

# Creative Teaching & Learning Science Lesson plans

## Materials

These lessons have been specifically written to support the teaching of science through the theme of materials.

### *Science Lesson 1: Properties and uses (Key Stages 1 and 2)*

**Aims of the lesson:** To investigate different properties of materials.

**Activity:** Begin by writing a list of materials on the board. As a whole class, brainstorm the properties of each material. Next, explain that pupils are going to think about which would be most suitable to make a notepad. The following can be posed:

- ❖ What is a notepad used for. (The pupils need to understand what sort of materials are suitable for writing)
- ❖ Which of the materials in our list can you write on?
- ❖ Why are some unsuitable for a writing book even though you can write on them (e.g. too heavy, the ink rubs off)?
- ❖ Which material is the most suitable? What properties does this material have that makes it the most suitable?

Next ask groups of pupils or individual pupils to look at other everyday items. For each item, the name, its use, what it is made from and a sentence explaining why the material chosen to make the item was a good choice should be recorded.

**Extension:** Ask the class to investigate why certain inventions might fail. For example, a glass umbrella, a wood shopping bag or a ceramic newspaper. In each case, the pupils should note why the materials chosen would not be suitable for the purpose.

**Differentiation:** This activity should be suitable for pupils of all abilities.

### *Science Lesson 2: Flexibility (Key Stage 1)*

**Aims of the lesson:** To categorise different materials according to specific properties.

**Activity:** Begin this lesson by ensuring that the class understand what is meant by properties in the context of materials. Essentially, a property describes something about a material and the things it can and can't do. Here is a table of materials that lists some properties:

Material	Common property
Steel	Strong (meaning steel will resist the effects of forces)
Glass	Brittle (meaning it is hard, but breaks easily)
Copper	Conductor (meaning that it allows heat or electricity to flow through it)
Rubber	Flexible (meaning that it bends easily)
Wood	Rigid (meaning it will not bend easily)

This activity concentrates on two specific properties: flexibility and rigidity. Each pupil (or group) needs a copy of the sheet on page 47. This shows a variety of materials and/or objects made from a specific material and asks the pupil to decide if the material is flexible or rigid.

**Extension:** As an added investigation, the class could locate and list all the materials found in their classroom that are flexible or rigid and then suggest why certain objects need to be made from flexible or rigid materials.

**Differentiation:** This activity should be suitable for children of all abilities.

## Flexibility

Name:

Date:

Here are some pictures of objects made from different materials.

Circle the materials that are flexible in blue and circle the materials that are rigid in red.



**Wool**



**Wood**



**Paper**



**Cotton**



**Glass**



**Leather**



**Rubber**



**Iron**



**Chalk**

## Science Lesson 3: House materials (Key Stage 2)

**Aims of the lesson:** To discover the materials found in an average house and classify them according to purpose.

**Activity:** The poster found in this issue of *Teaching & Learning* shows an average family home, with four rooms displayed. Each of the rooms (bedroom, bathroom, lounge and kitchen) will hold a variety of objects made from different materials. Begin by displaying this poster and ask the class to discuss what objects they can see and what materials the objects are made from. Some objects have already been labelled for your ease of reference, but there are many more that have not been labelled. The class should begin this activity by compiling a list of objects found in their own homes and note the materials they are made from. Then ask:

- ❖ Why is that object made from that material?
- ❖ What properties does that material have that makes it fit for the object's purpose?

Once these questions have been explored, ask each pupil or groups of pupils to complete a table like the one given below.

Object	What is this object designed to do?	What material is it made from?	Why was this material used?
Bath	Hold water so needs to be waterproof and rigid	Ceramic	It is waterproof and stays rigid.

**Extension:** This type of investigative activity can be carried out for any location. As an extension the class could try to locate and specify materials used in the playground (linking to rocks and soils).

**Differentiation:** This activity should be suitable for pupils of all abilities.

## Science Lesson 4: Solids and liquids (Key Stages 1 and 2)

**Aims of the lesson:** To investigate solids, liquids and gases and correctly categorise some materials.

**Activity:** All materials exist as a solid, liquid or gas, and some materials can exist in more than one of these three states. Begin this investigation by discussing with the class what solids, liquids and gases are. For your own ease of reference they are:

- ❖ Gas: A form of matter with no fixed shape or volume.
- ❖ Liquid: A form of matter with a definite volume, but no fixed shape.
- ❖ Solid: A form of matter with a fixed shape and a fixed volume.

Once the class understand the differences, explain that some materials can exist as a solid and as a liquid. Can the class think of any (water, chocolate, glass, ice-cream etc)? Then explain that liquids can be changed to a solid by cooling (this is called freezing or solidifying) and solids can be changed to a liquid by heating (this is called melting). Ask the pupils to suggest when they have seen water freezing, and what conditions are necessary for this to happen. Ask them to suggest how to make ice melt. Elicit examples of familiar materials that melt or solidify. Once this knowledge and understanding has been reinforced, give each pupil a copy of the activity sheet found opposite (page 49). This sheet asks the children to categorise items according to whether they are a solid or a liquid. Once the items have been categorised, the pupils are asked two extension questions designed to reinforce their knowledge and understanding.

**Extension:** This activity only deals with solids and liquids. As an extension the class could try to think of some gases.

**Differentiation:** While some of the classroom discussion might be more suitable for more able children, the worksheet is suitable for pupils of all abilities.

## Solids and liquids

Name:

Date:

Look at the items displayed here. Do you know which ones are solids and which ones are liquids?



Write the items in the correct columns in this table.

Solids	Liquids

Some materials can exist as both a solid and a liquid. Can you list some here?

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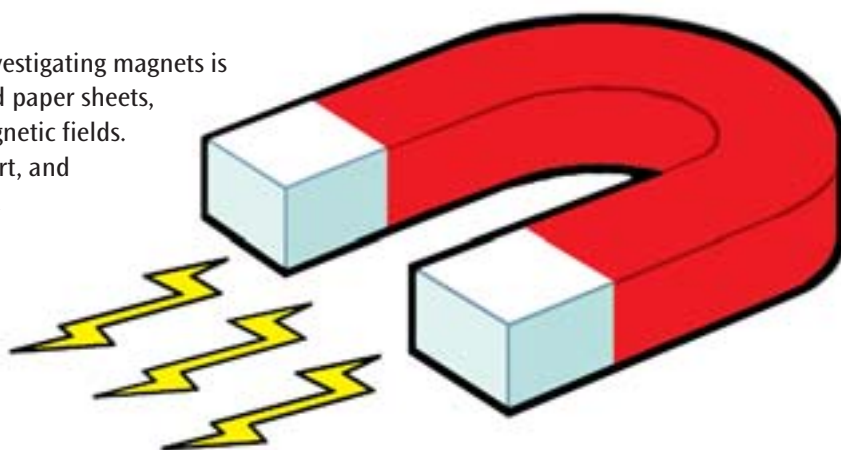
## Science Lesson 5: Marvellous magnets (Key Stages 1 and 2)

**Aims of the lesson:** To carry out an inquiry-based investigation into magnets and magnetism.

**Activity:** All modern devices that incorporate motors, electrical energy production or transmission, computers, televisions and many more all use magnetic materials. This activity asks the pupils to investigate the properties of magnets. Begin by distributing magnets to the class either to individual pupils or groups of pupils. Demonstrate how magnets work (making sure to show how magnets attract and repel). Then, distribute materials/objects to be tested. Each pupil or group of pupils should then test the materials to see if they are magnetic (or not) and systematically record their results. Then ask the class to identify objects within the classroom that may (or may not) be magnetic. Each pupil or group should predict whether (or not) the object will be magnetic and record their predictions. Then, each pupil or group should test the objects and record their observations. Finally, the pupils or groups should report their findings and compare their predictions to their observations.

**Extension:** An excellent extension activity to investigating magnets is to look at magnetic fields. The class would need paper sheets, iron filings and bar magnets to explore the magnetic fields. The magnets should be placed 1 – 2 inches apart, and lined up so they attract or repel each other. Ask the pupils to predict what will happen when iron filings are poured onto the paper over the magnets? Then, once the filings have been poured, ask the class to observe what happened and report back.

**Differentiation:** This activity is based on a simple principle and so the main activity should be suitable for pupils of all abilities.



## Science Lesson 6: Magical water (Key Stages 1 and 2)

**Aims of the lesson:** To investigate water – reinforcing the principle that materials can change their state.

**Activity:** Water is a very special form of matter. It can exist as a solid (ice), liquid (water) or a gas (water vapour). Begin the lesson by showing the class the photograph found opposite (page 51). This photograph shows Antarctica – a continent covered in ice and surrounded by water. Some of the pupils may be aware that both the North and South Poles are melting (due to many factors including the Greenhouse Effect). Reinforce the fact that when ice gets warmer it melts.

But how can ice be made to melt more quickly? Establish that an ice cube will melt more quickly in a warmer place and ask the class how they could use this fact to find the warmest place in the classroom. The class should plan the investigation before carrying it out, ensuring that all the test criteria remain constant (including the size of ice cubes used). Once the ice has melted it becomes water again. Explain that if a source of heat were continually applied to the water, its temperature would get higher and higher until eventually it would evaporate. This can be demonstrated by boiling some water – although care must be taken when demonstrating this in the classroom.

**Extension:** Water is not the only substance that evaporates into a gas. If you place a penny on some shaving foam, at first the penny will stay on top of the foam. However, after a short time, the foam will begin to evaporate and, if you leave it overnight, the gas bubbles in the foam will escape into the air leaving a sticky, soapy residue.

**Differentiation:** This activity should be suitable for pupils of all abilities.





# Antarctica

