Describing Rocks

1. Choose one particular rock. Describe the rock's appearance, texture, colour, form, hardness.

2. What is your rock being used for?

3. Use a magnifying lens to look at your rock closely. Draw your rock below, including the different shapes and colours of rock particles. Add any interesting features, bedding planes, lines, cracks.

4. Place a blob of water on your rock. Record the amount of time it takes for the water to be absorbed.

5. What features would affect how your rock takes in water?

Introduction, Describing Rocks

Sc3 Materials and their Properties

Science Scheme of Work: Unit 8G; Rocks & Weathering

2	**Changing materials**
d	**Geological Changes**

For outdoor work teachers should choose an area to work in and confine the group to that area. A Risk Assessment should be conducted to ensure there are no dangers such as broken glass, dog faeces in the area. Hazards should be removed before work commences.

Choose one particular rock. Feel the rock and describe the texture.

Encourage students to use imagination when describing the rocks. Note the size and shape of grains. How they fit together, spaces between grains, different colours. There may be bedding planes or fossil evidence that could be recorded.

What is your rock being used for?

Buildings, walls, floors, naturally occurring.

Use a magnifying lens to look at your rock closely. Draw your rock below, including the different shapes and colours of rock particles. Add any interesting features, bedding planes, lines, cracks.

Place a blob of water on your rock. Record the amount of time it takes for the water to be absorbed.

Different rocks will absorb the water at different rates. This will depend upon the porosity of the rocks. The gaps between grains will create porosity.

What features would affect how your rock takes in water?

Fine grained rocks such as clay, fit together very closely and hold water for a long time. Rocks with large gaps between the grains such as mixed sandstones will have a very high porosity and let the water flow through. The porosity of rocks can have a big effect on the ability of ground to hold water. Rock type can make the difference between being able to store water for use by people, for farming and industrial, and home use or losing water and being dependant on rainfall for new water supplies.

Forces of Erosion

See the effects of water on rocks.

Equipment: **Clear plastic beaker, marker pen, water, freezer.**

Fill a marked clear plastic beaker with water. Half fill the beaker, and mark the level of the water. Place in the freezer until frozen. Collect beaker and mark the space taken up in the beaker by the frozen water.

1. What has happened to your water?

2. If water collects in cracks in a rock face, what might occur if that water freezes?

3. What effect would that have on the rock?

Equipment: **Deep sided plastic tray, sand, water, beaker.**

Prepare a small mound of sand in a plastic tray. Carefully pour tap water over the mound.

3. What colour is the water before the experiment?

4. What colour is the run off water?

3. Why has this happened?

4. How far has the sand travelled across the tray? Where is most of the sand deposited?

5. What factors do you think have affected the deposition of the sand particles?

Forces of Erosion

Sc3 Materials and their properties

Science Schemes of Work: Unit 8G; Rocks & Weathering

2	**Changing Materials**
d	**Geological changes**

See the effects of water on rocks. Fill a marked clear plastic beaker with measured amount of water. Freeze for one day. Collect beaker and measure cubic cms taken up by water. What has happened to your water?
The water has expanded filling more space in the beaker.

If water collects in cracks in a rock face, what might occur if that water freezes?
Water from precipitation can seep into cracks within the rock. This water can freeze if the climate permits. When water freezes it expands.

What effect would this have on the rock?
Over time pressure from this would then cause the rock to split. Over a long period of time this will cause considerable erosion to the rock. This is known as freeze thaw.

Carefully pour tap water over a small mound of sand in a plastic tray.
What colour is the water before the experiment?
Clear tap water.

What colour is the run off water?
The water should have changed slightly towards the colour of the sand

Why has this happened?
The run off water will have taken on the colour of the sand because it contains particles of sand carried up with the water.

How far has the sand travelled across the tray? Where is most of the sand deposited?
More of the sand will be dropped closely to the original mound as the flow of water will loose energy quickly and then begin to deposit the particle load.

What do you think has affected the deposition of the sand particles?
The kinetic energy of the water decreases as the water reaches the bottom of the slope. The less energy the water has the fewer particles it will be able to carry. Sand will be deposited as the water looses energy.

Acid Rain

Waste products from many human activities pollute the air this can cause acid rain.

Can you think of any sources of air pollution? List them below.

What is acid rain?

What effects might acid rain have on usual weathering processes?

Can you think of any ways to reduce the amount of acid rain produced?

What could you do as an individual?

Acid Rain

Sc3 Materials and their Properties

Science Scheme of Work: Unit 8G; Rocks & Weathering

2	**Changing Materials**
i.	**Chemical Reactions**

Waste products from many human activities pollute the air causing acid rain. Can you think of any sources of air pollution? List them below.

Car exhaust fumes, factory emissions, power plant emissions, the tall stacks at the side of cooling towers emit acid rain pollutants as part of a by product of electricity generation.

What is acid rain?

Use internet to research.

Fumes containing acid particles like nitrogen oxide from industrial processes and car exhaust fumes and sulphur dioxide from the burning of fossil fuels being released into the atmosphere. The molecules are attracted to water vapour, being stored in clouds and then released as rain with an acid pH.

What effects might acid rain have on usual weathering processes?

Acts as a catalyst to increase rate of reaction, increasing the effects of weathering on rocks and buildings made from rocks, statues, gravestones, garden gate posts.

Can you think of any ways to reduce the amount of acid rain produced?

Use solar, wind, water energy. Encourage people to use public transport or walk for short journeys. Restrictions on industrial emissions.

What could you do as an individual?

Use less energy in the home, turn off lights, turn off televisions, computers after use. Walk to school, use public transport.

Acid Rain Investigation

Conduct an experiment to test the effects of acid rain.

Equipment:

A piece of chalk, 2 pieces of litmus paper, 1 pot of tap water, one pot of vinegar, a stopwatch.

Test the pH of the vinegar pot and the pH of the water pot and record in the table below. Snap one piece of chalk in two. Add one half of the chalk to the pot of tap water and record how long it takes to dissolve, then add chalk to the vinegar pot and record the time it takes to dissolve again.

What do you think will happen?

SUBSTANCE	pH	TIME
WATER		
VINEGAR		

How would you describe the effect of pH on the speed of the reactions?

What effect might pollution like this have on rocks?

What problems may acid rain contribute to in everyday situations?

Acid Rain Investigation

Sc3 Materials and their properties

3	**Patterns of behaviour**
g.	**Acids and bases**

Conduct an experiment to test the effects of acid rain.

What do you think will happen?
Get the pupils to write their own hypotheses for the experiment.

How would you describe the effect of pH on the speed of the reactions?
The lower pH should work more effectively on breaking the rock down, increasing the effects of weathering on rocks.

What effect might pollution like this have on rocks?
Increase problems caused by weathering and erosion.

What problems may acid rain contribute to in everyday situations?
Trees and ecosystems adversely affected. Acid lakes; fish and invertebrate deaths. Prevailing westerly winds carry pollution to other countries, so the countries who suffer are often not the original polluters.