It may also be drier, shinier and a lighter colour.

Conclusion

What do you know about the formation of metamorphic rocks?

Student answers will vary. However, students should understand that metamorphic rocks are formed when other types of rocks are changed by heat or pressure.

Skills Lab 2.7: Modelling the rock cycle

Experiment worksheet answers (pages 30–31 and 165)

Questions

1 What type of weathering (mechanical or chemical) took place at step 2?

mechanical

2 What term is used to describe the movement of the sediment pile of crayon shavings onto the aluminium foil at step 4?

erosion

3 What type of rock did you form in step 8?

sedimentary rock

4 What type of rock did you form in step 11?

metamorphic rock

5 What type of rock did you form in step 15?

igneous rock

6 What are the similarities and differences between the three forms of rock you created?

All three rocks contain the same chemical element (the wax from the crayon). Each rock has a different colour and hardness.

Challenge 2.8: Preventing soil erosion

Experiment worksheet answers (pages 32–33 and 166)

Processing, analysing and evaluating

Student responses for this challenge will vary based on their own planning and evaluation of their experiment design.

Communicating

Present the various stages of your investigation in a formal experimental report.

Student responses will vary, but should communicate the aim of their experiment, the equipment used, method, results, discussion of their design and any improvements that could have been made, and a conclusion.

Challenge 2.9A: Using evidence to deduce

Experiment worksheet answers (pages 34–35 and 166)

Student answers will vary.

Challenge 2.9B: Reconstructing animals

Experiment worksheet answers (pages 34–35 and 167)

Discussion

Student responses will vary.