

NUCLEUS

English for Science and Technology



GENERAL SCIENCE

Martin Bates / Tony Dudley-Evans



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ENGLISH FOR SCIENCE AND TECHNOLOGY

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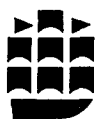
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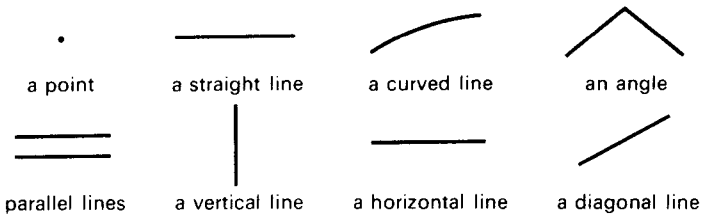
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Unit 1 Properties and Shapes

Section 1 One-dimensional and two-dimensional properties

1. Look at these:



Now read this and answer the questions:

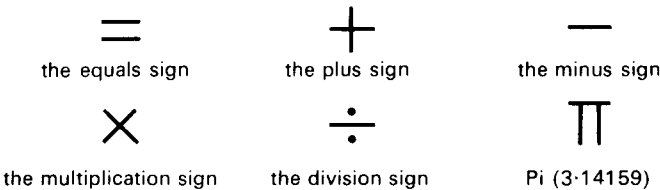
The letter 'E' has one vertical line and three horizontal lines. It also has four angles.

Which of these letters are described below?

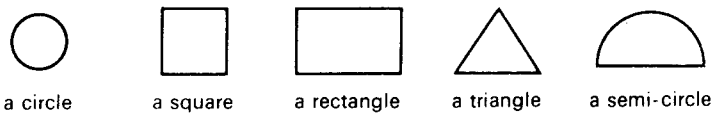
D, M, C, H, F, L, Z, B.

- a) A letter with 2 horizontal lines and 1 vertical line.
- b) A letter with 1 curved line and no straight lines.
- c) A letter with 2 curved lines and 1 vertical line.
- d) A letter with 2 parallel vertical lines, 1 horizontal line and 4 angles.
- e) A letter with 2 vertical lines and 2 diagonal lines.

Now write sentences describing these signs:



2. Look at these figures and answer the questions:


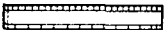
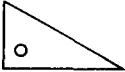




- a) Which figure is curved?
- b) Which figures have parallel sides?
- c) Which figure always has equal sides?

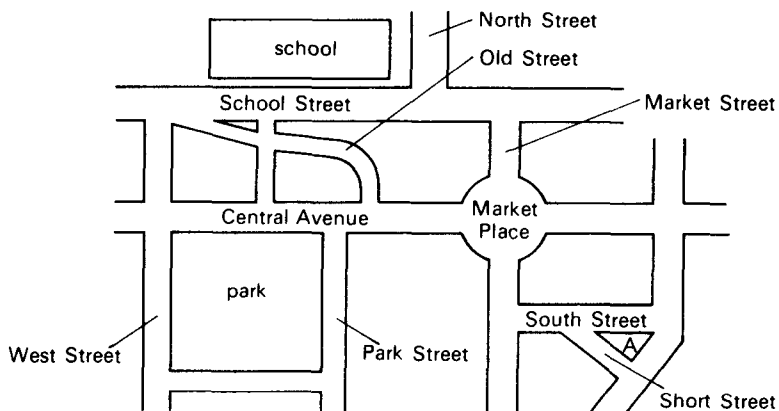
- d) Which figure may have equal sides?
- e) Which figure has 3 angles?
- f) Which figure has a curved side and a straight side?

Now make sentences from the table:

Example: A coin is shaped like a circle. It is circular in shape.

	A coin		square.		rectangular	
	A ruler		rectangle.		circular	
	A set square	is shaped like a	semi-circle.	It is	square	in shape.
	A protractor		triangle.		semi-circular	
	A chess-board		circle.		triangular	
						
						

3. Look at this plan of a town:



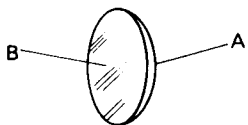
Answer these questions:

- a) What shape is the plan of the school?
- b) Which street is curved?
- c) What shape is area A?
- d) Which area is square?
- e) Name two streets which are parallel.

- f) Are Old Street and School Street parallel?
- g) Which part is roughly circular in shape?
- h) Which streets meet at an angle of 90 degrees (at right angles)?
- i) Which streets meet at a different angle?

Section 2 Three-dimensional shapes

4. Look and answer:



This is a lens. One *surface* is *curved* and the other is *flat*. Which is which?

Look at these solids:



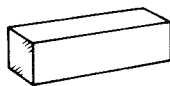
a sphere



a hemisphere



a cube



a rectangular prism



a cylinder

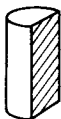


a cone

Now describe them:

Example: A cube has 6 surfaces. They are all flat and square.

5. Look and read:



The *cross-section* of a cylinder is circular. The *longitudinal* section is rectangular. The sides of a cylinder are parallel. The sides of a cone are *tapering*.

Answer these questions:

- a) What shape is the cross-section of a sphere?
- b) What shape is the longitudinal section of a hemisphere?
- c) What shape is the cross-section of a cube?
- d) Which solid is rectangular in cross-section?
- e) In longitudinal section, are the sides of a cylinder parallel or tapering?

- f) In longitudinal section, are the sides of a cone parallel or tapering?
 g) What shape is the cross-section of a cone?

6. Complete these:

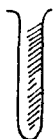
Cylindrical = shaped like a _____
 Cubic = shaped like a _____
 Conical = shaped like a _____
 Spherical = shaped like a _____

Now describe the shapes of these objects:

Example: A ball is spherical in shape.



a ball



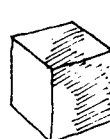
a test-tube



a funnel

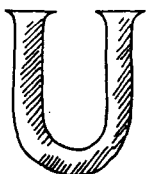


a flask



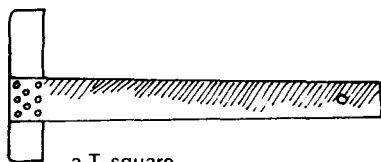
a salt crystal

7. Look at this:

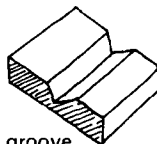


This tube is shaped like the letter 'U'.
 It is *U-shaped*.

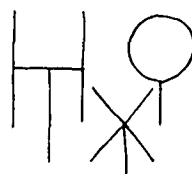
Describe the shapes of the following:



a T-square

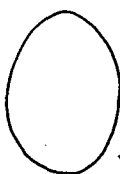


a groove



aerials

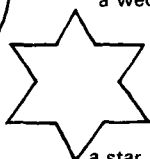
These objects are used to describe shapes:



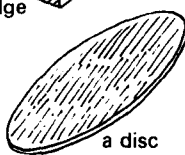
an egg



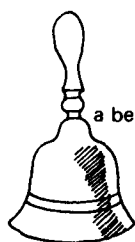
a wedge



a star



a disc



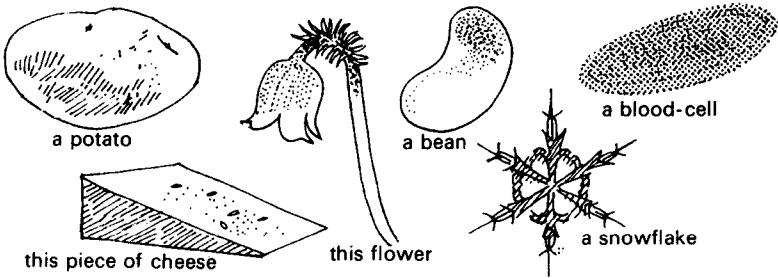
a bell



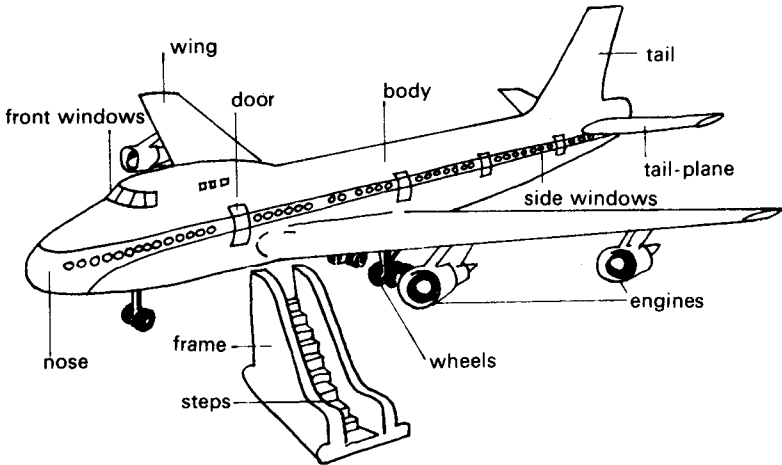
a kidney

Now describe the following objects:

Example: A potato is egg-shaped.



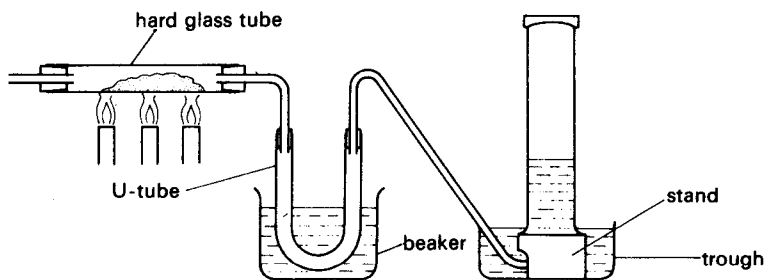
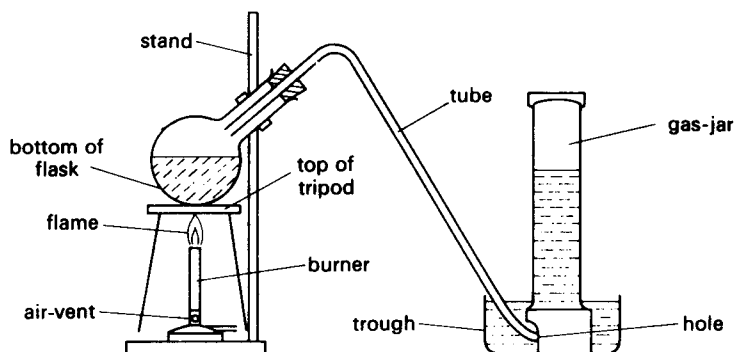
8. Look at this picture:



Now say whether these statements are true or false. Correct the false statements.

- a) The tail is nearly triangular in shape.
- b) The door is flat.
- c) The steps are parallel to each other.
- d) The sides of the frame are curved.
- e) The tail-plane is wing-shaped.
- f) All the windows are circular.
- g) The engines are nearly cylindrical.
- h) The wheels are cubic in shape.
- i) The front of the plane is cylindrical.
- j) The nose is tapering.
- k) The wings are at right angles to the body.

9. Look at these diagrams and complete the descriptions:



In the first apparatus, the bottom of the flask is _____ in shape. The flask is in a _____ position. The stand is _____. The gas-jar is _____ in shape. The burner is also _____. The air-vent is _____. The flame is _____. The bottom of the trough is _____. The hole at the bottom of the gas-jar is _____ in shape. The top of the tripod is _____. In cross-section, the tube is _____.

Now make as many sentences as you can describing the second apparatus.

Section 3 Properties of materials

10. Look and read:

100°C	Steam	Boiling Point Melting Point	↑ ↓	Point of Condensation Freezing Point
0°C	Water			
	Ice			

Ice is *solid*. Water is *liquid*. Steam is *gaseous*. Steam and water are *fluids*.

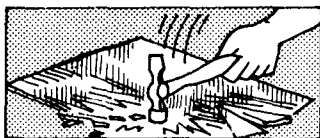
-183°C	Oxygen	Boiling Point
-218.4°C	Oxygen	Melting Point
	Oxygen	

-245.9°C	Neon	Boiling Point
-248.7°C	Neon	Melting Point
	Neon	

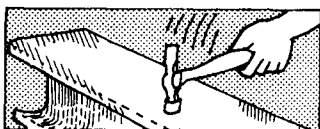
Complete these statements:

- At -183°C oxygen changes from the gaseous state to the _____ state.
- At -218.4°C oxygen changes from the liquid state to
- At 183°C oxygen is in the _____ state.
- At -246°C neon is in the _____ state.
- At -220°C oxygen is in the _____ state.
- Steam, water, ice, oxygen, neon: all these are fluids except _____.

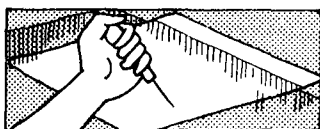
11. Read the following properties of materials and complete the examples:



A *brittle* material *breaks* easily; eg glass, . . .



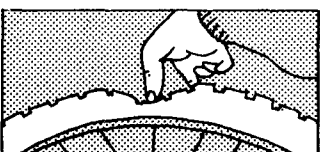
A *tough* material does not break easily; eg steel, . . .



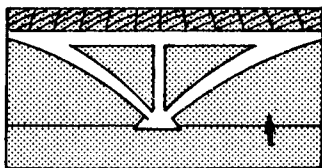
A *hard* material is difficult to *scratch*; eg glass, . . .



A *soft* material is easy to scratch; eg chalk, . . .



A *flexible* material *bends* easily; eg rubber, . . .



A *rigid* material does not bend easily;
eg concrete, . . .

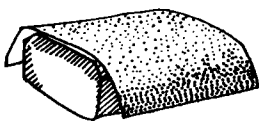
Answer these questions:

- a) Why does a glass beaker break if you drop it?
- b) Why doesn't a polythene beaker break?
- c) Why is butter easy to cut?
- d) Why can a diamond cut glass?
- e) Why do the branches of a tree bend in the wind?
- f) Why don't the walls of a house bend in the wind?
- g) Which is more flexible: a wooden ruler or a plastic ruler?
- h) What are the different properties of green wood (on a tree) and dry wood?

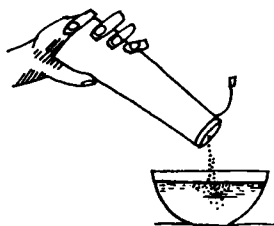
12. Read and complete these:



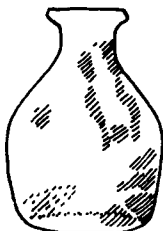
Some materials have a *smooth* surface;
they produce little *friction* when they
are rubbed; eg ice, . . .



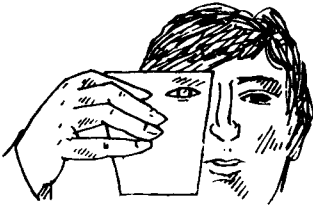
Some materials have a *rough* surface
and produce a lot of friction; eg
sandpaper, . . .



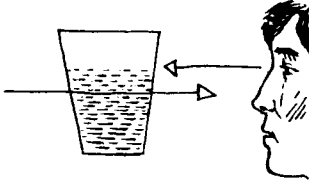
Materials which are *soluble* in water
dissolve easily; eg salt, . . .



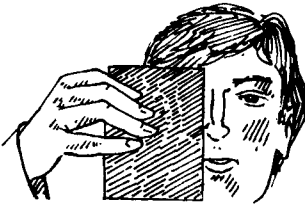
Materials which are *insoluble* do not
dissolve; eg glass, . . .



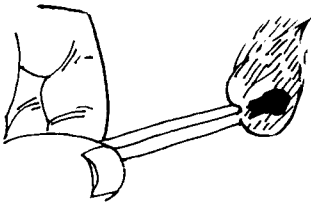
You can see through *transparent* materials; eg water, . . .



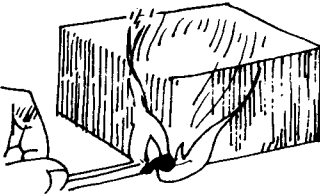
You cannot see through *translucent* materials but the light passes through them; eg dirty water, . . .



You cannot see through *opaque* materials and the light cannot pass through them; eg metal, . . .



Combustible materials *burn* easily; eg wood, . . .



Non-combustible materials do not burn, eg stone, . . .

Read this and choose the right properties:

A material which is used for making clothes must be solid/fluid, brittle/tough, soft/hard, rigid/flexible, smooth/rough, opaque/transparent and soluble/insoluble.

Complete these sentences:

One material with these properties is wool. Others are _____ and _____.

Steel is not generally used for clothes because it is

Glass is unsuitable because it is _____, _____ and _____.

Now suggest different properties which are suitable for the following purposes and give examples of materials with the right properties:

- a) For the body of a car we need a material which is _____, _____, _____ and _____, eg _____.
- b) For a window . . . , eg _____.
- c) For a cooking pot . . . , eg _____.

13. Complete the following table, giving the properties of the materials:

	steel	glass	rubber	sugar	wood
tough/brittle	tough				
soft/hard	hard				
soluble/insoluble	insoluble				
combustible/non-combustible	non combustible				
flexible/rigid	rigid				
transparent/opaque	opaque				

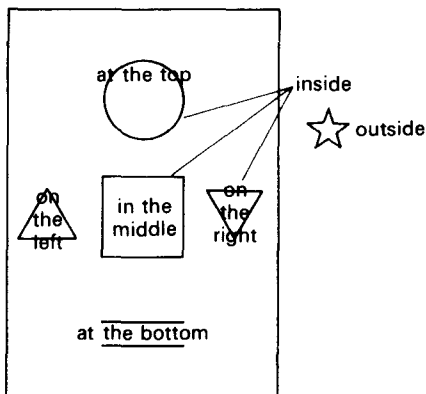
Look at these examples and make other questions and answers like them:

Example: What properties have glass and steel in common?
Glass and steel are hard, insoluble and rigid.

Unit 2 Location

Section 1 Positions on two dimensions

1. Look and read:

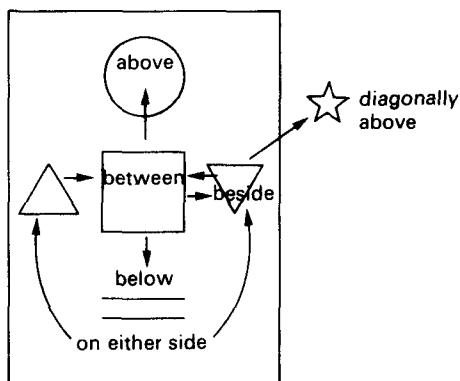


The words give the positions of the shapes *in relation to the rectangle*.

Make questions and answers like the following:

Example: What is there *at the top of the rectangle*?
There is a circle at the top of the rectangle.

2. Now look at this:



The words give the positions of the shapes *in relation to one another*.

Make questions and answers like the following:

Example: Where is the circle?
The circle is above the square.

3. Look and read:

Sc Scandium	Ti Titanium	V Vanadium	Cr Chromium	Mn Manganese	Fe Iron	Co Cobalt	Ni Nickel	Cu Copper	Zn Zinc
Y Yttrium	Zr Zirconium	Nb Niobium	Mo Molybdenum	Tc Technetium	Ru Ruthenium	Rh Rhodium	Pd Palladium	Ag Silver	Cd Cadmium
La Lanthanum	Hf Hafnium	Ta Tantalum	W Tungsten	Re Rhenium	Os Osmium	Ir Iridium	Pt Platinum	Au Gold	Hg Mercury

Above there is a table of some elements. The elements are arranged in horizontal *rows* and vertical *columns*.

Give the positions of the following elements in relation to the whole table:

Examples: Lanthanum is at the bottom, on the left.
Vanadium is *in the third column from the left*, at the top.
Cobalt is *in the top row, near the middle*.

Tungsten, cadmium, zinc, gold, scandium, iron.

Now give the position of these elements in relation to others:

Example: Osmium is beside and *to the right* of rhenium.

Cobalt in relation to nickel and iron

Niobium in relation to molybdenum

Platinum and mercury in relation to gold

Gold in relation to silver

Iron in relation to rhodium

Silver in relation to zinc

Silver in relation to gold

4. Read these sentences which give other positions:

Cobalt is *next to*, or *adjacent to*, nickel.

Iron is not adjacent to nickel because cobalt is between them.

Manganese is *in line with* copper and gold is in line with hafnium.

Yttrium is *near* tantalum but *far from* zinc.

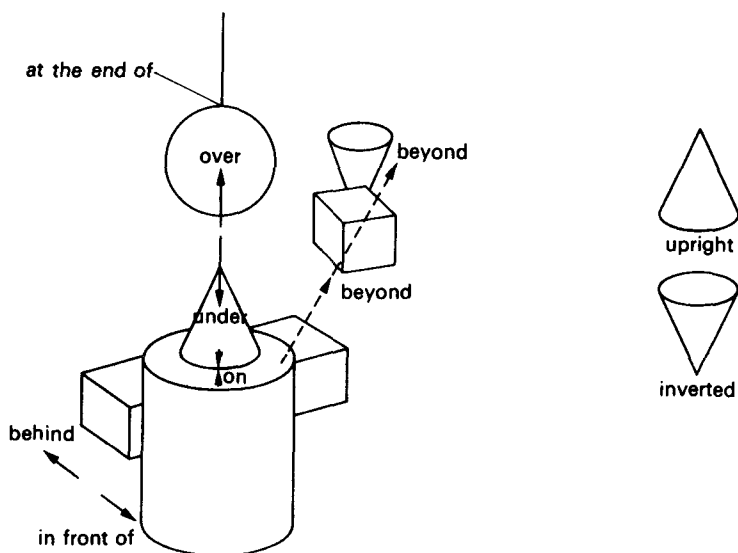
Now say whether these statements are true or false. Correct the false statements.

- Silver is diagonally above nickel.
- Zinc is in line with scandium.
- Molybdenum and ruthenium are on either side of technetium.
- Gold is adjacent to mercury.
- Iron is beside and to the right of cobalt.
- Gold is vertically below silver.

- g) Vanadium is near cadmium.
- h) Mercury is at the bottom of the table, on the right.
- i) Copper is between nickel and zinc.
- j) Manganese is in the middle row.
- k) Silver is in the third column from the right.

Section 2 Positions on three dimensions

5. Look and read:



Note: The sphere is *above* all the other solids, but it is *over* only the cone and the middle of the cylinder.

Now make questions and answers:

Example: Where is the sphere in relation to the upright cone?
The sphere is *over* the upright cone.

sphere . . . upright cone. upright cone . . . cylinder.
upright cone . . . sphere. cylinder . . . upright cone.
rectangular solid . . . cylinder. inverted cone . . . cube.
cylinder . . . rectangular solid. cube . . . inverted cone.
cube . . . rectangular solid. sphere . . . line.