



Box 3

Hands-on science out of the box!



60+ cards
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Hands-on science out of the box!



Terry Hudson & Debbie Roberts





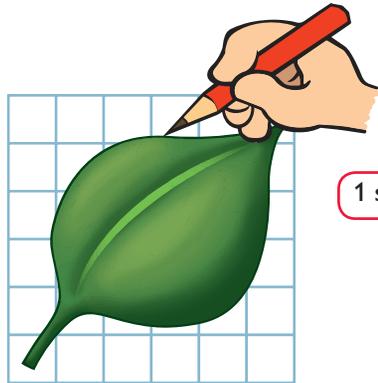
Plants

2: Looking at leaves

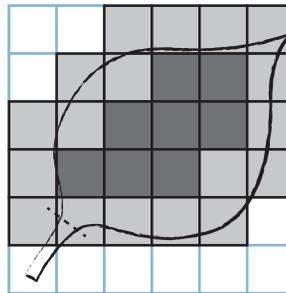
Stay safe!

Tell your teacher if you have any allergies linked to plants.
Check with your teacher before you pick any leaves.

- 1 Collect five leaves from different plants.
a. Draw your leaves. b. Compare the leaves. c. How are they the same? d. How are they different?
- 2 Measure the size of the leaves using graph paper as shown below. Your results will be in square centimetres (cm^2).



1 square = 1cm^2



1 square = 1cm^2

- 3 Record your observations and measurements in a table.

Objectives

Know that plants have roots, leaves, stems and flowers.

Talk
about

Why are leaves important to plants?



Material properties

Objectives

Explore how some materials are magnetic but many are not.

5: Magnetic materials

- 1 Look around the room and find an object that you think will be attracted to a magnet. We say such objects are 'magnetic'.
- 2 Write down the names of the magnetic objects.
- 3 Then find an object that you predict will not be attracted to a magnet. We say these are 'not magnetic'.
- 4 Your teacher will give you a magnet to test the objects.
- 5 Was your prediction correct?
- 6 Now you have practised predicting and testing magnetic materials, find more objects. Try to find six objects that you predict will be attracted to the magnet and six that will not.
- 7 Test your predictions and record your observations.





Forces and motion

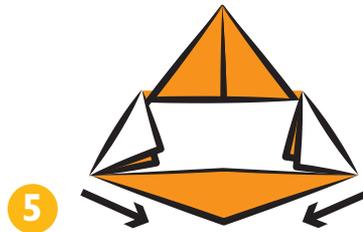
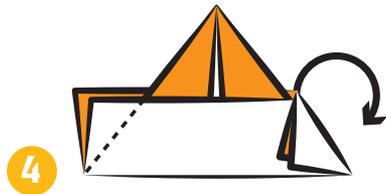
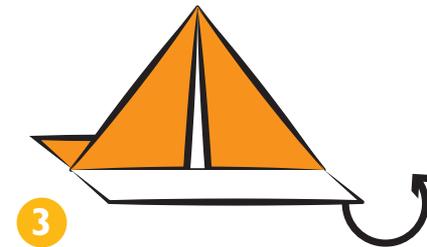
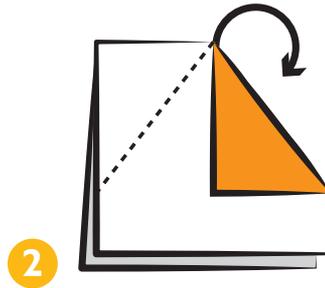
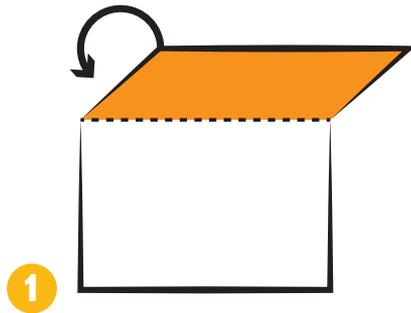
Objectives

Explore how forces can change the shape of objects.

6: Making shapes with paper

Your teacher will give you a sheet of paper.

- 1 Follow the instructions to try to make a paper hat. You could work with a partner to help each other.
- 2 Try to design and make different objects from paper. You could try an aeroplane or a boat, for example.
- 3 Identify the pushes and pulls that you use to make the hat.





Scientific Enquiry

Stage 3

Scientific Enquiry skills		Biology cards	Chemistry cards	Physics cards
Ideas and evidence	Collect evidence by making observations when trying to answer a science question. (3Ep1)	2, 4, 6, 9, 13, 20, 25, 35	1, 6	4, 10
Plan investigative work	Suggest ideas, make predictions and communicate these. (3Ep2)	4, 5, 6, 8, 9	5, 6, 8, 9	10
	With help, think about collecting evidence and planning fair tests. (3Ep3)	5, 6, 7, 13, 25	6, 9	10
Obtain and present evidence	Observe and compare objects, living things and events. (3Eo1)	2, 3, 4, 7, 14, 16, 28, 31	3, 10	1, 3, 5, 7
	Measure using simple equipment and record observations in a variety of ways. (3Eo2)	2, 3, 4, 5, 6, 7, 8, 9, 32	8, 9	2, 3, 10
	Present results in drawings, bar charts and tables. (3Eo3)	2, 4, 5, 6, 7, 9, 24, 30, 38	1, 8	7, 8
Consider evidence and approach	Draw conclusions from results and begin to use scientific knowledge to suggest explanations. (3Eo4)	3, 4, 5, 6, 7, 8, 9, 25, 38	8, 9	8, 10
	Make generalisations and begin to identify simple patterns in results. (3Eo5)	2, 4, 10, 13, 18, 27, 29, 40	5	3, 10



Stage 3: Teacher's Notes

Plants

2: Looking at leaves

Objectives

Know that plants have roots, leaves, stems and flowers.

Collect evidence in a variety of contexts to answer questions or test ideas.

Observe and compare objects, living things and events.

Measure using simple equipment and record observations in a variety of ways.

Present results in drawings, bar charts and tables.

Make generalisations and begin to identify simple patterns in results.

Resources

- selection of different leaves
- pens or pencils
- graph paper (1 cm square best)
- worksheets

Key skills

observing, recording, comparing, measuring

Cross-subject links

maths

Background information

There is a huge range of different-sized leaves and the same plant will have smaller leaves at the top – because they are growing and because there is more light – and larger leaves at the bottom. Some leaves have smooth margins and others are serrated or saw-like. Rough leaves can sometimes have hairs that protect them from insects and other animals.

Step by step guide

- You may have to start by explaining the process of calculating the area of a leaf using graph paper. However, this gives more meaningful results than simply dividing length by width as in finding the area of rectangles. Tell the students to count full squares and then count up squares that were partly covered by the leaf. If they ignore squares that are less than half and add squares that are more than half, they will arrive at a reasonably accurate area. You could use this as basis to cover some mathematics and issues linked to experimental error.
- Hand out the leaves to the students and ask them to work individually, in pairs or small groups of three or four. The students measure each leaf in turn using the technique shown on the card. Encourage them to record each leaf as they finish the measurement. Finally, ask the students to compare the surface areas of the leaves and other factors such as the colour, shape, texture and margin.



2: Looking at leaves

Objectives

Know that plants have roots, leaves, stems and flowers.

Complete the table below to record your leaf observations and measurements

Leaf	Colour	Shape	Texture: what does it feel like?	Size (cm ²): how big is it?	Is the edge (the margin) smooth or rough?
1					
2					
3					
4					
5					



5: Magnetic materials

Objectives

Explore how some materials are magnetic but many are not.

Suggest ideas, make predictions and communicate these.

Make generalisations and begin to identify simple patterns in results.

Resources

- a range of magnetic and non-magnetic materials
- magnet
- worksheets

Key skills

predicting, investigating, recording

Cross-subject links

design and technology

Background information

Students have studied the properties of materials in previous grades and earlier cards. This card introduces magnetic and non-magnetic materials. Students need to know that magnetic materials will be attracted to or move towards a magnet. On the other hand, materials that are not attracted to a magnet are called 'non-magnetic'. Magnets themselves will repel or move away from another magnet. Magnetism is a property of materials that students will explore.

Step by step guide

- Students can use the image of the magnet attracting metal objects to prompt their thinking about magnetic and non-magnetic materials.
- Students should select an object from around the room that they think will be attracted to a magnet.
- They should record the name of the object. The worksheet demonstrates a useful method of recording the students' findings.
- They will then need a magnet to test their predictions. They record on the worksheet whether the prediction was correct.
- Students should then collect a further six objects that they predict will be magnetic and six that they predict will be non-magnetic.
- They should test their predictions and record them in the same way.



Stage 3: Teacher's Notes

Forces and motion

6: Making shapes with paper

Objectives

Explore how forces can change the shape of objects.

Resources

- paper
- worksheets

Key skills

planning, designing, predicting

Cross-subject links

design and technology

Background information

Students have studied how pushes and pulls can make objects move. This card provides students with an opportunity to investigate how forces can change the shape of objects.

Step by step guide

- Encourage the students to work in pairs to follow the instructions on the card and produce a paper hat.
- They should discuss when they are using forces and identify these by labelling the worksheet.
- When they have completed the paper hat, they should design and construct a different object, for example a boat or aeroplane.
- Allow them to make changes to their paper object and try to perfect their design.

Support for language development

Provide students with scrap paper. Ask them to compare the flat sheet with a crumpled-up piece. Show them that the paper has now changed shape because it has been pushed and squashed into a different shape.



Forces and motion

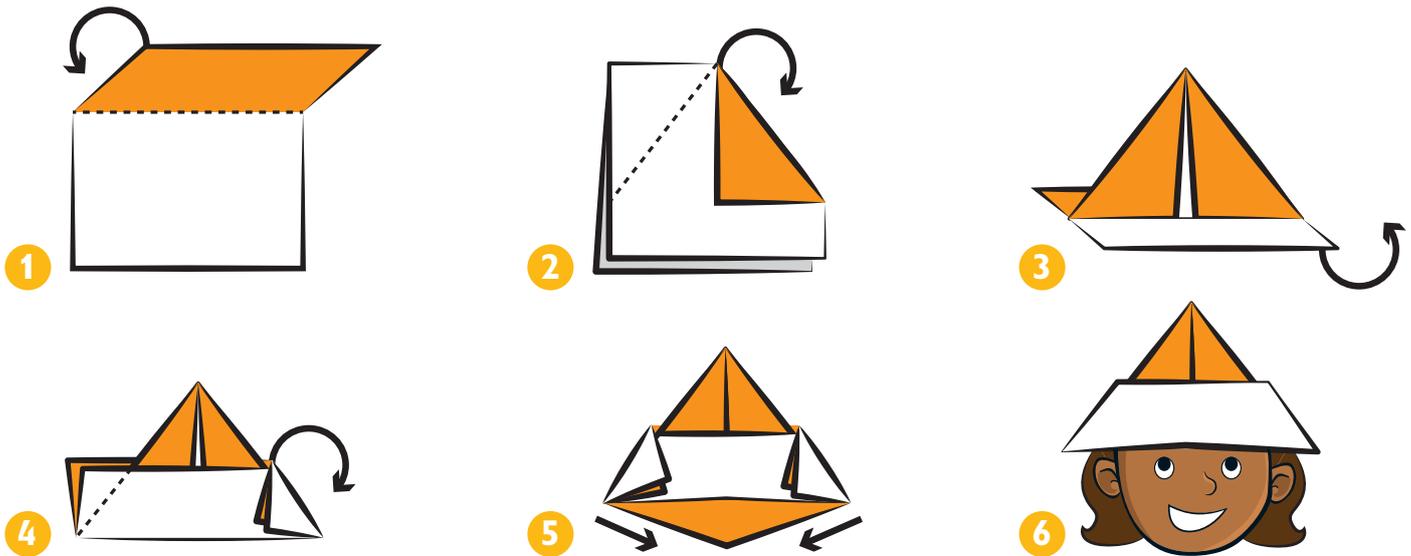


Can be used on a projector.

6: Making shapes with paper

Objectives

Explore how forces can change the shape of objects.



- 1 Write on the diagram where you will use pushes or pulls.
- 2 Draw a design of another object that you could make out of paper in the space.
- 3 Label where you predict you will use pushes and pulls to change the shape of the paper.



Stage 3

Topic	Card number												
Topic: Plants													
Know that plants have roots, leaves, stems and flowers. (3Bp1)	1	2	3	4									
Explain observations that plants need water and light to grow. (3Bp2)	5	6											
Know that water is taken in through the roots and transported through the stem. (3Bp3)	7	8	9										
Know that plants need healthy roots, leaves and stems to grow well. (3Bp4)	10	11	12										
Know that plant growth is affected by temperature. (3Bp5)	13												
Topic: Humans and animals													
Know that life processes common to humans and animals include nutrition (water and food), movement, growth and reproduction. (3Bh1)	14	15											
Describe differences between living and non-living things using knowledge of life processes. (3Bh2)	16	17	18										
Explore and research exercise and the adequate, varied diet needed to keep healthy. (3Bh3)	19	20	21	22	23								
Know that some foods can be damaging to health, e.g. very sweet and fatty foods. (3Bh4)	24	25	26	27									
Explore human senses and the ways we use them to learn about our world. (3Bh5)	28	29	30	31	32	33	34	35	36	37	38	39	
Sort living things into groups, using simple features, and describe rationale for groupings. (3Bh6)	40												



Stage 3

Topic	Card number									
Topic: Material properties										
Know that every material has specific properties, e.g. hard, soft, shiny. (3Cp1)	1	2								
Sort materials according to their properties. (3Cp2)	3	4								
Explore how some materials are magnetic but many are not. (3Cp3)	5	6								
Discuss why materials are chosen for specific purposes on the basis of their properties. (3Cp4)	7	8	9	10						



Stage 3

Topic	Card number												
Topic: Forces and motion													
Know that pushes and pulls are examples of forces and that they can be measured with forcemeters. (3Pf1)	1	2	3										
Explore how forces can make objects start or stop moving. (3Pf2)	4	5											
Explore how forces can change the shape of objects. (3Pf3)	6	7	8										
Explore how forces, including friction, can make objects move faster or slower or change direction. (3Pf4)	9	10											



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