Swadlincote Townscape
KS2 Science Rot or Repair
Index

Please note: maps, photos and worksheets date from Sept 2018.
Some buildings may have enjoyed further restoration work when you try out these activities- if so, compare the photographs with the appearance of the building and adapt the session accordingly!
Please let us know if you spot anything that has changed:
Environmental Education Project team: rosliston@south-derbys.gov.uk 01283 535039
or find us on Facebook 'Environmental Education Project at Rosliston Forestry Centre'
Have fun!

Swadlincote Townscape
KS2 Science Rot or Repair
Teacher Session Notes

Session Aim and Overview

The aim of this session is to look at the different building materials used in the High Street, their range of properties and uses and the impact of weathering.

It is part of the Townscape scheme which looks at the historical buildings in the High Street and pupils will become 'building detectives' to consider their state of repair.

- If you wanted to do the whole session it lasts approximately 2 hours and includes a range of different activities and experiments.
- All can be done in the town centre and some can also be done in school.
- There are a variety of activities that you can do and each session is listed below with approximate times, however, you can adapt the times to suit.
- Read through all the session notes to decide what activities you would like to do.
- Children should be in small groups with an adult
- The pupils are going to be 'building detectives' and they will be exploring the High Street and the Delph in Swadlincote town centre to find out if the materials used in buildings here are in a good state of repair (are they damaged or look like new) and if not, to discover why.
- Consider ways in which the buildings could be damaged: weather; wind, rain, heat from sun, animals (pigeon poo) and plants.
- If you are going to do the experiment you need to set it up at the beginning of your session so it has time to work while you are doing the survey and other activities. It needs to be left for about 1 hour. Decide where to leave the experiment- make a 'friend' with a shop keeper or put it in a bag and carry it with you. (A large reusable shopping bag with flat base would be best)

Learning Outcomes:

- **Learning Outcome 1:** Observe and explore the different materials used within the buildings in Swadlincote.
- **Learning Outcome 2:** Understand materials have different properties.
- **Learning Outcome 3:** Understand that one material can have several uses.
- **Learning Outcome 4**: Link the properties of building materials to their uses and functions. Consider other reasons why materials have been used in buildings within the town – cost, appearance.
- **Learning Outcome 5**: Understand 'weathering' i.e. that, over time, the weather, plant and animal activity can affect the appearance and state of building materials. Preventing weathering and so maintaining the building materials can be a constant battle!

Links to National Curriculum:

Science:

Sc2/3.1a identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses.

Sc5/3.1a compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets

Sc5/3.1d give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic

Sc5/1.5 reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations

Geography:

Ge2/1.4c use fieldwork to observe, measure, record and present the human and physical features in the local area using a range of methods, including sketch maps, plans and graphs, and digital technologies.

Resources for the whole session:

- Camera. Check that the camera is charged.
- First Aid kit.
- Wet wipes for post experiment.
- Playground chalk
- **Map out lining the position of the shops**
- **Rot or Repair Science Background**
- Clipboards, pencils and enough scrap paper, poly pockets (if raining)
- **How Good is Your Building? Step game teacher notes KS1&2**
- **Worksheets: What Materials Are Used In Buildings? Pupil worksheet KS2 and KS2 higher**
- **Answer sheet: What Materials Are Used In Buildings?**
- **Worksheets: Do Hard Building Materials Absorb Water? Pupil sheet KS1 and KS2**
- **Answer sheet: Do Hard Building Materials Absorb Water? Pupil sheet KS1 and KS2**
- **Worksheets: Swadlincote Quick Survey KS1 & 2 pupil sheet or Swadlincote Building Survey KS2 pupil sheet or Swadlincote Building Survey KS2 Higher pupil sheet** (1 per group)
- **Answer sheet: Swadlincote Quick Survey KS1 & KS2**
- **Answer sheet: Swadlincote Building Survey KS2**
- **Answer sheet: Swadlincote Building Survey KS2 Higher**
- **What Materials are used in Buildings Pupil sheet KS2 and KS2 Higher**
- Sample Materials e.g. small samples of plastic, stone, granite, metal, wood, painted wood, glass, slate and brick. If high ability add clay tile, terracotta, Stucco, glazed tile, UPVC and roofing felt. These can be obtained from builder's merchants or contact the Environmental Education Project at Rosliston Forestry Centre

Resources for the experiments:

Experiment 1:

- **Worksheet: The Effect of Acid Rain On Building Materials KS2 Pupil Experiment**
- **Worksheet: The Effect of Acid Rain On Building Materials KS2 Higher Pupil Experiment**
- **Answer sheets: The Effect of Acid Rain On Building Materials KS2 and KS2 Higher**
- 2 plastic cups / 500ml plastic tub with wide 'mouth' and screw lid.
- Small sieve (i.e. an icing sugar duster or tea strainer)
- Large reusable shopping bag with flat base
- 2 pieces of metal (2p coins)
- 2 pieces of Limestone – the same size
- 2 pieces of Granite – the same size
- 'Normal Rain'
- 'Acid Rain' (50% white vinegar 50% water)
- Measuring cylinder
- 1 x goggles
- Pen to label pots

Experiment 2:

- **Worksheet: Do Hard Building Materials Absorb Water? Pupil sheet KS1 and 2.**
- **Answer sheet Do Hard Building Materials Absorb Water? Pupil sheet KS1 and 2.**
- Plastic cup/ 500ml plastic tub with wide 'mouth' and screw lid.
- 500ml blue water (water with food colouring added)
- Small sieve (i.e. an icing sugar duster or tea strainer)
- Large reusable shopping bag with flat base
- Sample Materials e.g. small samples of plastic, stone, granite, metal, wood, painted wood, glass, slate and brick which can be obtained from builder's merchants or contact the Environmental Education Project at Rosliston Forestry Centre

Materials Session:
On your way to the High Street you may do some observations of the buildings. Look at the materials and their uses in the buildings. Recap on names of materials, properties and uses. Use the examples **What Materials Are Used In Buildings?**

In the High Street:

Experiment 1: (15 mins.)
Use **Worksheet: The Effect of Acid Rain On Building Materials KS2 Pupil Experiment**
Worksheet: The Effect of Acid Rain On Building Materials KS2 Higher Pupil Experiment

Acid rain can damage buildings … an example of chemical weathering. Before pupils leave to do their surveys show the pot of 'acid rain' and pot of 'normal rain'. You are going to do a quick experiment to see how acid rain might affect these materials: metal, granite and limestone.
Put a piece of granite, limestone and metal (dirty 2p) coin into the acid rain. For a bit of a 'cheat' use a piece of chalk instead of the limestone.

Experiment 2:(15 mins.)
Set up this experiment to see which materials absorb (take in) water and therefore could damage buildings over time. Water, if left to soak in, can weaken and damage some materials. Damp can also make people ill.
Use **Experiment sheet: Do Hard Building Materials Absorb Water? Pupil sheet KS1 and 2.** Follow the instructions. Make predictions and write on worksheets.

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Survey Session: (30 mins.)
You are going to carry out a survey of the buildings along the High Street so that you can find out what kinds of materials used to make the buildings here are damaged, why and maybe think of ways we could stop the damage happening as this could prevent further costs to the owners.
Use the worksheets to record your findings: **Rot or Repair Swadlincote Quick Survey KS1 and 2 or Rot or Repair Swadlincote Building Survey KS2/KS2 Higher pupil worksheet.**
The quick survey has some visual examples of damage on them. Can the children see why the materials would be no good after a time? What do they think would happen to the rotten window sill?

Model how to do the survey using the Town Hall. If it is in good repair, discuss why it is: windows replaced by UPVC, regularly painted, wood replaced, gutters cleared, bird faeces washed off regularly etc.

- Safety: ensure children are not reading and walking at the same time.
- Position each group at a different starting point on the High Street. E.g. 7, High Street (currently to let). Card Factory, Evening Telegraph Newsagent, Fortune Garden, Greggs, Co-op Travel and Peacocks.
- Ask groups to choose a building that looks in need of repair, one that it is in good condition and one that they are not sure whether it is in good or bad condition at first. Then choose other buildings at random.
- If you need extension work, note the two forms of pigeon spikes on the buildings and the number of pigeons with each. Look to see which type of spike is the more effective as you are walking back.
- Before return, each group to choose one building and take photos of the roof, gutter, upper windows, lower windows, upper wall, lower wall and door to be used for discussion later. **(Not essential)**
- Allow 30 minutes and state return time.
- Give a return meeting point- e.g. The Delph
- Meet back up on The Delph.
- Discuss findings in the survey taking one example from each group.
- Look at the experiments that were set up earlier. Note results and complete the questions. Discuss their conclusions as you go round.

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Plenary: (15 mins.)
Within groups/ as a class: discuss the photographs taken of their chosen building (roof, gutter, upper windows, lower windows, upper wall, lower wall and door) and its state of repair.
Whose building has rotten window sills? Whose building has lots of pigeon poo?

Or (check you are able to use the Delph – for example there are no market stalls on it!)
How Good is Your Building step game. (A game where pupils explore how change can affect a certain building for good or bad.)

Ask for 5 or 10 things they have learnt

Additional Tasks:

- Design a poster to explain to shop owners the process of weathering and how they could stop or slow it down.
- Research people who have developed new materials.

<table>
<tr><td rowspan="4">KS2/3</td><td>Spencer Silver</td><td>https://www.tes.com/teaching-resource/spencer-silver-bio-worksheet-11047932</td></tr>
<tr><td>Ruth Benerito</td><td>Ruth Mary Rogan Benerito was an American chemist and inventor known for her work related to the textile industry, notably including the development of wash-and-wear cotton fabrics</td></tr>
<tr><td>New materials e.g. polymers</td><td>Polymers are very large molecules made when many smaller molecules join together, end-to-end
<table>
<tr><th>polymer</th><th>use</th></tr>
<tr><td>polyethene</td><td>plastic bags and bottles</td></tr>
<tr><td>polypropene</td><td>crates and ropes</td></tr>
<tr><td>polychloroethene</td><td>water pipes and insulation on electricity cables</td></tr>
</table>
http://www.bbc.co.uk/schools/gcsebitesize/science/aqa_pre_2011/oils/polymersrev5.shtml</td></tr>
<tr><td>Research your own person and material</td><td>Polyvinyl chloride or PVC was first created by the German chemist Eugen Baumann in 1872</td></tr>
</table>

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Some buildings may have enjoyed further restoration work when you try out these activities- if so, compare the photographs with the appearance of the building and adapt the session accordingly!
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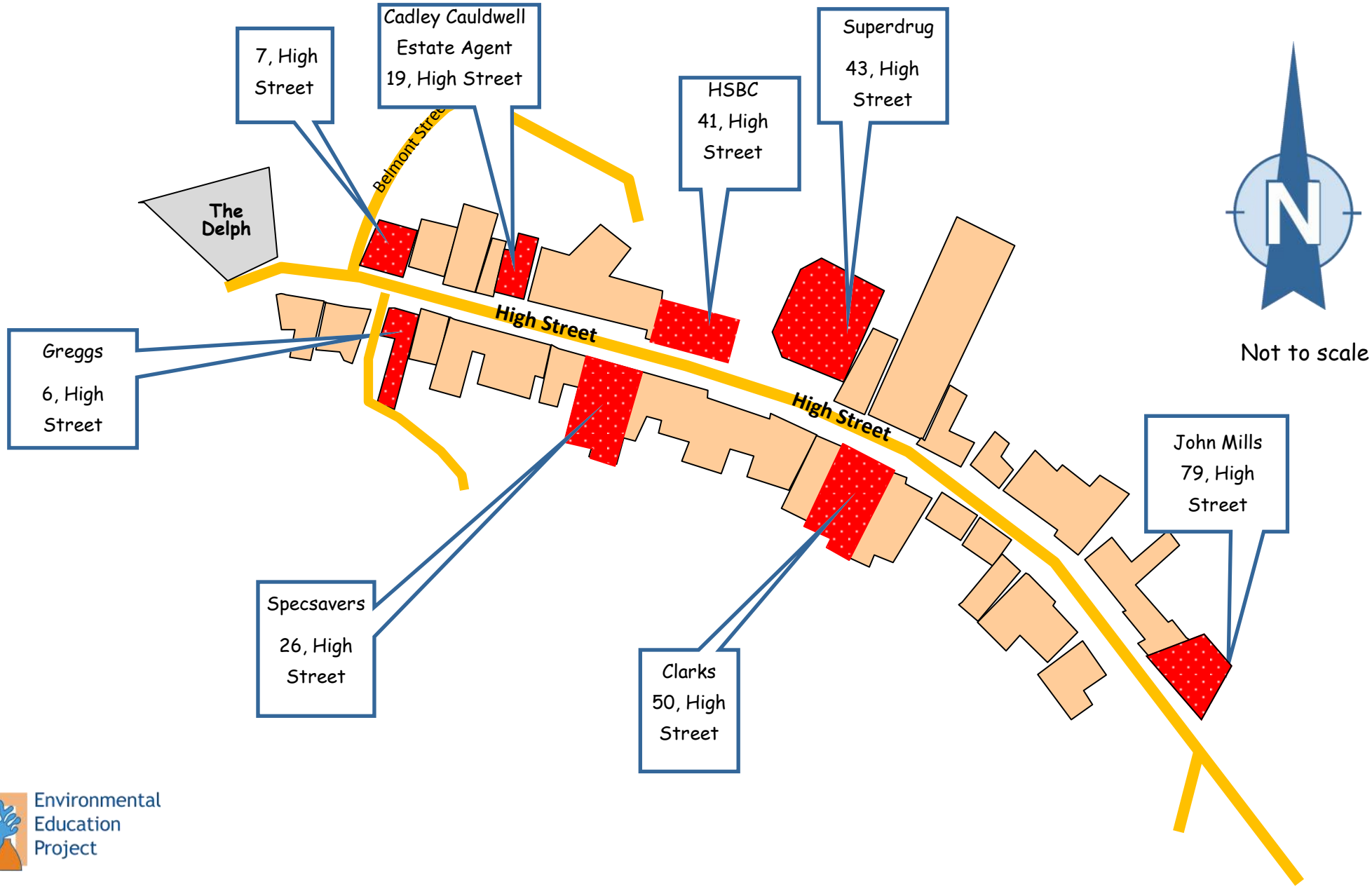
Have fun!

Townscape 'Rot or Repair' Map



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Rot or Repair

KS2 Pupil Worksheet

What Materials Are Used In Buildings?

There are many different types of **materials** used in buildings.

How many do you know? How many do you need to look up?

Choose from: Stone Wood Brick Clay tiles Concrete

Plastic Metal Paint Glass UPVC

Shiny / coloured tiles Slate

 www.decoist.com	 www.artfactory.com	 www.harrisreading-ilders.co.uk	 www.alamy.com
 www.houseofanderson1905.co.uk	 londonpostcodewalks.wordpress.com	 www.wikiwand.com	 www.hotel-r.net
 https://modernize.com	 www.whitespace.org.uk	 http://metalbuildinghomes.org	 www.everest.co.uk

Extension : Do you know the names of any other building materials? _____

_____

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KS1 & KS2

What Materials Are Used In Buildings?

ANSWERS

There are many different types of materials used in buildings.
How many do you know? How many do you need to look up?

 Paint www.decoist.com	 Wood www.artfactory.com	 Stucco uk.pinterest.com	 Brick www.alamy.com
 Plastic www.houseofanderson1905.co.uk	 Shiny, coloured tiles londonpostcodewalks.wordpress.com	 Clay tiles www.wikiwand.com	 Stone www.hotel-r.net
 Terracotta www..ebay.co.uk	 Glass www.whitespace.org.uk	 Lead www.agaceroofing.com	 UPVC www..everst.co.uk
 Roof felt http://roofinginorpington.co.uk	 Pebble dash www.warmwall.net	 Concrete www.harrisreading-ilders.co.uk	 Metal http://metalbuildinghomes.org
 Slate https://modernize.com			

Rot or Repair

KS2 Pupil Experiment Worksheet

The Effect of Acid Rain On Building Materials (1)

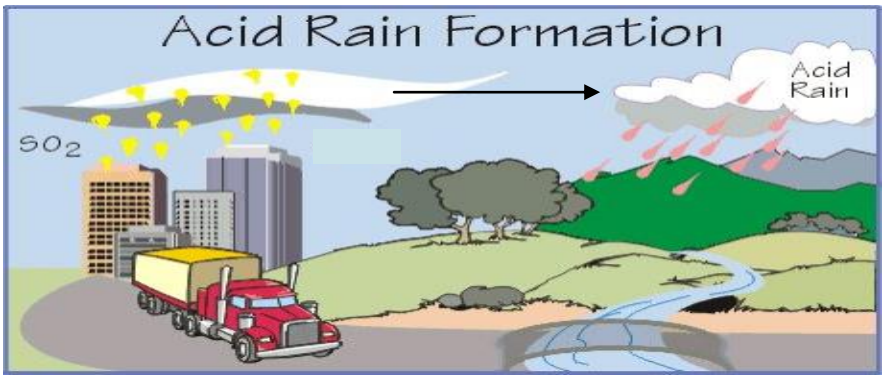
LOTTERY FUNDED

The Science Bit

Factories, power stations, cars and lorries need to burn **fuels**.
Can you name them? (write your answers on your answer sheet)

These fuels burn to make a gas called **sulfur dioxide SO_2**. When the sulfur dioxide dissolves in the rain, the rain becomes **acid rain**.

Acid rain can damage buildings … an example of **chemical weathering**



www.geography.learnontheinternet.co.uk

Key Words

acid rain **black** **brown** **chemical** **dull** **fuel** **green** **grey** **metal** **orange** **raised** **rust** **shiny** **silver** **smooth** **stone** **sulfur dioxide** **weathering** **white**

Your Task

We are going to investigate the effect of **acid rain on metal and stone**.

Prediction - what you THINK will happen.
(Write your answers on your answer sheet)

1. Which of the materials do you think will be affected by acid rain ?
   Metal Granite Limestone.
2. Explain why you think this.
3. How will you know that the acid rain has had an effect?

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KS2 Pupil Experiment Worksheet
The Effect of Acid Rain On Building Materials (2)

For your experiment each group will need:

2 pieces of metal - the same size
2 pieces of stone A – the same size
Measuring Cylinder
'Acid rain'
'Normal rain'
Pens to label
Sieve
2 plastic cups/pots with lids
1 x goggles

Method – what to DO:

Safety: wear googles, be careful with the 'acid rain' liquid, wipe up spills.

1. Label the two pots A and B.
2. Use the measuring cylinder to measure out 20ml of 'Acid Rain'.
3. Pour it into pot A.
4. Use the measuring cylinder to measure out 20ml of 'Normal Rain'.
5. Pour it into pot B.
6. Put one piece of metal and one piece of stone into each pot.
7. Wash your hands.
8. Fill in column 2, 3 and 4 of your results table.
9. Leave the metal and stone in the pot. Look at them carefully after 1 hour and 24 hours.

Remember to fill in your results table each time.

When the experiment has finished in the classroom:

1. At the sink, empty all of your pots through the sieve and wash and dry all the apparatus.
2. Make sure everything is put away tidily.
3. Wipe down your table.
4. Wash your hands.

When you have finished at The Delph:

1. Empty your pots through the sieve at a nearby drain.
2. Dry everything as best you can.
3. Put everything back into the bag.
4. Wipe your hands with a wet wipe.

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KS2 Pupil Experiment Worksheet
The Effect of Acid Rain On Building Materials (3)

SWADLINCOTE TOWNSCAPE HERITAGE SCHEME

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Students name …… **Class** ……

Five different fuels are p_____ c_____ d_____ g____ o_____.

They all burn and give out a gas called _____

Prediction - what you THINK will happen

1. Metal Limestone will be affected by acid rain? (circle your choice/choices)

Method – what you DO

Add labels to these beakers to show how you set up the experiment.

Results – what you SEE/MEASURE

Cup	Acid Rain or Normal Rain	Metal/ Stone	Describe the metal/stone		
			At the beginning	After 1 hour	After 24 hours
A					
B					

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KS2 Pupil Experiment Worksheet

The Effect of Acid Rain On Building Materials

(4)

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Conclusion – what you have LEARNT

1. Which type of rain changed the metal? _____

2. How do you know? _____

_____

3. Which type of rain changed the limestone?

_____

4. How do you know? _____

_____

5. If building materials have acid rain pouring on them for years and years, what do you think may happen? _____

_____

Can you find pictures of metal **and** stone in buildings that have been weathered by acid rain?

Evaluation – THINKING about your experiment

1. Was your prediction correct? _____

2. This was a 'fair test' because:

   a) The one difference between the experiments was _____

   b) The factor we kept the same was _____

3. How did you keep safe? _____

4. How could you make your results more accurate?

_____

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KS2 Answer Sheet

The Effect of Acid Rain On Building Materials (1)

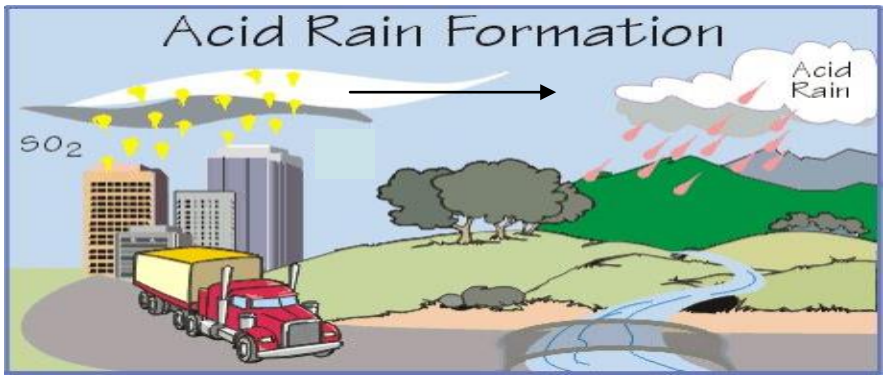
LOTTERY FUNDED

The Science Bit

Factories, power stations, cars and lorries need to burn **fuels**.
Can you name them? (write your answers on your answer sheet)

These fuels burn to make a gas called **sulfur dioxide SO_2**. When the sulfur dioxide dissolves in the rain, the rain becomes **acid rain**.

Acid rain can damage buildings … an example of **chemical weathering**



www.geography.learnontheinternet.co.uk

Key Words

acid rain **black** **brown** **chemical** **dull** **fuel** **green** **grey** **metal** **orange** **raised** **rust** **shiny** **silver** **smooth** **stone** **sulfur dioxide** **weathering** **white**

Your Task

We are going to investigate the effect of **acid rain on metal and stone**.

Prediction - what you THINK will happen.

(Write your answers on your student sheet)

1. Which of the materials do you think will be affected by acid rain ?

   Metal Granite Limestone.

2. Explain why you think this.
3. How will you know that the acid rain has had an effect?

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KS2 Answer Sheet

The Effect of Acid Rain On Building Materials (2)

LOTTERY FUNDED

For your experiment each group will need:

2 pieces of metal - the same size
2 pieces of limetone – the same size
2 plastic cups/pots with lids
'Acid Rain'
'Normal Rain'
Pens to label
Sieve
1 x goggles
Measuring cylinder

Method – what to DO:

Safety: wear googles, be careful with the 'acid rain' liquid, wipe up spills.

1. Label the two pots A and B.
2. Use the measuring cylinder to measure out 20ml of 'Acid Rain'.
3. Pour it into pot A.
4. Use the measuring cylinder to measure out 20ml of 'Normal Rain'.
5. Pour it into pot B.
6. Put one piece of metal and one piece of limestone into each pot.
7. Wash your hands.
8. Fill in column 2, 3 and 4 of your results table.
9. Leave the metal and stone in the pot. Look at them carefully after 1 hour and 24 hours.

Remember to fill in your results table each time.

When the experiment has finished in the classroom:

1. At the sink, empty all of your pots through the sieve and wash and dry all the apparatus.
2. Make sure everything is put away tidily.
3. Wipe down your table.
4. Wash your hands.

When you have finished at The Delph:

1. Empty your pots through the sieve at a nearby drain.
2. Dry everything as best you can.
3. Put everything back into the bag.
4. Wipe your hands with a wet wipe.

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KS2 Answer Sheet

The Effect of Acid Rain On Building Materials (3)

Student name Sample Answer

Five different fuels are petrol coal diesel gas oil

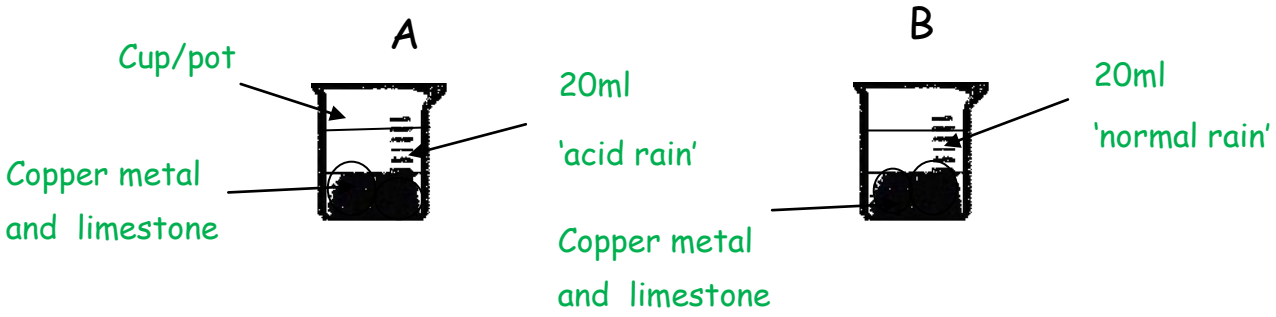
They all burn and give out a gas called sulfur dioxide.

Prediction - what you THINK will happen

Metal Limestone will be affected by acid rain? (circle your choice/ choices)

Method – what you DO

Add labels to these beakers to show how you set up the experiment.



Results – what you SEE/MEASURE

Cup	Acid Rain or Normal Rain	Metal/ Stone	Describe the metal/stone		
			At the beginning	After 1 hour	After 24 hours
A	Acid	Copper Metal	Dark brown / orange, dull	Brown/orange, brighter	Bright pink/gold, shiny
		Limestone	Light grey, grainy	Fizzing	Fizzing, looks smaller
B	Normal	Copper Metal	Dark brown / orange, dull	Dark brown / orange, dull	Dark brown / orange, dull
		Limestone	Light grey, grainy	Light grey, grainy	Light grey, grainy

Rot or Repair

KS2 Answer Sheet

The Effect of Acid Rain On Building Materials (4)

LOTTERY FUNDED

Conclusion – what you have LEARNT

1. Which type of rain changed the metal? Acid Rain

2. How do you know? The metal changed from a) dull to bright and b) dark orange to orangey pink.

3. Which type of rain changed the limestone? Acid rain.

4. How do you know? The limestone piece a) fizzed/released a gas and b) appeared to get smaller/lost mass

5. If building materials have acid rain pouring on them for years and years, what do you think may happen? Change colour, appear shiny, become weaker, appear worn/losing detail/losing mass.

Can you find two pictures of metal and stone in buildings that are damaged by acid rain

Evaluation – THINKING about your experiment

1. Why did you use 'normal rain'? To show that it was the 'acid' part of the acid rain that caused the results. So you had something to compare the acid rain results with— a control.

2. This was a 'fair test' because:

a The one difference between the experiments was the type/acidity/pH of the rain.

(tricky this one, as we have set up two different experiments at the same time—comparing the effect on limestone and comparing the effect on metal. So pupils may be confused and say the building material.)

b. The factor we kept the same was time (1 hour, 24 hour), volume of rain (20ml, size of the limestone/metal (1-2 cm^3).

3. How did you keep safe? Goggles, rinsed hands, screwed lid on firmly.

4. How could you make your results more accurate? Measure loss in mass with a balance, make use of a numbered colour chart for the change in colour.

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Rot or Repair
Experiment
Do Hard Building Materials Absorb Water?
KS1 & KS2 Pupil Worksheet (1)

SWADLINCOTE TOWNSCAPE HERITAGE SCHEME

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The Science Bit

Some **building materials** need protection from the wet. **Water** can **weaken** and damage materials, cause them to bend or **warp**, develop **mould** and also attract bacteria and **insects**. The **damp** conditions can also trigger **illnesses** in humans like **asthma** and other breathing problems.


www.cleanlinest.wordpress.com


www.inspectapedia.com


www.scientificamerican.com


www.ddcoatings.com

Key Words

asthma, building, brick, concrete, damp, glass, granite, insects, limestone, mass, material, metal, mould, painted wood, plastic, slate, warp, water, weaken, wood,

Your Task: We are going to investigate if hard materials absorb water.

You will need :

- Choose six pieces of building material, each a similar size from limestone, concrete, wood, metal, painted wood, plastic, granite , brick, slate and glass.
- Plastic cup.
- 500ml plastic tub with wide 'mouth' and screw lid.
- 500ml blue water
- Small sieve

Method-what you DO

Safety: wipe up spilt liquids.

1. Make sure you know the name of each of the pieces of building material.
2. Write the names of the pieces into your results table.
3. Predict which ones you think will absorb water? Note this in column 2.

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4. Half fill the tub with the blue water.
5. Add the pieces of material. Make sure each piece is covered with water.
6. Screw the lid on tightly.
7. Leave for at least one hour.
8. Empty the tub through the sieve over a sink/drain/plastic cup.
9. Note which pieces have absorbed water in your results table.
10. Note whether your predictions were right.

When the experiment has finished

On the High Street:

1. Carefully empty the plastic cup down the nearest drain.
2. Put all the apparatus in the bag.
3. Wipe your hands with a wet wipe.

In the classroom:

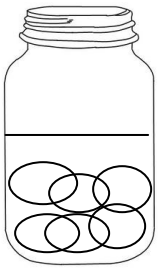
1. Wash out the tub and sieve.
2. Put back the apparatus and pieces of building material into the right box.
3. Wash your hands.

Rot or Repair
Experiment
Do Hard Building Materials Absorb Water?
KS1 & KS2 Pupil Worksheet (3)

Students name ……

Method – what you DO

Label the diagram to show what you did.



Results – what you SEE

Building Material	Do you think it will absorb water?	Did it absorb water?	How did you know?	Was your prediction right?

Conclusion – what you have LEARNT

1. Which building materials absorb water?

_____

2. How do you know ?

_____

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Experiment
Do Hard Building Materials Absorb Water?
KS1 & KS2 Pupil Worksheet (4)

3. If building materials absorb water for years and years, what do you think may happen?

_____

4. Can you think of other reasons why it is useful for building materials to be waterproof i.e. do not absorb water ?

_____

5. Can you find a picture of metal and a picture of stone in buildings that have been weathered by water ?

Evaluation – THINKING about your experiment

1. Was your prediction correct? _____
2. This was a 'fair test' because:
   a) The one difference between the experiments was _____
   b) The factor we kept the same was _____
3. How did you keep safe? _____
4. How could you make your results more accurate? _____

_____

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Rot or Repair

Experiment

Do Hard Building Materials Absorb Water?

KS1 & 2 Pupil Worksheet (1)
ANSWER SHEET

The Science Bit

Some **building materials** need protection from the wet. **Water** can **weaken** and damage materials, cause them to bend or **warp**, develop **mould** and also attract bacteria and **insects**. The **damp** conditions can also trigger **illnesses** in humans like **asthma** and other breathing problems.

www.cleanlinest.wordpress.com

www.inspectapedia.com

www.scientificamerican.com

www.ddcoatings.com

Key Words

asthma, building, brick, concrete, damp, glass, granite, insects, limestone, mass, material, metal, mould, painted wood, plastic, slate, warp, water, weaken, wood,

Your task: We are going to investigate if hard materials absorb water.

You will need:

- Choose six pieces of building material, each a similar size from limestone, concrete, wood, metal, painted wood, plastic, granite , brick, slate and glass.
- Plastic cup
- 500ml plastic tub with wide 'mouth' and screw lid.
- 500ml blue water
- Small sieve

Method-what you DO

1. Make sure you know the name of each of the pieces of building material.
2. Write the names of the pieces into your results table.
3. Which ones do you think will absorb water? Note this in column 2.

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4. Half fill the tub with the blue water.
5. Add the pieces of material. Make sure each piece is covered with water.
6. Screw the lid on tightly.
7. Leave for at least one hour.
8. Empty the tub through the sieve over a sink/drain/plastic cup.
9. Note which pieces have absorbed water in your results table.
10. Also note whether your predictions were right.

When the experiment has finished:

On the High Street:

1. Carefully empty the plastic cup down the nearest drain.
2. Put all the apparatus in the bag.
3. Wipe your hands with a wet wipe.

In the classroom:

1. Wash out the tub and sieve.
2. Put back the apparatus and pieces of building material.
3. Wash your hands.

Rot or Repair

Experiment

Do Hard Building Materials Absorb Water?

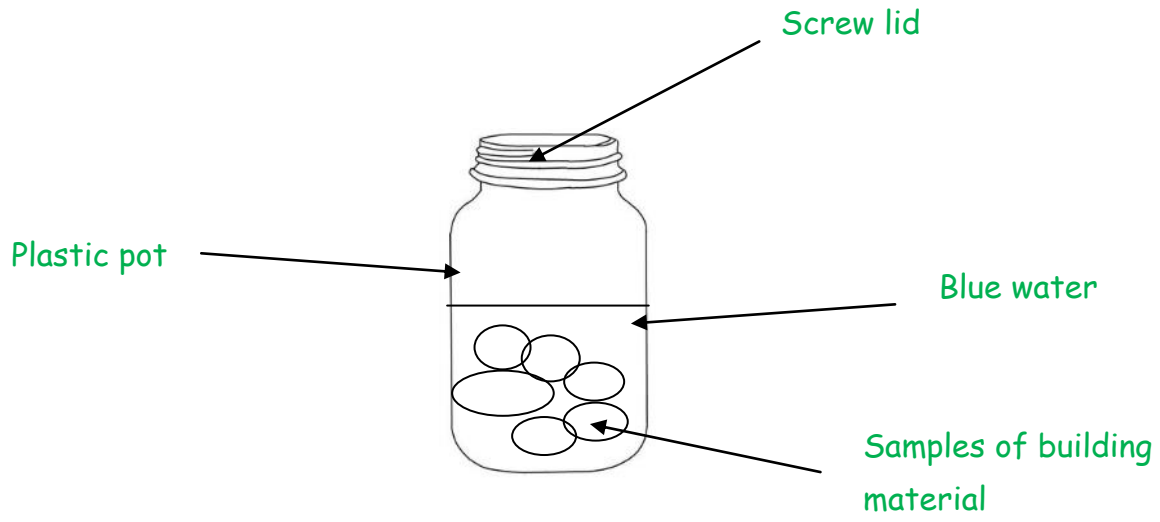
KS1 & 2 Pupil Worksheet (3)

ANSWER SHEET

Student name Sample Answer

Method- what you DID

Label the diagram to show what you did.



Results- what you OBSERVED

Building Material	Do you think it will absorb water?	Did it absorb water ?	How did you know ?	Was your prediction right?
Wood	Y	Y	Could see blue in the wood	Y
Metal	N	N	There was no blue colour	Y
Limestone	N	Y	Could see blue in the stone	N
Painted wood	Y	N	There was no blue colour	N
Brick	Y	Y	Could see blue in the brick	Y
Granite	N	N	There was no blue colour	Y

Conclusion- what you have LEARNT

1. Which building materials absorb water? Wood, limestone, brick
2. How do you know? They all had a blue colour at the end.

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Rot or Repair

Experiment

Do Hard Building Materials Absorb Water?

KS1 & 2 Pupil Worksheet (4)

ANSWER SHEET

3. If building materials absorb water for years and years, what do you think may happen?
Wear it away; water may freeze and crack the stone; pieces may fall off

Go soft; moss grow on it; break down

4. Can you think of other reasons why it is useful for building materials to be waterproof i.e. do not absorb water? Keep the building waterproof, warm … many other reasons

5. Can you find a picture of metal and a picture of stone in buildings that have been weathered by water?

Evaluation – THINKING about your experiment

1. Was your prediction correct? _____

2. This was a 'fair test' because:

   a) The one difference between the experiments was the TYPE of building material.
   b) The factor we kept the same was size of the piece of material, time left 60 minutes

3. How did you keep safe? Mop up any water we spilled. Washed hands

4. How could you make your results more accurate? Use a balance to measure the mass of the materials.

SWADLINCOTE TOWNSCAPE HERITAGE SCHEME
heritage lottery fund LOTTERY FUNDED
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Rot Or Repair KS2
Pupil worksheet
Swadlincote Building Survey

All building materials are chosen for their **properties.**
E.g. hard, strong, colour, cheap, waterproof, stretchy, shiny, rough, bendy etc.

Over time most building materials are **damaged** by **animals, people** or the **weather**. This is called **WEATHERING.**

Rain and wind	Frost and ice	Heat	Rubbing and abrasion	Wee and poo. Animal waste.	Plants
					
www.pinterest.com	www.pixcove.com	d4nations.com	www.codename we.tumblr.co	bird-control-solutions.blogspot.co.uk	www.emaze.com

YOUR TASK.
You are going to look at a number of buildings in Swadlincote to see which materials have been used and if they have stood up to any **damage or WEATHERING.**

YOUR RESULTS. What you see.
Use the table to record and note down what you see.

YOUR CONCLUSIONS. What you have found out.

Look at your results table and then answer these questions.

1. Which building materials were often **weathered**? _____
   _____
2. Which materials did not look **weathered**? _____
   _____
3. Did you see anything that stopped **animal** damage? _____
   _____
4. Were some of these actions better than others? Why? _____
   _____
5. Did you see anything that stopped **weather** damage? _____
   _____
6. What type of building materials are chosen now? Look at your results for the newest buildings.
   _____
   Why?
   _____

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Rot Or Repair KS2
Pupil worksheet
Swadlincote Building Survey

SWADLINCOTE TOWNSCAPE HERITAGE SCHEME

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RESULTS FROM ……..…..…….. (put your name here)

Name of Building with lots of damage ……

Part of the building.	What material is it made of ?	How is this material damaged ?	What may have caused this damage?	What can we do to repair it ?

Name of Building with little damage ……

Part of the building.	What material is it made of ?	How is this material damaged ?	What may have caused this damage?	What can we do to repair it?

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EXTENSION WORK

Design a poster to explain to shop owners the process of weathering and how they could stop or slow it down.

OR

Find out about a new material e.g. the name, who made it, why it is so useful?

KS1	John Dunlop	www.twinkl.co.uk/resource/t-sc-159-john-boyd-dunlop-information-powerpoint
	Charles Macintosh	www.twinkl.co.uk › PlanIt › Science › Y2 › Scientists and Inventors https://www.tes.co.uk/.../charles-rennie-mackintosh-2012-aqagcse-rm-theme-6191653
	John McAdam	https://www.tes.com/teaching-resource/simple-biography-of-john-mcadam-6440640 http://www.twinkl.co.uk/resource/t-sc-099-blank-john-mcadam-fact-file-sheet-differentiated
KS2/3	Spencer Silver	https://www.tes.com/teaching-resource/spencer-silver-bio-worksheet-11047932
	Ruth Benerito	
	New materials e.g. polymers, super sticky, super thin	

Rot Or Repair KS2
Pupil worksheet
Swadlincote Building Survey
ANSWERS

All building materials are chosen for their **properties.**
E.g. hard, strong, colour, cheap, waterproof, stretchy, shiny, rough, bendy etc.

Over time most building materials are **damaged** by **animals, people** or the **weather**. This is called **WEATHERING.**

Rain and wind	Frost and ice	Heat	Rubbing and abrasion	Wee and poo. Animal waste.	Plants
					
www.pinterest.com	www.pixcove.com	d4nations.com	www.codename we.tumblr.co	bird-control-solutions.blogspot.co.uk	www.emaze.com

YOUR TASK.

You are going to look at a number of buildings in Swadlincote to see which materials have been used and if they have stood up to any **damage or WEATHERING.**

YOUR RESULTS. What you see.
Use the table to record and note down what you see.

YOUR CONCLUSIONS. What you have found out.

Look at your results table and then answer these questions.

1. Which building materials were often **weathered**? Stone, brick, concrete, terracotta, paint, UPVC, stucco, plastic, roof felt, pebble dash, metal.
2. Which materials did not look **weathered**? Glass, lead, slate, glazed tiles.
3. Did you see anything that stopped **animal** damage? Two designs of pigeon spikes, pigeon 'tents' and pigeon trip wires.
4. Were some of these actions better than others? Why? Yes. The new spike design was more effective .The spikes sticking out at all angles made it more difficult for the pigeons to land and sit there. The pigeons were sitting between the design of the older spikes which just stuck up in one direction.
5. Did you see anything that stopped **weather** damage? Paint, plastic covered metal, use of materials that will take longer to weather – see Q2.
6. What type of building materials are chosen now? Look at your results for the newest buildings. Plastic covered metal, UPVC, plastic, glazed tiles, granite, glass, slate

   Why? They do not weather or they take longer to weather.

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Rot Or Repair KS2
Pupil worksheet
Swadlincote Building Survey
SAMPLE ANSWERS

RESULTS FROM

…….. (put your name here)

Name of Building with <u>lots of damage</u> Newsagent

Part of the building.	What material is it made of?	How is this material damaged?	What may have caused this damage?	What can we do to repair it?
Chimney	Brick	Crumbling	Plants	New bricks and plaster

Name of Building with <u>little damage</u> Number 7

Part of the building.	What material is it made of?	How is this material damaged?	What may have caused this damage?	What can we do to repair it?
Window	wood	rotting	Heat, rain	New window, paint

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Rot Or Repair KS2
Pupil worksheet
Swadlincote Building Survey
ANSWERS

EXTENSION WORK

Design a poster to explain to shop owners the process of weathering and how they could stop or slow it down.

OR

Find out about a new material e.g. the name, who made it, why it is so useful.

KS1	John Dunlop	www.twinkl.co.uk/resource/t-sc-159-john-boyd-dunlop-information-powerpoint
	Charles Macintosh	www.twinkl.co.uk › PlanIt › Science › Y2 › Scientists and Inventors https://www.tes.co.uk/.../charles-rennie-mackintosh-2012-aqagcse-rm-theme-6191653
	John McAdam	https://www.tes.com/teaching-resource/simple-biography-of-john-mcadam-6440640 http://www.twinkl.co.uk/resource/t-sc-099-blank-john-mcadam-fact-file-sheet-differentiated
KS2/3	Spencer Silver	https://www.tes.com/teaching-resource/spencer-silver-bio-worksheet-11047932
	Ruth Benerito	
	New materials e.g. polymers, super sticky, super thin	

Rot Or Repair (Quick Building Survey)
KS1 & KS2 Pupil Survey
of the High Street & The Delph

SWADLINCOTE TOWNSCAPE HERITAGE SCHEME

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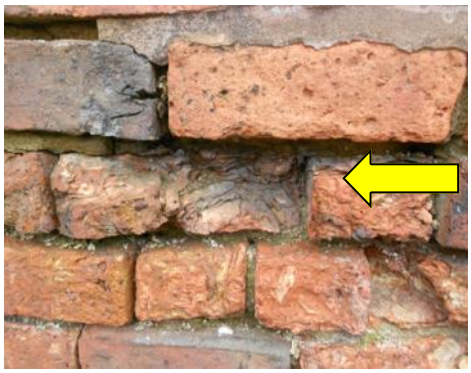
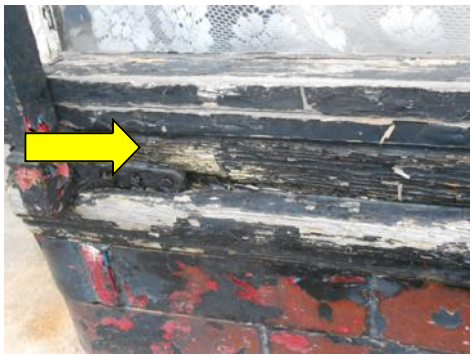
Here are some examples of damage to building materials.





Damage can be caused by water, wind and pigeon droppings.

Materials at risk are wood, metal, stone brick and clay

Your Task:

Look at the buildings around The Delph and High Street

Name 3 types of damage and name the material damaged.

How could you stop this damage?

Something extra

1. Pick 5 buildings. Count the pigeons on them.
Are there more on some buildings?
Why?

2. Can you find more examples of damage to other materials?

Environmental Education Project

Rot Or Repair (Quick Building Survey)
KS1 & KS2 Pupil Survey
of the High Street & The Delph

Results of …… (your name)

Damage	Material
Extra :	

I could protect the buildings by

……

……

Building	
1	
2	
3	
4	
5	

More on buildings ……

……

because ……

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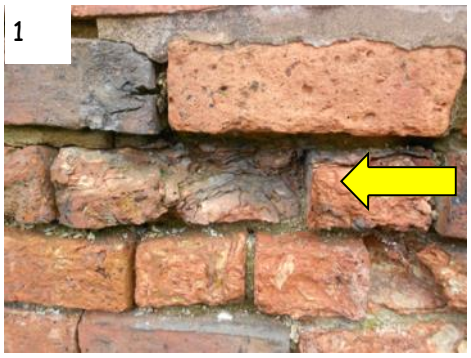
Rot Or Repair (Quick Building Survey)

KS1 & KS2 Pupil Survey of the High Street & The Delph

ANSWERS

Here are some examples of damage to building materials.

1



2

3

4

Damage done by water, wind and pigeon droppings.

Materials at risk are wood, metal, stone brick and clay.

Your Task:

Look at the buildings around the Delph / High St.

Name 3 types of damage and name the material damaged.

How could you stop this damage?

Something extra:

1. Pick 5 buildings. Count the pigeons on them.
Are there more on some buildings?
Why?

2. Can you find more examples of damage to other materials?

5

6

7

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Rot Or Repair (Quick Building Survey)

KS1 & KS2 Pupil Survey of the High Street & The Delph

ANSWERS

Results of Sample Answer (your name)

Damage	Material
1. Rainwater, frost, acid rain, temperature change, rubbing	Brick, mortar
2. Heat, rainwater, acid rain, animals, plants, rubbing	Wood, paint
3. Heat, acid rain, animals	Paint
Extra : 4. Rainwater, frost, heat, wind, acid rain, animals, plants	Wood, plastic, tile mortar
5. Animals—pigeon droppings. Plants—moss. Rainwater	Brick, mortar, metal
6 Rainwater, acid rain, heat, animals	Wood
7 Plants—Buddleia	Mortar

I could protect the buildings by:

regular maintenance (repainting, repointing, clearing gutters of moss etc.)
using materials that can withstand weathering e.g. Aluminium, UPVC

Building	
1 Boots	3
2 William Hill	1
3 HSBC	0
4 Superdrug	4
5 Foresters	4

Less on buildings 2 and 3

because the pigeon spikes stop the pigeons landing and leaving droppings.

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Rot Or Repair Game
How Good Is Your Building?
KS 1&2 Teacher Notes (1)

SWADLINCOTE TOWNSCAPE HERITAGE SCHEME

heritage lottery fund
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Preparation:

- Find a suitable place to play on the Delph.
- Draw 3 parallel lines in chalk across the floor approximately 10m apart.
- Line the group up on the middle line facing you and in groups of three or four with their arms loosely linked.
- Pupils imagine they are each a shop on the High Street.

Safety:

- Ask pupils to be aware of people around them and to move if necessary.
- Do not pull or push one another too hard.

Introduction:

They are going to play a game to see how change can affect the building they have chosen for good or bad.

- The middle line is their current state of repair – open for business and reasonably safe. A positive change moves forwards, negative moves backwards. If you go as far back as the last line, your building has fallen apart and MAY be demolished. You could make a lot of collapsing noise at this point.
- Pupils belonging to buildings which get demolished can become 'Town Centre Managers' and help you to survey the other buildings (pupils) to make sure they are moving the correct amount of spaces.
- If you go forwards to the 1st line, your building has won an award for good maintenance. Congratulations! You can all cheer.
- The pupils have linked arms in groups of three or four to show that each building is linked to its neighbours. Directions will apply to some buildings and not others. You cannot break the link so if you have to follow a direction but your neighbours don't, they will pull you back and you can also try and pull them.

You will agree a finish point before the next instruction is given..

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Practice:

- In this game the pupils can move forwards or backwards in toe-to-heel steps (carefully!).

Practice this! The instructions **will not apply to all** the buildings/ shops. To decide which pupils (shops) move you can ask those with brown shoes, black shoes, long hair… etc.

The Game:

Line up on the middle line in your groups of three or four.

Think of your shop.

- Grass is allowed to grow in your guttering MOVE BACKWARDS 2 SPACES.
- Your brickwork starts to crumble from a very long period of weathering (effects of wind and rain). MOVE BACKWARDS 1 SPACE..
- Your wooden window sills are replaced as the old were damaged and rotten. MOVE FORWARDS 2 SPACES.
- Someone clears the grass and debris from your guttering MOVE FORWARDS 2 SPACES.
- High winds overnight catch the edge of some tiles and a small hole appears in your roof MOVE BACKWARDS 2 SPACES.
- After a period of time, no one fixes your damaged roof and the hole becomes much larger MOVE BACKWARDS 5 SPACES.
- Pigeons nest in your roof and their poo damages the decorative band of terracotta in the brickwork, this damages the appearance and is very expensive to replace MOVE BACKWARDS 2 SPACES.
- The hole in your roof is fixed and re-tiled. MOVE FORWARDS 5 SPACES.
- Pigeon spikes are introduced to stop the pigeons landing on your building. While they stop the pigeons from coming onto your building, the locals think they look ugly. STAY WHERE YOU ARE.
- The store owner has your woodwork sanded down and repainted MOVE FORWARDS 2 SPACES.
- Your building has a new coat of paint. MOVE FORWARDS 2 SPACES.
- When painting, the workmen painted over an original feature (mosaic floor tiles or glazed stall riser bricks). While this doesn't make your building worse, the customers comment on the feature that they all miss. STAY WHERE YOU ARE.

SWADLINCOTE TOWNSCAPE HERITAGE SCHEME
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- A hard winter means lots of ice gets into the fronts of the bricks and the mortar between them and pieces start to fall off. MOVE BACKWARDS 2 SPACES.
- Shops which are getting lots of customers can afford to repair bricks and mortaring. MOVE FORWARDS 2 SPACES.
- A sparrow hawk in towns eats quite a few pigeons over the winter. STAY WHERE YOU ARE. (While the number of pigeons is reduced, this does not repair the damage already being done.)
- Cracks appear on paintwork to shops on the south facing side of the street. MOVE BACKWARDS 2 SPACES.
- A long wet summer followed by an even wetter winter creates damage and damp patches to the side of your buildings. MOVE BACKWARDS 3 SPACES. THOSE ON THE END OF THE STREET GET FLOODED MOVE BACKWARDS 5 SPACES.

Make up some more if you need to!

When you need to finish the activity:

- Ask the Town Centre Managers to choose, with reasons, 3 buildings which can receive a grant which helps to restore and repair old buildings.
  Should they be:
- the buildings nearest the first line as they were in good repair?
  or
- the buildings nearest the last line that could be demolished?

Rot or Repair Glossary

PROPERTIES.

Metals – strong/ hard/ shiny

Plastics – waterproof, can be heated into any shape, can be strong, dyed different colours or made transparent.

Glass - normally **transparent** and can be made into many different shapes. Thick glass can be strong, but thin glass will break very easily. It's not very expensive to make, easy to shape when it's heated up to a liquid, reasonably resistant to heat when it's cooled and dried hard. It can be recycled any number of times.

Wood – strong and long-lasting

Fabrics – made out of different materials and can be **stretchy** (a pair of tights), **insulating** (keep you warm, like a woollen coat) or **absorbent** (a towel).

Concrete – made with cement, sand and crushed rock – very strong.

Ceramics - E.g. clay tiles. They can be long lasting strong and heat resistant. They can also be brittle but can withstand the damaging effects from acid and oxygen in the air. They can also be waterproof.

Paint – used to decorate, add colour to a surface but also a layer of protection. You can use special paints to make metal waterproof and stop it rusting or special paint for treating wood to stop water making it rot.

WEATHERING.
(Adapted from www.nationalgeographic.org)

This is the process of rocks crumbling due to rain, wind, or other atmospheric conditions. Also called physical weathering.

Or

The breaking down or dissolving of rocks and minerals on Earth's surface. Water, ice, acids, salt, plants, animals, and changes in temperature are all agents of weathering.
Once the rock has been broken down, a process called erosion transports the bits of rock and minerals away. No rock on Earth's surface is hard enough to resist weathering. Together, the processes of weathering and erosion carved the Grand Canyon. Weathering and erosion constantly change the Earth. Weathering wears away exposed surfaces over time. It smooths the sharp, rough areas on rocks. Weathering also helps create soil as tiny bits of weathered rock mix with plant and animal remains.

Mechanical / Physical Weathering

Freeze-thaw. Water seeps into cracks and crevices in rock. If the temperature drops low enough, the water will freeze. When water freezes it expands. The ice then works as a wedge. It slowly widens the cracks and splits the rock. When ice melts, water performs the act of erosion by carrying away the tiny rock fragments lost in the split.

Heat. Rock can heat up and cool down. The changes in temperature cause the rock to expand and contract. As this happens over and over again, the rock weakens and 'peels'. Over time, it crumbles.

Water. When clay or other materials near hard rock absorb water, the clay swells with the water, breaking apart the surrounding rock.

Salt Water. This sometimes gets into the cracks and pores of rock. If the saltwater evaporates, salt crystals are left behind. As the crystals grow they put pressure on the rock, slowly breaking it apart.

Plants. The seed of a tree may sprout in soil that has collected in a cracked rock. As the roots grow they widen the cracks, eventually breaking the rock into pieces. Over time, trees can break apart even large rocks. Even small plants, such as mosses, can enlarge tiny cracks as they grow.

Animals. Animals, such as moles and prairie dogs, tunnel underground and also work to break apart rock and soil. Other animals dig and trample rock above ground, causing rock to slowly crumble.

Chemical Weathering

Chemical weathering changes the materials that make up rocks and soil. Sometimes, carbon dioxide from the air or soil combines with water. This produces a weak acid, called carbonic acid that can dissolve rock.
Carbonic acid is especially effective at dissolving limestone. When the carbonic acid seeps through limestone underground, it can open up huge cracks or hollow out vast networks of caves.

Another type of chemical weathering works on rocks that contain iron. These rocks rust in a process called oxidation. As the rust expands, it weakens the rock and helps break it apart.
The chemicals in urine and faeces can also weaken rock.

People and Weathering

Weathering is a natural process, but human activities can speed it up. For example, certain kinds of air pollution increase the rate of weathering. Burning coal, natural gas, and oil releases chemicals such as nitrogen oxide and sulfur dioxide into the atmosphere. When these chemicals combine with sunlight and moisture, they change into acids. They then fall back to Earth as acid rain. Acid rain rapidly weathers limestone, marble, and other kinds of stone. The effects of acid rain can be seen on gravestones. Names and other inscriptions can be impossible to read.

Rot or Repair

KS2 Higher Pupil Worksheet

What Materials Are Used In Buildings?

SWADLINCOTE TOWNSCAPE HERITAGE SCHEME

heritage lottery fund
LOTTERY FUNDED

There are many different types of **materials** used in buildings.

How many do you know? How many do you need to look up?

Choose from : Stone Wood Brick Clay tiles Concrete Slate
Plastic Lead Metal Stucco Paint Glass
Shiny / coloured tiles Terracotta UPVC Pebble dash Felt

 www.decoist.com	 www.artfactory.com	 uk.pinterest.com	 www.alamy.com
 www.houseofanderson1905.co.uk	 londonpostcodewalks.wordpress.com	 www.wikiwand.com	 www.hotel-r.net
 www..ebay.co.uk	 www.whitespace.org.uk	 www.agaceroofing.com	 www..everst.co.uk
 http://roofinginorpington.co.uk	 www.warmwall.net	 www.harrisreading-ilders.co.uk	 http://metalbuildinghomes.org
 https://modernize.com			

Extension: Do you know the names of any other building materials? _____

_____

Rot or Repair

KS1 & KS2

What Materials Are Used In Buildings?

ANSWERS

There are many different types of materials used in buildings.
How many do you know? How many do you need to look up?

 Paint www.decoist.com	 Wood www.artfactory.com	 Stucco uk.pinterest.com	 Brick www.alamy.com
 Plastic www.houseofanderson1905.co.uk	 Shiny, coloured tiles londonpostcodewalks.wordpress.com	 Clay tiles www.wikiwand.com	 Stone www.hotel-r.net
 Terracotta www..ebay.co.uk	 Glass www.whitespace.org.uk	 Lead www.agaceroofing.com	 UPVC www..everst.co.uk
 Roof felt http://roofinginorpington.co.uk	 Pebble dash www.warmwall.net	 Concrete www.harrisreading-ilders.co.uk	 Metal http://metalbuildinghomes.org
 Slate https://modernize.com			

Rot or Repair

KS2 Higher Pupil Experiment Worksheet

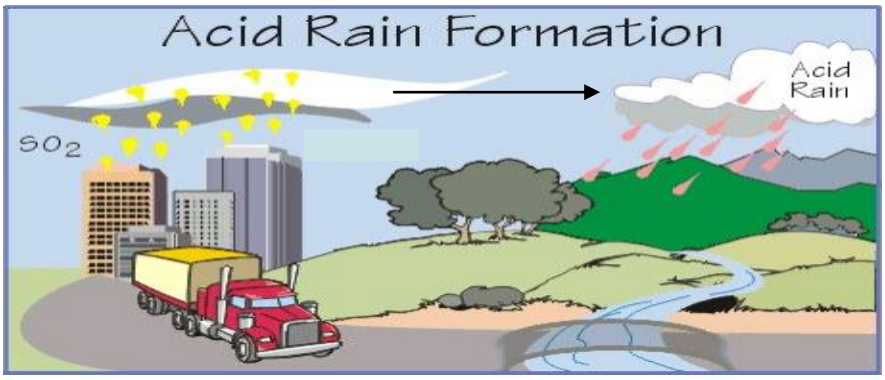
The Effect of Acid Rain On Building Materials (1)

The Science Bit

Factories, power stations, cars and lorries need to burn **fuels**.
Can you name them ? (write your answers on your student sheet)

These fuels burn to make a gas called **sulfur dioxide SO_2.** When the sulfur dioxide dissolves in the rain, the rain becomes **acid rain**.

Acid rain can damage buildings … an example of **chemical weathering**



www.geography.learnontheinternet.co.uk

Key Words:

acid rain **black** **brown** **chemical** **dull** **fuel** **green** **grey** **metal** **orange** **raised** **rust** **shiny** **silver** **smooth** **SO_2** **stone** **sulfur dioxide** **weathering** **white**

Your Task:

We are going to investigate the effect of **acid rain on metal and stone**.

Prediction - what you THINK will happen:
(Write your answers on your student sheet)

1. Which of the materials do you think will be affected by acid rain ?
   Metal Granite Limestone.
2. Do some research to explain your choices.
3. How will you know that the acid rain has had an effect?

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Rot or Repair

KS2 Higher Pupil Experiment Worksheet

The Effect of Acid Rain On Building Materials (2)

You will need for your experiment:

2 pieces of metal - the same size
2 pieces of limestone – the same size
2 pieces of granite – the same size
'Acid Rain'
'Normal Rain'
Pens to label
Sieve
2 plastic cups/pots with lids
Measuring cylinder
Balance
1 x goggles

Method – what to DO:

Safety: wear googles, be careful with the 'acid rain' liquid, wipe up spills.

1. Label the two pots A and B.
2. Use the measuring cylinder to measure out 20ml of 'Acid Rain'.
3. Pour it into pot A.
4. Use the measuring cylinder to measure out 20ml of 'Normal Rain'.
5. Pour it into pot B.
6. Find the mass of each piece of metal and note it in columns 2,3 & 4 of your results table.
7. Place one piece of each type of metal/stone in pot 'A' and the other piece in pot 'B'.
8. Wash your hands.
9. After 1 hour and 24 hours remove each piece with a spoon and shake off the liquid. Find the mass and note the results in column 5/7. Return the piece to the correct pot.
10. Wash your hands.

When the experiment has finished in the classroom:

1. At the sink, empty all of your pots through the sieve and wash and dry all the apparatus.
2. Make sure everything is put away tidily.
3. Wipe down your table.
4. Wash your hands.

When you have finished at The Delph:

1. Empty your pots through the sieve at a nearby drain.
2. Dry everything as best you can.
3. Put everything back into the bag and tick off the list as you do so.
4. Wipe your hands with a wet wipe.
5. Give the bag back to your leader.

Environmental Education Project

Rot or Repair

KS2 Higher Pupil Experiment Worksheet

The Effect of Acid Rain On Building Materials (3)

LOTTERY FUNDED

Students name …… **Class** ……

Five different fuels are p_____ c_____ d_____ g_____ o_____ . They all burn and give out a gas called _____

Prediction - what you THINK will happen

1. Metal Granite Limestone will be affected by acid rain? (circle your choice(s))
2. This is because (use some science?) _____

_____

3. I will know that the acid rain has had an effect because _____

_____

Method – what you DO:

Add labels to these beakers to show how you set up the experiment.

Results – what you SEE/MEASURE:

Pot	Acid or Normal Rain	Metal / Stone	Mass of metal/stone (g)				
			At the start	After 1 hour	Diff	After 24 hours	Diff
A							
B							

Environmental Education Project

Rot or Repair

KS2 Higher Pupil Experiment Worksheet

The Effect of Acid Rain On Building Materials (4)

Conclusion – what you have LEARNT:

1. Which type of rain changed the metal? _____
2. How do you know? _____

_____

3. Which type of rain changed the stone? _____
4. How do you know? _____

_____

5. If building materials have acid rain pouring on them for years and years, what do you think may happen? _____

_____

Can you find pictures of metal **and** stone in buildings that have been weathered by acid rain?

Evaluation – THINKING about your experiment:

1. Was your prediction correct? _____
2. Why did you use 'normal rain'? _____

_____

3. This was a 'fair test' because:
   a) The one difference between the experiments was _____
   b) The factor we kept the same was _____
4. How did you keep safe? _____
5. How could you make your results more accurate? _____

_____

Environmental Education Project

Rot or Repair

KS2 Higher Answer Sheet

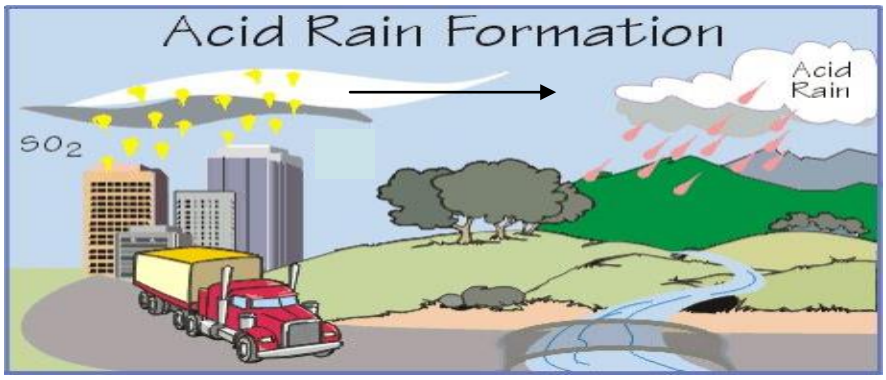
The Effect of Acid Rain On Building Materials (1)

The Science Bit

Factories, power stations, cars and lorries need to burn **fuels**.
Can you name them? (write your answers on your student sheet)

These fuels burn to make a gas called **sulfur dioxide SO_2.** When the sulfur dioxide dissolves in the rain, the rain becomes **acid rain**.

Acid rain can damage buildings … an example of **chemical weathering**



www.geography.learnontheinternet.co.uk

Key Words

acid rain **black** **brown** **chemical** **dull** **fuel** **green** **grey** **metal** **orange** **raised** **rust** **shiny** **silver** **smooth** **SO_2.** **stone** **sulfur dioxide** **weathering** **white**

Your Task:

We are going to investigate the effect of **acid rain on metal and stone**.

Prediction - what you THINK will happen:

(Write your answers on your student sheet)

1. Which of the materials do you think will be affected by acid rain ?

   Metal Granite Limestone.

2. Do some research to explain your choices.
3. How will you know that the acid rain has had an effect?

Rot or Repair

KS2 Higher Answer Sheet

The Effect of Acid Rain On Building Materials (2)

For your experiment each group will need:

2 pieces of metal - the same size
2 pieces of limestone – the same size
2 pieces of granite – the same size
'Acid Rain'
'Normal Rain'
Pens to label
Sieve
2 plastic cups/pots with lids
Measuring cylinder
1 x goggles
Balance

Method – what to DO:

Safety: wear googles, be careful with the 'acid rain' liquid, wipe up spills.

1. Label the two pots A and B.
2. Use the measuring cylinder to measure out 20ml of 'Acid Rain'.
3. Pour it into pot A.
4. Use the measuring cylinder to measure out 20ml of 'Normal Rain'.
5. Pour it into pot B.
6. Find the mass of each piece of metal and note it in columns 2,3 & 4 of your results table.
7. Place one piece of each type of metal/stone in pot 'A' and the other piece in pot 'B'.
8. Wash your hands.
9. After 1 hour and 24 hours remove each piece with a spoon and shake off the liquid. Find the mass and note the results in column 5/7. Return the piece to the correct pot.
10. Wash your hands.

Remember to fill in your results table each time.

When the experiment has finished in the classroom:

1. At the sink, empty all of your pots through the sieve and wash and dry all the apparatus.
2. Make sure everything is put away tidily.
3. Wipe down your table.
4. Wash your hands.

When you have finished at The Delph:

1. Empty your pots through the sieve at a nearby drain.
2. Dry everything as best you can.
3. Put everything back into the bag and tick off the list as you do so.
4. Wipe your hands with a wet wipe.

Environmental Education Project

Rot or Repair

KS2 Higher Answer Sheet

The Effect of Acid Rain On Building Materials (3)

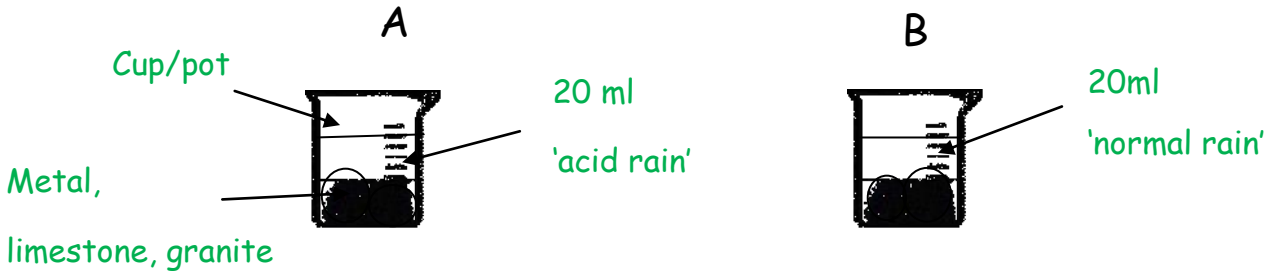
Student name Sample Answer

Five different fuels are petrol coal diesel gas oil

They all burn and give out a gas called sulfur dioxide.

Method – what you DO:

Add labels to these beakers to show how you set up the experiment.



Prediction - what you THINK will happen:

1. Metal Granite Limestone will be affected by acid rain? (circle your choice/choices)
2. This is because (use some science?) Some types of rock are easily weathered by chemicals. When acid rain falls on limestone or chalk, a chemical reaction happens and the new soluble substances are washed away (weathered)
3. I will know that the acid rain has had an effect because - There will be a difference in mass. Change in appearance.

SWADLINCOTE TOWNSCAPE HERITAGE SCHEME

KS2 Higher Answer Sheet

The Effect of Acid Rain On Building Materials (4)

heritage lottery fund LOTTERY FUNDED

Results – what you SEE/MEASURE: (Answers will vary)

Pot	Acid or Normal Rain	Metal/ Stone	Mass of metal/stone (g)				
			At the start	After 1 hour	Diff	After 24 hours	Diff
A	Normal	Metal					
		Lime-stone					
		Granite					
B	Acid	Metal					
		Lime-stone					
		Granite					

Rot or Repair

KS2 Higher Answer Sheet

The Effect of Acid Rain On Building Materials (5)

Conclusion – what you have LEARNT

1. Which type of rain changed the metal? Acid Rain

2. How do you know? The metal changed from a) dull to bright and b) dark orange to orangey pink.

3. Which type of rain changed the stones? Acid rain.

4. How do you know? The limestone piece a) fizzed / released a gas and b) appeared to get smaller/lost mass. The granite is a harder rock and not so easily weathered by acid rain. Some may crumble away in time, therefore the mass would reduce.

5. If building materials have acid rain pouring on them for years and years, what do you think may happen? Change colour, appear shiny, become weaker, appear worn/losing detail/losing mass.

Can you find two pictures of metal and stone in buildings that have been weathered by acid rain?

Evaluation – THINKING about your experiment:

1. Was your prediction correct?

2. Why did you use 'normal rain'? To show that it was the 'acid' part of the acid rain that caused the results. So you had something to compare the acid rain results with— a control.

3. This was a 'fair test' because:

a The one difference between the experiments was the type/acidity/pH of the rain.

(tricky this one, as we have set up two different experiments at the same time—comparing the effect on limestone and comparing the effect on metal. Pupils may be confused and say the building material.)

b. The factor we kept the same was time (1 hour, 24 hour), volume of rain (20ml), size of the stones and metal (1-2 cm^3).

4. How did you keep safe? Goggles, rinsed hands, screwed lid on firmly.

5. How could you make your results more accurate? Make use of a numbered colour chart for the change in colour. Leave the rocks/ metal in the rain for longer.

LOTTERY FUNDED

Rot or Repair
Experiment KS2 Higher
Pupil Worksheet (1)
Do Hard Building Materials Absorb Water?

The Science Bit

Some **building materials** need protection from the wet. **Water** can **weaken** and damage materials - it can **weather** them, cause them to bend or **warp**, develop **mould** and also attract bacteria and **insects**. The **damp** conditions can also trigger **illnesses** in humans like **asthma** and other breathing problems.


www.cleanlinest.wordpress.com


www.inspectapedia.com


www.scientificamerican.com


www.ddcoatings.com

Key Words

asthma, building, brick, concrete, damp, glass, granite, insects, limestone, mass, material, metal, mould, painted wood, plastic, slate, warp, water, weaken, wood.

Prediction - what you THINK will happen

(Write your answers on your result sheet)

1. Which of your materials do you think will absorb water?
2. Explain why you think this.
3. How will you know that water has been absorbed?

Your task: We are going to investigate if hard materials absorb water.

You will need:

- Choose six pieces of building material, each a similar size from : limestone, concrete, wood, metal, painted wood, plastic, granite , brick, slate and glass.
- Calculator
- 500ml plastic tub with wide 'mouth' and screw lid.
- 500ml blue water
- Small sieve
- Balance

Environmental Education Project

SWADLINCOTE TOWNSCAPE HERITAGE SCHEME
heritage lottery fund
LOTTERY FUNDED

Method—what you DO

Safety: wipe up spilt liquids.

1. Make sure you know the name of each of the pieces of building material.
2. Write the names of the pieces into your results table.
3. Use the balance to find the mass of each piece.
5. Write the mass for each in the second column of the results table.
6. Half fill the tub with the blue water.
7. Add the pieces of material. Make sure each piece is covered with water.
8. Screw the lid on tightly.
9. Leave for at least one hour.
10. Empty the tub through the sieve over a sink / drain.
11. Note which pieces have absorbed water in your results table.
12. Find the mass of each piece again.
13. Enter the details into the third column of your table.
14. Calculate the difference between the starting and final mass.

When the experiment has finished

On the High Street:

1. Carefully empty the plastic tub down the nearest drain.
2. Dry the apparatus as well as you can with the paper towel.
3. Put <u>all</u> the apparatus in the bag.
4. Wipe your hands with a wet wipe.

In the classroom:

1. Wash out the tub and sieve.
2. Put back the apparatus and pieces of building material into the right box.
3. Wash your hands.

Rot or Repair
Experiment KS2 Higher
Pupil Worksheet (3)
Do Hard Building Materials Absorb Water?

LOTTERY FUNDED

Students name _____

Prediction-what you THINK will happen

1. The materials that will absorb water include _____

_____

2. This is because _____

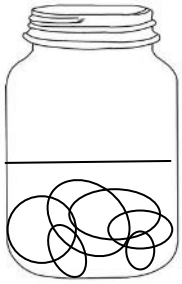
_____

3. I will know water has been absorbed because _____

_____

Method-what you DO

Label the diagram to show what you did.



Results-what you SEE/MEASURE

Building Material	Mass at start (g)	Mass at the end (g)	Difference (g) (end mass-start mass)	Which materials absorbed water?

Environmental Education Project

Rot or Repair
Experiment KS2 Higher
Pupil Worksheet (4)
Do Hard Building Materials Absorb Water?

LOTTERY FUNDED

Conclusion-what you have LEARNT

1. Which building materials absorb water?

2. How do you know ?

3. If these building materials have water pouring on them for years and years, what do you think may happen ?

Building Material	What may happen
Limestone	
Wood	
Terracotta	

Can you find two pictures of materials in buildings that are damaged by water?

Evaluation-THINKING about your experiment

1. Why did you use 'blue' water?

_____

2. This was a 'fair test' because:

   a) The one difference between the experiments was _____

   b) The factor we kept the same was _____

3. How did you keep safe? _____

4. How could you make your results more accurate? _____

_____

Environmental Education Project

Rot or Repair
Experiment KS2 Higher
Pupil Worksheet (1)
Do Hard Building Materials Absorb Water?
ANSWER SHEET

The Science Bit

Some **building materials** need protection from the wet. **Water** can **weaken** and damage materials, cause them to bend or **warp**, develop **mould** and also attract bacteria and **insects**. The **damp** conditions can also trigger **illnesses** in humans like **asthma** and other breathing problems.


www.cleanlinest.wordpress.com


www.inspectapedia.com


www.scientificamerican.com


www.ddcoatings.com

Key Words

asthma, building, brick, concrete, damp, glass, granite, insects, limestone, mass, material, metal, mould, painted wood, plastic, slate, warp, water, weaken, wood,

Prediction - what you THINK will happen

(Write your answers on your result sheet)

1. Which of your materials do you think will absorb water?
2. Explain why you think this.
3. How will you know that water has been absorbed?

Your task: We are going to investigate if hard materials absorb water.

You will need :

- Choose six pieces of building material,

each a similar size from :

limestone, concrete, wood, metal, painted wood,

plastic, granite , brick, slate and glass.

- Calculator
- 500ml plastic tub with wide 'mouth' and screw lid.
- 500ml blue water
- Small sieve
- Balance

Environmental Education Project

Do Hard Building Materials Absorb Water?
ANSWER SHEET

LOTTERY FUNDED

Method—what you DO

Safety: wipe up spilt liquids.

1. Make sure you know the name of each of the pieces of building material.
2. Write the names of the pieces into your results table.
3. Use the balance to find the mass of each piece.
5. Write the mass for each in the second column of the results table.
6. Half fill the tub with the blue water.
7. Add the pieces of material. Make sure each piece is covered with water.
8. Screw the lid on tightly.
9. Leave for at least one hour.
10. Empty the tub through the sieve over a sink / drain.
11. Note which pieces have absorbed water in your results table.
12. Find the mass of each piece again.
13. Enter the details into the third column of your table.
14. Calculate the difference between the starting and final mass.

When the experiment has finished

On the High Street:

1. Carefully empty the plastic tub down the nearest drain.
2. Dry the apparatus as well as you can with the paper towel.
3. Put <u>all</u> the apparatus in the bag.
4. Wipe your hands with a wet wipe.

In the classroom:

1. Wash out the tub and sieve.
2. Put back the apparatus and pieces of building material into the right box.
3. Wash your hands.

Rot or Repair

Experiment KS2 Higher

Pupil Worksheet (3)

Do Hard Building Materials Absorb Water?

ANSWER SHEET

Student name: **SAMPLE ANSWER**

Prediction-what you THINK will happen

1. The materials that will absorb water include _____

_____

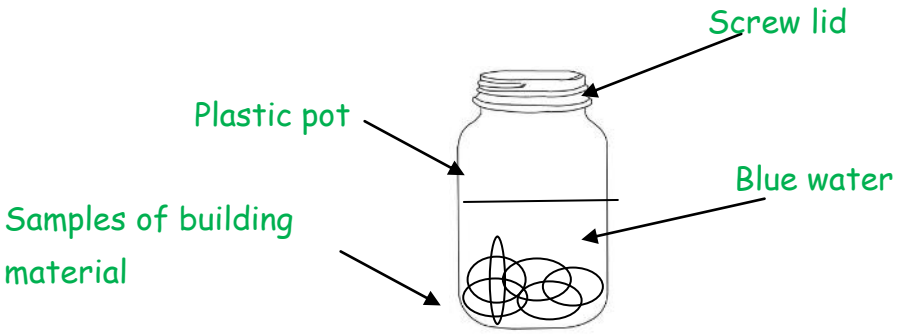
2. This is because _____

_____

3. I will know water has been absorbed because _____

Method-what you DO

Label the diagram to show what you did.



Results-what you SEE/MEASURE

Building Material	Mass at start (g)	Mass at the end (g)	Difference (g) (end mass- start mass)	Which materials absorbed water ?
Wood	43	55	+12	Y
Metal	76	76	0	N
Limestone	89	97	+8	Y
Granite	94	94	0	N
Painted wood	48	49	O	N
Terracotta	56	62	+6	Y

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Rot or Repair

Experiment KS2 Higher

Pupil Worksheet (4)

Do Hard Building Materials Absorb Water?

ANSWER SHEET

SWADLINCOTE TOWNSCAPE HERITAGE SCHEME

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Conclusion – what you have LEARNT

1. Which building materials absorb water?

   Wood, Limestone, Terracotta

2. How do you know ?

   They all got heavier. (Improve: their MASS (weight) was bigger / increased)

3. If these building materials have water pouring on them for years and years, what do you think may happen ?

Building Material	What may happen
Limestone	Wear it away; water may freeze and crack the stone; pieces may fall off
Wood	Go soft; moss grow on it; break down
Terracotta	Moss grow on it

Can you find two pictures of materials in buildings that are damaged by water?

Evaluation – THINKING about your experiment

1. Why did you use 'blue' water?

   So that we could SEE that the material had taken up water.

2. This was a fair test because:

a. The one difference between the experiment was the TYPE of building material.

b. The factor(s) we tried to keep the same were the size of the piece of material 1-2 cm^3 and the time left in the solution 60 minutes

3. How did you keep safe? Mop up any water we spilled.

4. How could you make your results more accurate? Use a balance that measures to 0.01g

Environmental Education Project

Rot or Repair
KS2 Higher Swadlincote Building Survey
Pupil Worksheet

LOTTERY FUNDED

All building materials are chosen for their **properties.**
E.g. hard, strong, colour, cheap, waterproof, stretchy, shiny, rough, bendy etc.

Over time most building materials are **damaged** by **animals, people** or the **weather.** This is called **WEATHERING.**

Rain and wind	Frost and ice	Heat	Rubbing abrasion	Wee and poo. Animal waste	Plants
					
www.pinterest.com	www.pixcove.com	d4nations.com	www.codename we.tumblr.com	bird-control-solutions. blogspot.co.uk	www.emaze.com

YOUR TASK.
You are going to look at a number of buildings in Swadlincote to see which materials have been used and if they have stood up to any **damage or weathering**

YOUR RESULTS. What you see.
Use the table to record what you see.

YOUR CONCLUSIONS. What you have found out.

Look at your results table and then answer these questions.

1. Which building materials were often **weathered**?

   _____

   _____

2. Which materials did not look **weathered**?

   _____

3. Where did windows look most **weathered**, top or bottom? Why?

   _____

   _____

4. Which type of building look most **weathered**? Why?

   Banks Charity Shops Estate Agents Other Shops Hairdressers/Nail bar

   _____

Environmental Education Project

5. The sun is usually seen on the HSBC side of the High Street. Will this have an effect? Why?

_____

_____

6. Did you see any thing that stopped **animal** damage?

_____

_____

7. Were some of these actions better than others? Why?

_____

_____

8. Did you see anything that stopped **weather** damage?

_____

_____

9. What type of building materials are chosen now ?  Look at your results for the newest buildings.

_____

Why?

_____

10. Is there a problem using these building materials?

_____

_____

11. Some owners repair the rotten wood in the windows and then paint them again.
Do you think this is a good idea ? _____ Why ?

_____

_____

SWADLINCOTE TOWNSCAPE HERITAGE SCHEME

Rot or Repair
KS2 Higher Swadlincote Building Survey
Pupil Worksheet

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LOTTERY FUNDED

RESULTS TABLE FOR ……..…… (put your name here)

Name of the Building/ High Street address	Material that is damaged	Material used for	Material chosen because	Cause of the damage	Actions taken to stop damage	Material not damaged
7, High Street	Wood	Windows	Cheap, strong	Heat Rain	Painted	x
	Metal	Drainpipe	Shape it, cheap	Rain	Painted	x

Environmental Education Project

Rot or Repair
KS2 Higher Swadlincote Building Survey
Pupil Extension Worksheet

Design a poster to explain to shop owners the process of weathering and how they could stop or slow it down.

OR

Find out about a new material e.g. the name, who made it, why it is so useful.

OR

Compare the shops that are on the High Street now. Have many changed since 2017?

If so, why do you think this has happened?

KS1	John Dunlop	www.twinkl.co.uk/resource/t-sc-159-john-boyd-dunlop-information-powerpoint
	Charles Macintosh	www.twinkl.co.uk › PlanIt › Science › Y2 › Scientists and Inventors https://www.tes.co.uk/.../charles-rennie-mackintosh-2012-aqagcse-rm-theme-6191653
	John McAdam	https://www.tes.com/teaching-resource/simple-biography-of-john-mcadam-6440640 http://www.twinkl.co.uk/resource/t-sc-099-blank-john-mcadam-fact-file-sheet-differentiated
KS2/3	Spencer Silver	https://www.tes.com/teaching-resource/spencer-silver-bio-worksheet-11047932
	Ruth Benerito	
	New materials e.g. polymers, super sticky, super thin	

Rot or Repair
KS2 Higher
Swadlincote Building Survey
SAMPLE ANSWERS

All building materials are chosen for their **properties.**
E.g.. hard, strong, colour, cheap, waterproof, stretchy, shiny, rough, bendy etc.

Over time most building materials are **damaged** by **animals, people** or the **weather.** This is called **WEATHERING.**

E.g.. Rain and wind	Frost and ice	Heat	Rubbing and **abrasion**	Wee and poo. **Animal Waste**	Plants
					
www.pinterest.com	www.pixcove.com	d4nations.com kwe.tumblr.co	www.codename blogspot.co.uk	bird-control-solutions.	www.emaze.com

YOUR TASK.
You are going to look at a number of buildings in Swadlincote to see which materials have been used and if they have stood up to any **damage or WEATHERING.**

YOUR RESULTS. What you see.
Use the table to record and note down what you see.

YOUR CONCLUSIONS. What you have found out.

Look at your results table and then answer these questions.

1. Which building materials were often **weathered**? Stone, brick, concrete, terracotta, paint, UPVC, stucco, plastic, roof felt, pebble dash, metal.
2. Which materials did not look **weathered**? Glass, lead, slate, glazed tiles.
3. Where did windows look most **weathered**, top or bottom? Why? Bottom. Where water collects and where people can rub against.
4. Which type of building look most **weathered**? Why?
   Banks Charity Shops Estate Agents Other Shops Hairdressers/Nail bar
   Less money available in their profits to invest in the appearance of the building.
5. The sun is usually seen on the HSBC side of the High Street. Will this have an effect? Why?
   Yes. You will see more weathering because the buildings will be in sunlight, therefore, exposed to more heat.

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6. Did you see any thing that stopped **animal** damage?
   Two designs of pigeon spikes, pigeon 'tents' and pigeon trip wires.
7. Were some of these actions better than others? Why?
   Yes. The new spike design was more effective. The spikes sticking out at all angles made it more difficult for the pigeons to land and sit there. The pigeons were sitting between the design of the older spikes which just stuck up in one direction.
8. Did you see anything that stopped **weather** damage? Paint, plastic covered metal, use of materials that will take longer to weather – see Q2.
9. What type of building materials are chosen now? Look at your results for the newest buildings. Plastic covered metal, UPVC, plastic, glazed tiles, granite, glass, slate
   Why? They do not weather or they take longer to weather.
10. Is there a problem using these building materials? Plastic and UPVC does not biodegrade so it is difficult to dispose of. UPVC and granite are very expensive.
11. Some owners repair the rotten wood in the windows and then paint them again.
    Do you think this is a good idea? Why?
    Children to give their own opinions

Rot or Repair

KS2 Higher

Swadlincote Building Survey

SAMPLE ANSWERS

RESULTS TABLE FOR ……..…… (put your name here)

Building/ High Street address	What material is damaged?	What is the material used for?	Why was that material chosen?	What has caused the damage?	Action to stop damage.	Material not damaged
Number 7	Wood	Windows	Cheap, strong	Heat Rain	Painted	x
	Metal	Drainpipe	Shape it, cheap	Rain	Painted	x
	See separate sheet giving details on the observations you can find on: a) The HSBC Side and the b) Salt Bros Side					

Rot or Repair Survey KS2 Higher
Weathering Observations Of High Street
(Birds Side)

SAMPLE ANSWERS (2017)

Building/ High Street address	What material is damaged	What is the material used for?	Why was that material chosen?	What has caused the damage?	Actions to stop damage	Material not damaged
Charity shop				Animal waste	Recently had work completed ?	
Greggs				Plant	Paint	
St Giles						
Hillfield		Gutter		Plant		
Birds						
Prince Bates						
Scrivens						
Fisher C						
Smiths						
Go Mobile Nail						
Empty	Painted wood	Window		Paint		
Specsavers						
Casino						
Yum Yum				Plant		
Labyrinth						
Teddy's				Plants		Plastic
Mind						Shiny tiles
Cafe						Plastic and metal
Coop Travel	Painted wood	window		Rain		Granite
Your Move						
Clintons						
Peacocks	Stone	Decorations		Frost		
	Wood			Rain		
Clarks	Metal	Screws		Rain		
Discount DIY						
KC Fish Bar						
Clothing 4						
Vape HQ						
M&N Comp						
MB Mob						

SWADLINCOTE TOWNSCAPE HERITAGE SCHEME
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Rot or Repair Survey KS2 Higher
Weathering Observations Of High Street (HSBC Side)

SAMPLE ANSWERS (2017)

Building/ High Street address	What material is damaged?	What is the material used for?	Why was that material chosen?	What has caused the damage?	Actions to stop damage	Material not damaged
No. 7	Wood – more at the bottom	window		Heat, rain		
	Metal			Rain		
Empty shop	Paint			Heat		
Thompsons	Paint					
Boots						
Estate Agents	Metal	Drainpipe			Painted	UPVC
	Metal	Gutter		Plants		
William Hill	Metal	Gutter		Plant	Pigeon spikes	
New					Windows	Plastic
Card Factory	??	Window			Wall	Brick
					Roof	??
YMCA						
Max Photo					Shop sign	Plastic
Newsagent	Brick	Chimney		Plant		Shiny tiles
	Paint	Window				
HSBC					Pigeon spikes	Shiny tiles
Superdrug						Plastic
Shoe Zone						UPVC
Hallmark	Metal	Window		Bash		
	Shiny tiles	Base		Bashed		
Thorntons						
Pound stretcher						
Forever Mob						
Foresters						Shiny tiles
Empire Comput-ers						
CDZ						
Nomad Tattoo	Metal	Gutter		Plants		
Fortune Garden						
USA Chicken	Shiny tiles	Walls		Bashed		Plastic
John Mills	Metal	Sign?		Rain	Paint	
	Paint	Windows				

Rot or Repair Survey KS2 Higher
Weathering Observations Of High Street (HSBC Side)
Additional Tasks

Design a poster to explain to shop owners the process of weathering and how they could stop or slow it down.

OR

Find out about a new material e.g. the name, who made it, why it is so useful.

OR

Compare the shops that are on the High Street now. Have many changed since 2017?

If so, why do you think this has happened?

KS1	John Dunlop	www.twinkl.co.uk/resource/t-sc-159-john-boyd-dunlop-information-powerpoint
	Charles Macintosh	www.twinkl.co.uk › PlanIt › Science › Y2 › Scientists and Inventors https://www.tes.co.uk/.../charles-rennie-mackintosh-2012-aqagcse-rm-theme-6191653
	John McAdam	https://www.tes.com/teaching-resource/simple-biography-of-john-mcadam-6440640 http://www.twinkl.co.uk/resource/t-sc-099-blank-john-mcadam-fact-file-sheet-differentiated
KS2/3	Spencer Silver	https://www.tes.com/teaching-resource/spencer-silver-bio-worksheet-11047932
	Ruth Benerito	
	New materials e.g. polymers, super sticky, super thin	