

Task Booklet
Year 8 Science



Forces and Energy



Student Name:
Science Teacher:

Task One - Types of Energy

Core

1. Unscramble the words below to reveal the different types of energy.

(a) glith _____

(b) tacsliel _____

(c) duons _____

(d) tenpliato _____

(e) hamlerl _____

(f) cleerlicat _____

(g) nicekti _____

(h) clahicem _____

Standard

2. Choose a type of energy that fits the descriptions below.

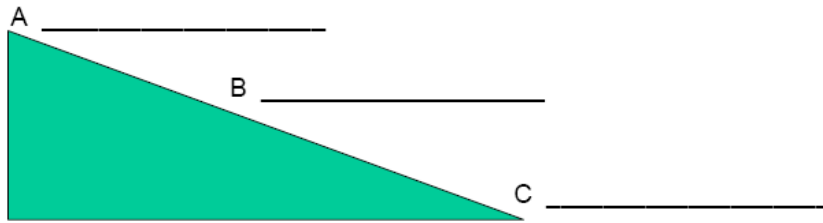
<i>Description</i>	<i>Type of Energy</i>
The type of energy moving objects have	
Useful type of energy that flows along wires	
Energy stored due to gravity & height above ground	
Energy given off by luminous objects	
Potential energy stored in a stretched elastic band	
Energy that can be released by a type of reaction	
Energy that noisy objects transmit	
Energy that everything above absolute zero has	

3. What are the units of temperature?

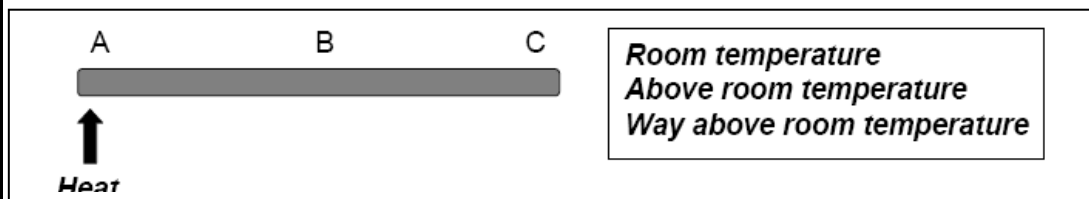
4. If the temperature is -18°C , what does the minus sign mean?

5. For heat to flow from one place to another there must be a temperature difference. Label the diagram below with the labels from the box.

Heat flow Low temperature High temperature



6. The diagram below shows a metal bar being heated at one end.



Use words from the box to say what the temperature will be at points A, B and C before heating and after heating for 30 minutes.

Before heating	After 30 mins heating
A	A
B	B
C	C

Extension

7. Do you know the difference between heat and temperature? Put a tick in the correct column for each row in the table below.

Statement	Applies heat	Applies to temperature
Measures how hot something is		
Is a form of energy		
Is measured in °C		
Is measured in Joules		
A difference in this causes heat to flow		
A flow of this causes a change in temperature		

Task Two - Conductors and Insulators

Core

- Sort these materials into the table.

water iron copper air plastic steel

Standard

<i>Good conductors of heat</i>	<i>Good insulators of heat</i>

- How does a thick woolly jumper reduce heat loss by conduction?

 - How does a thick woolly jumper reduce heat loss by convection?

- Drinking mugs can be made of metal or plastic. Why is it easier to hold a plastic mug than a metal mug when they are full of hot water?

 - Why does the water in the metal mug cool down more quickly than the water in the plastic mug?

Extension

- You could also use the metal and plastic mugs to hold cold drinks. Why would the metal cup feel colder even though the temperatures of the drinks were the same?

Task Three - Conduction

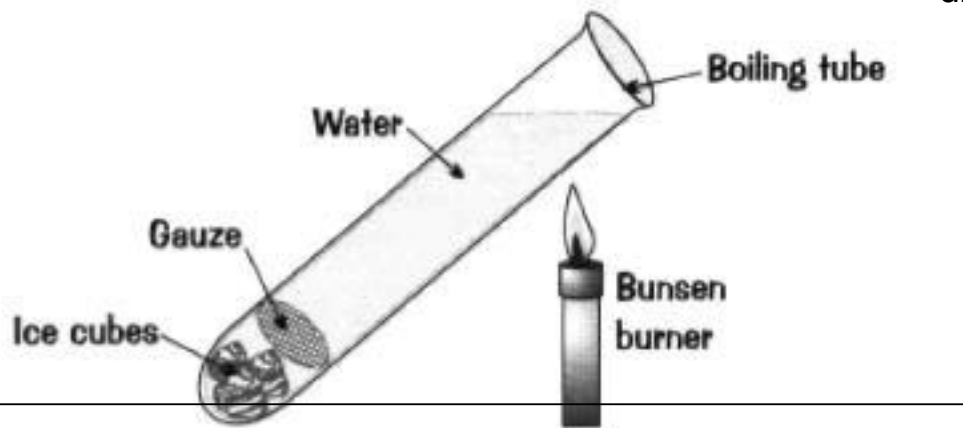
Core

1. Classify the following as insulators or conductors of heat.
- (a) copper _____
 - (b) polythene _____
 - (c) wood _____
 - (d) stainless steel _____
 - (e) aluminium _____
 - (f) air _____

Standard

2. Abby set up the apparatus below and heated the water at the top of the test tube. Very soon, the water at the top boiled. The ice at the bottom of the tube did not melt.

Good

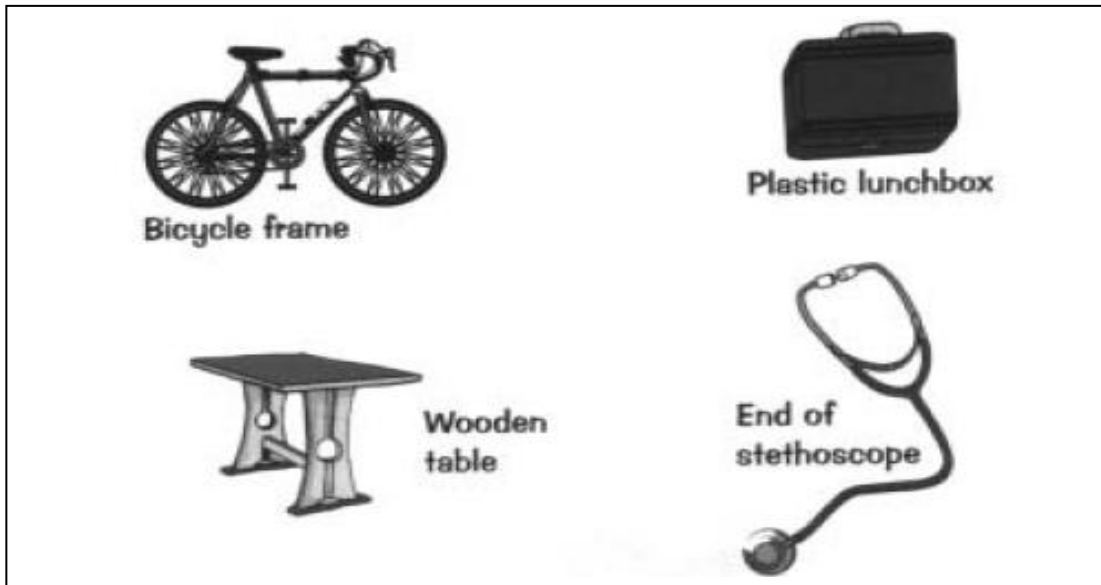


(a) Why did the water at the top boil?
conductors of thermal energy (heat) transfer heat energy from one place to another quite quickly.

(b) Why did the ice cube that the bottom not melt?

(c) What would happen if heating carried on for five minutes?

3. (a) Which of the following objects would feel cold to the touch?
Circle them.



- (b) Under normal conditions what would be the approximate temperature of:

- (i) the bicycle frame? _____
- (ii) the lunch box? _____
- (iii) your fingers? _____

- (c) For heat to flow there must be a temperature difference. Why do some objects feel cold and other objects feel warm?

- (d) Some materials are good at transferring heat from one place to another. What are they called? _____

- (e) Some materials are not good at transferring heat from one place to another. What are they called? _____

4. Complete the sentences with words from the box.

<i>insulators</i>	<i>metals</i>	<i>conductors</i>
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Most good thermal _____ *are*

Poor thermal _____ *are called*

Core

Task Four - Conduction, Convection, Radiation

1.

Complete the paragraph below using words from the box.

medium radiation energy heat convection vacuum

Conduction, _____ and _____ are ways by which _____ energy can be transferred from one place to another.

Conduction and convection need a _____, which means they need something to travel through. Radiation of _____ occur through a _____ can _____ and does not require a medium to travel through.

2. Label each diagram below as conduction, convection or radiation.



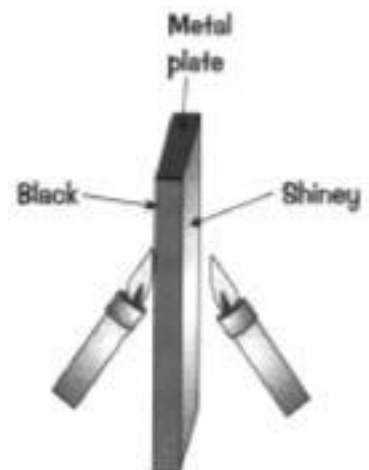
Standard

3. Imagine you are standing near to a large bonfire. Explain how you feel the heat from the fire.

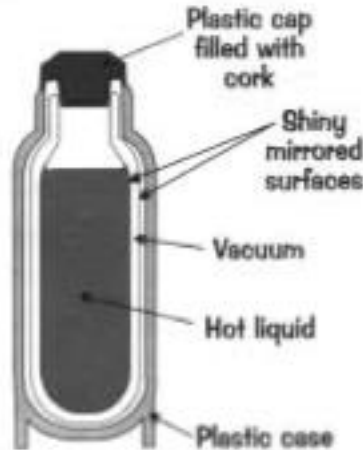
4. A student heated two sides of a metal plate for equal amounts of time with a bunsen burner. One side was black and the other side was shiny. She felt the heat radiating from each side.

(a) Which side of the plate would feel hottest?

(b) Which side is radiating most heat?



5. Vacuum flasks
drinks hot even in cold
The words in
sentences below
correct word at



(a) The shiny **absorb** radiation

(b) The glass
conductors of

(c) The vacuum prevents heat loss by **radiation** and convection.

(d) The top is made from plastic which is a good **conducting** material.

are used to keep
weather. **Ext
bold italics** in the
are incorrect. Write the
the end of the sentence.
surfaces of the flask
back into the flask.

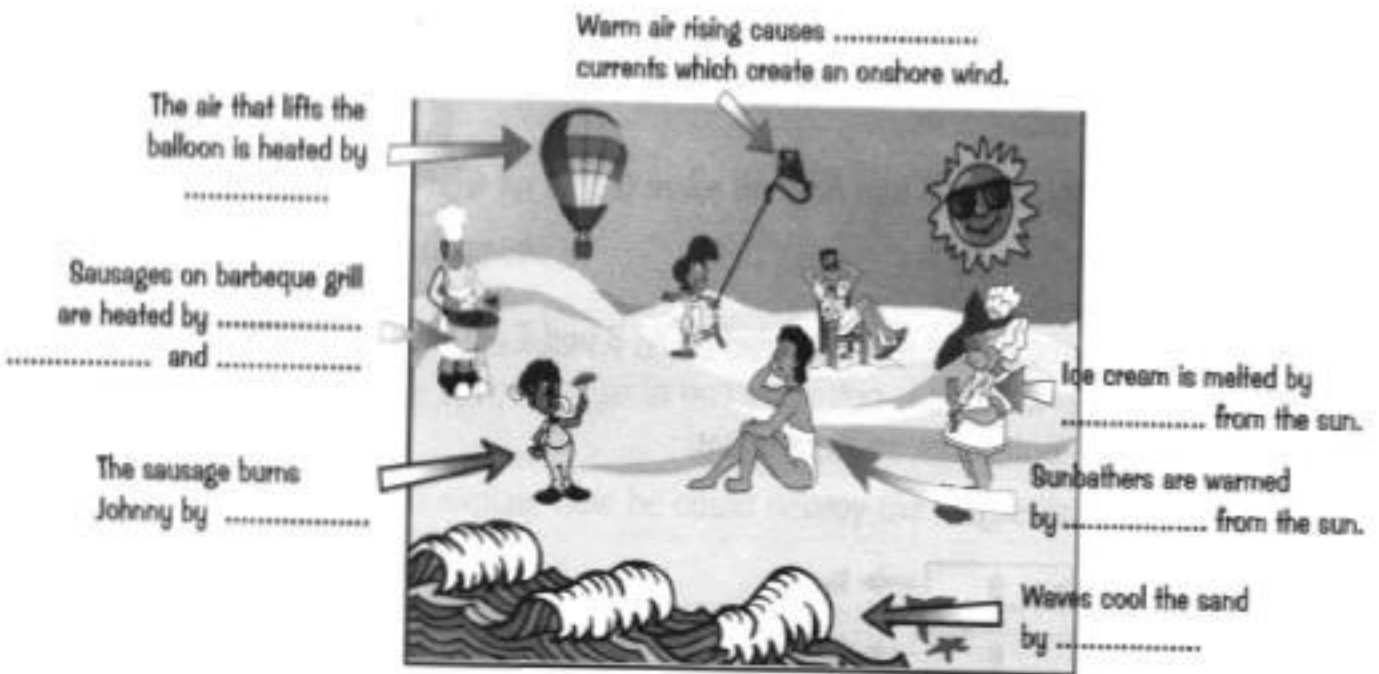
Correct word = _____
walls are **good**
heat.

Correct word = _____

Correct word = _____

Correct word = _____

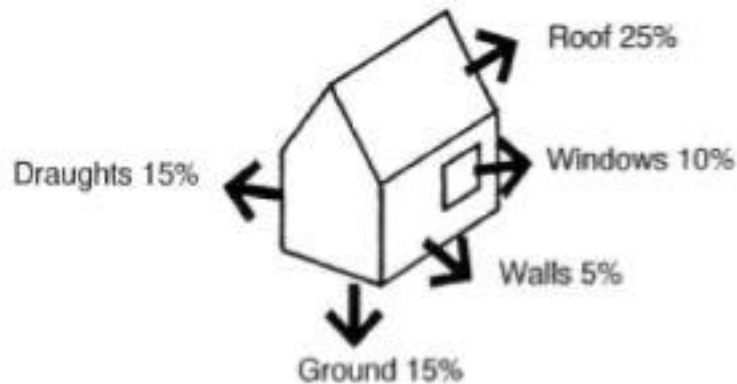
6. Look at the picture below showing energy transfers. Decide if they are conduction, convection or radiation and complete the labels.



Task Five - Reducing Heat Loss

Core

1. The diagram below shows how heat escapes from a house. The house is empty with no insulation, furniture or fittings.



- (a) List the five ways that heat escapes from the house. Put them in order from the largest loss to the smallest.

- 1
- 2
- 3
- 4
- 5

- (b) For each of the five ways say what could be done to stop so much heat escaping.

- 1

- 2

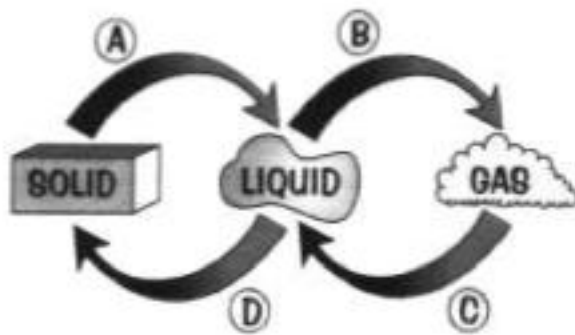
- 3

- 4

- 5

Core

Task Six - Solids, Liquids and Gases



1. Complete the missing labels A, B, C and D for the diagram below.

A B

C D

2. The melting point of sodium is 98°C and the melting point of oxygen is -210°C .

(a) Which has the highest melting point? _____

(b) What temperature is the freezing point of sodium?

(c) Why is it useful to know the boiling point of a substance?

Standard

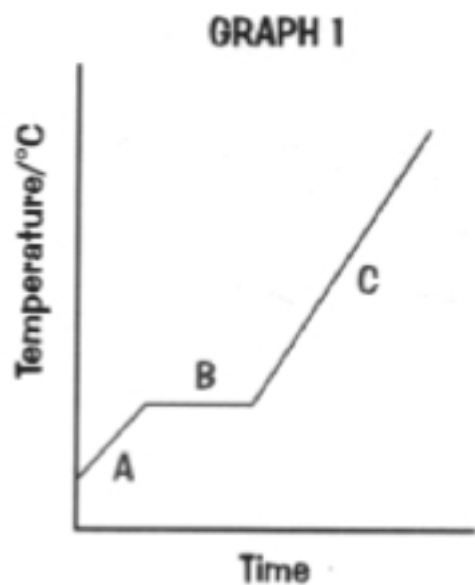
3. A temperature probe linked to a data logger records the temperature of some solid Salol as it is heated. The graph shows the results.

(a) What is happening to the temperature during part A of the graph?

(b) What is happening to the temperature during part B of the graph?

(c) What is happening to the temperature during part C of the graph?

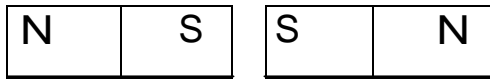
(d) Explain the shape of the graph.



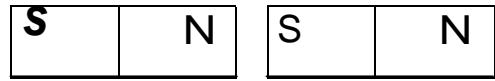
Task Seven - Magnets and Field Lines

Core

1. Will the magnets below attract or repel each other?
Write your answer in the space beneath each pair.



(a)



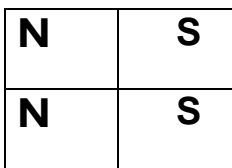
(b)



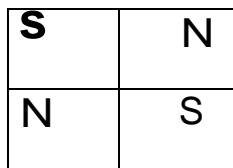
(c)



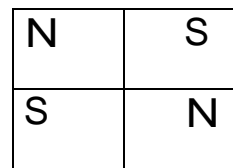
(d)



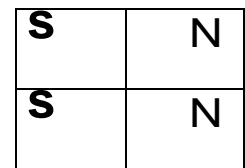
(e)



(f)

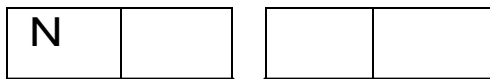


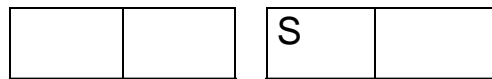
(g)



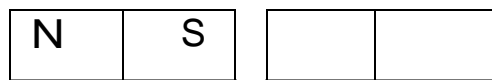
(h)

2. Complete the missing poles on the magnets to match the forces.



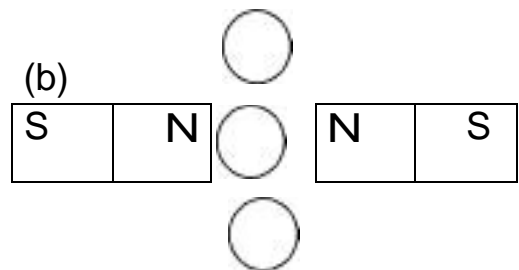
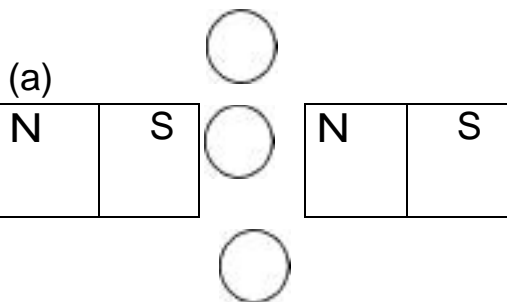






Standard

3. Add pointers to the compasses in the diagrams below.



Extension

4. A puzzle - fill in the squares using the clues.

Magnetic metal in coins	N						
Like poles _____	R						
More current, more field _____	S						
An iron _____ increases strength					C		
Repelled by a S pole	S						
Magnetic element in steel					I		
Attracted by a S pole					N		
Uses magnetism to make movement					M		
Input circuit controls the _____	R						
Small bits of iron	F						
The magnet in a compass					N		
Area of force round a magnet					F		
Magnetic element	C						

5. The letters in the boxes make up a word when read downwards. What is it?

Task Eight - Magnets

Core

Answer the questions below on magnets and magnetic materials.

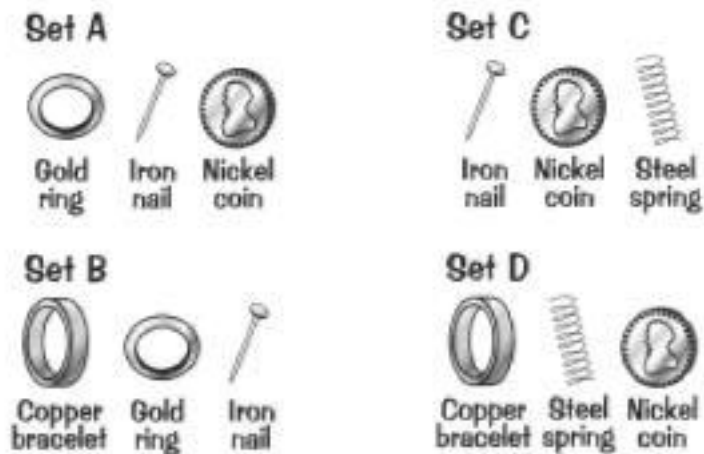
1. Name an object that would be attracted to a magnet.
What material is it made of?

Object _____ Material _____

2. Name an object that would not be attracted to a magnet.
What material is it made of?

Object _____ Material _____

3. Circle the set of objects below that contains three objects that would each be attracted to a magnet.



Standard

4. Name four magnetic **materials** (not objects).

1 _____

2 _____

3 _____

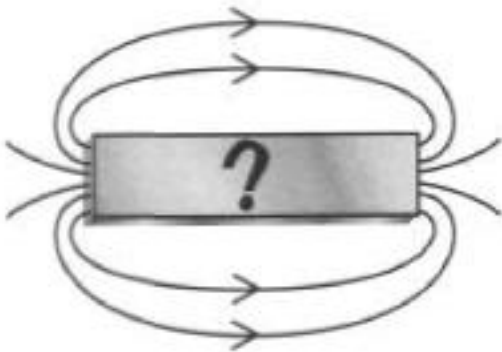
4 _____

5. Some 1 p and 2p coins contain nickel and some do not - it depends on the year in which they were made. How could you find out which years the coins containing nickel were made in?

6. Complete the gaps in the following sentence:

*Materials which are attracted to a magnet are called m _____
Materials. They all contain one of three elements, _____,
_____, or _____. If a magnetic material is magnetised
It becomes a*

7. What is the name given to the type of magnet shown in the diagram below?



The diagram shows a magnet.

8. On the diagram above mark the poles for this magnet (N and S).

Extension

9. It is possible to 'map' the direction of a magnetic field.

(a) What could you use to 'see' the field lines around a magnet?

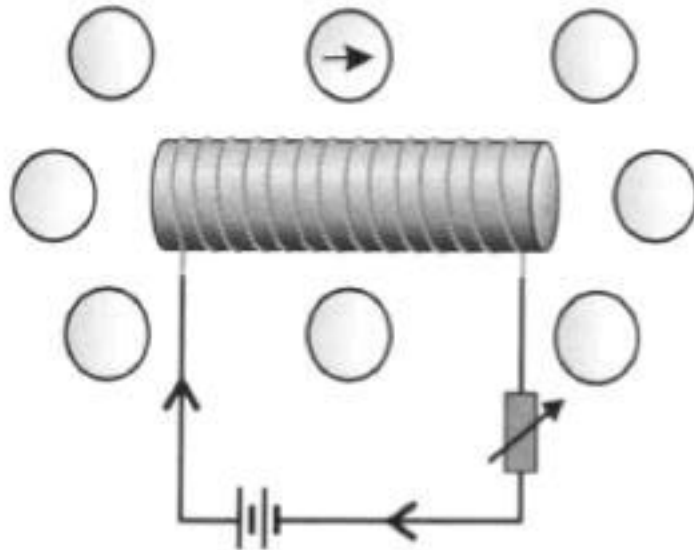
(b) What could you use to find the polarity of the magnet?

(c) What does it mean when the field lines are close together?

Extension

Task 9

3. (a) A small compass is placed at different points around an electromagnet. Add needles to the compasses to show the direction they will point when a current flows through the coil. One of the directions has been done for you.



- (b) What would happen to the directions if the current was reversed?

- (c) The current is changed back to its original direction and the iron core is removed. What do you think happens to the compass needles?

- (d) The current is switched off. What do you think will happen to the compass needles now?

4. Can you find any magnets in your home that have a useful function? If so say where they are found and, if you can, what their function is.

<i>Electro-magnet is found....</i>	<i>The electro-magnet is there to</i>

Task Ten - More Magnets

Core

1. Circle any sentence below that you think is true.

A N-pole will repel a S-pole

A N-pole will attract a S-pole

A N-pole will attract a piece of unmagnetised steel

A S-pole will attract a S-pole

A S-pole will attract a N-pole

A S-pole will repel a piece of unmagnetised steel

Standard

2. Complete the sentences below about magnets using words from the word list.

stronger two repel poles attract field

Any magnet has _____ 'ends' called _____

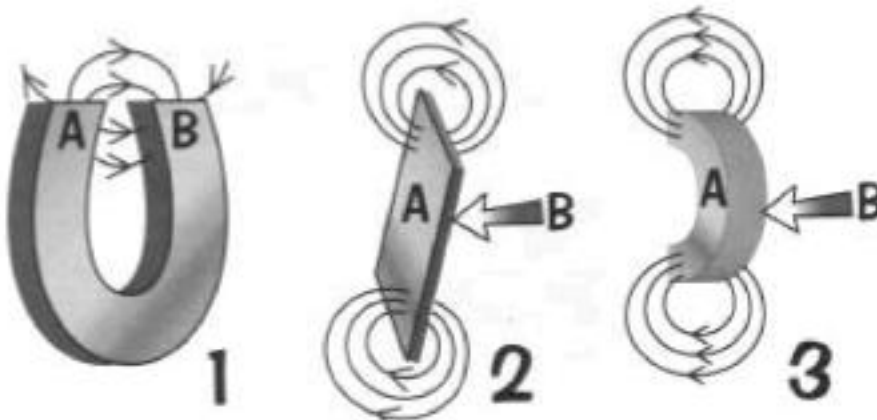
Opposite poles _____ attract but like poles _____

The area around a magnet where its force can be felt is known as the magnetic _____

The stronger the magnet, the _____ the field.

Extension

3. Magnets can be many different shapes. Underneath each magnet shown below write which letter marks the north pole and which letter marks the south.



North

South

North

South

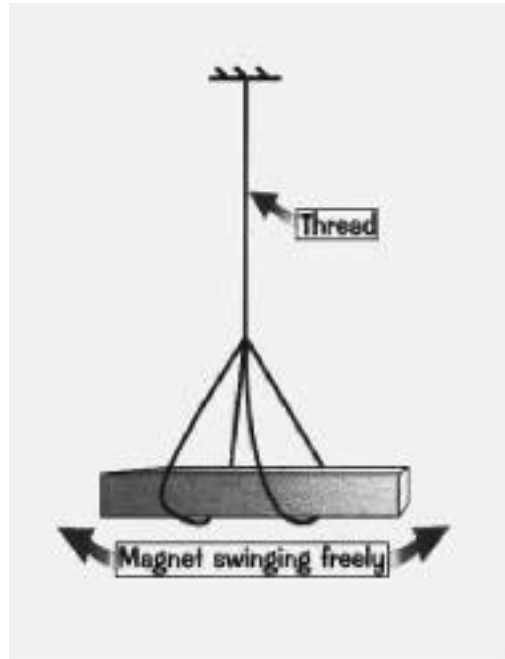
North

South

Task Eleven - Magnetic Poles

Core

1. A steel bar magnet is hung on a cradle by a thread. The magnet is allowed to swing freely.



- (a) What will have happened to the magnet when it stops swinging?

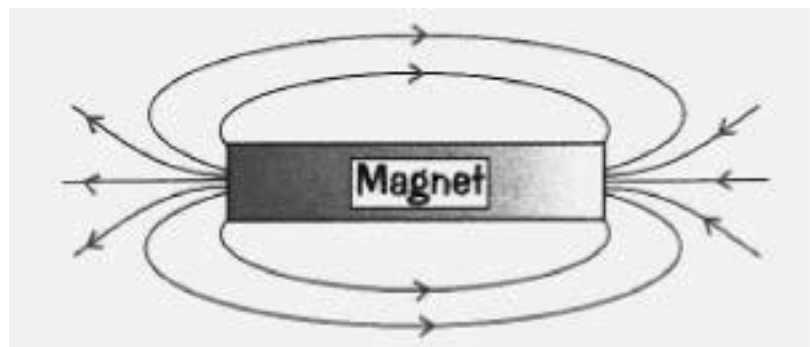
- (b) Hill walkers use a compass and a map to find their way. What is the needle of the compass made from?

- (c) What is the end of a magnet that points to the North pole of the Earth called?

- (d) What is the end of a magnet that points to the South pole of the Earth called?

Standard

2. On the diagram:
(a) Draw an N to show the position of the magnetic north pole.
(b) Draw an S to show the position of the magnetic south pole.
(c) Mark with an X somewhere the magnet is strong.
(d) Mark with a Y somewhere the magnet is weak.



Extension

3. Complete the sentences by crossing out the words that are not correct.

(a) *Around a bar magnet the magnetic field always goes from the magnetic [north / south] pole to the magnetic [north / south] pole.*

(b) *The closer you are to a magnet the [stronger / weaker] the magnetic field.*

(c) *The further away you are from the pole of a magnet the [stronger / weaker] the magnetic field.*

(d) *The shape of the magnetic field around a bar magnet can be shown using [iron filings / wood shavings] sprinkled near to the magnet.*

(e) *A compass needle always lines up [along / across] the magnetic field lines.*