2016 science sampling tests
Test booklets
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</table>
Science sampling

Booklet 2B

<table>
<thead>
<tr>
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<table>
<thead>
<tr>
<th>Middle name</th>
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<thead>
<tr>
<th>Last name</th>
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</table>

<table>
<thead>
<tr>
<th>Date of birth</th>
<th>Day</th>
<th>Month</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>School name</th>
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<tbody>
<tr>
<td></td>
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</tbody>
</table>
Please read this carefully.

Questions and answers
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Follow the instructions for each question.

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Marks
The number under each box at the side of the page tells you the maximum number of marks for each question.
Peter goes to the duck pond with his grandad and his dog.

Tick TWO boxes to show two things that are true about a dog and a duck.

- They both have fur.  
- They both move.  
- They both lay eggs.  
- They both breathe.

Two of the ducks come out of the pond.

(i) Describe how a duck's feet are adapted for swimming.

(ii) Why would the female duck be hard to see in a nest?

(iii) Explain why the female duck needs to stay hidden when she is in her nest.
Peter sees some piles of soil on the grass near the pond.

Grandad tells him that the piles of soil are made by animals called moles.

Look at the picture of a mole.

(i) Describe how a feature of the mole helps the mole to live underground.

Feature: __________________________________________

How it helps: ______________________________________

(ii) Why do moles live in soil? To find earthworms to eat, and to hide in the soil.

Which word cannot be used to describe a mole? Tick ONE box.

prey □ producer □ predator □ consumer □
2 Seed dispersal

a

The diagram shows a flower cut in half.

Put a cross (X) on the diagram to show where the seed develops.

b

Class 6 have collected different types of seed.

They blow the seeds with a fan.

This disperses the seeds.

They measure how far each seed travels.

What equipment can measure how far the seeds travel?

The seeds can be blown by the children's mouths or with a fan.

Explain why the fan helps to make the test fair.
Here is a table of the children’s results using a fan.

<table>
<thead>
<tr>
<th>Plant</th>
<th>sycamore</th>
<th>apple</th>
<th>bulrush</th>
<th>oak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed</td>
<td><img src="image" alt="sycamore seed" /></td>
<td><img src="image" alt="apple seed" /></td>
<td><img src="image" alt="bulrush seed" /></td>
<td><img src="image" alt="oak seed" /></td>
</tr>
<tr>
<td>Distance travelled (cm)</td>
<td>76</td>
<td>27</td>
<td>149</td>
<td>0</td>
</tr>
</tbody>
</table>

The sycamore seed and bulrush seed travel the furthest distances.

They fall slowly from the plant so the wind has more time to blow them away.

Tick ONE box to show which features of the seeds help them to fall slowly.

- They are smooth and soft.  
- They have a large area and are heavy.  
- They have a large area and are light.  
- They are flexible and soft.

Name the force that slows the seeds as they fall.

The children dispersed the seeds with a fan. The fan disperses seeds like the wind does in nature.

Name ONE other way seeds are dispersed in nature.
Class 6 are investigating how grass grows.

They grow grass on grass heads filled with sand.

They keep their grass heads standing in dishes of water so they do not dry out.

All plants need water to grow.

Name TWO other things that all plants need to grow.

_________________________ and _________________________

Some children give their grass head a hat.

They keep all other conditions the same.

The children predict that when the grass under the hat grows, it will look more yellow than the grass not covered by the hat.

Give ONE reason why the grass under the hat might look more yellow.

_________________________
Class 6 use a ruler to measure the height of the grass every week.

The grass grows to different heights so it is difficult to know which piece of grass to measure.

Write yes or no next to each idea to show if it is a good way for class 6 to measure the height of the grass each week.

<table>
<thead>
<tr>
<th>Class 6 could measure the height of the grass by...</th>
<th>Yes or no?</th>
</tr>
</thead>
<tbody>
<tr>
<td>finding an average length of several pieces of grass.</td>
<td></td>
</tr>
<tr>
<td>measuring the length of a different piece of grass each week.</td>
<td></td>
</tr>
</tbody>
</table>

Some other children put their grass head in a sealed, dry plastic bag.

They keep all other conditions the same.

They observe that droplets of water form on the inside of the bag.

Tick ONE box to explain why droplets of water form on the inside of the plastic bag.

Water...

- condenses from the grass head and evaporates on the bag.  
- dissolves from the grass head and evaporates on the bag.  
- evaporates from the grass head and condenses on the bag.  
- dissolves from the grass head and condenses on the bag.
Smallpox and cowpox are diseases. People who catch smallpox can die.

Dr Jenner discovered how to stop people catching smallpox.

I think that people who have had cowpox will not catch smallpox.

Dr Jenner did a test to find out if his statement was true.

He infected a boy called James with cowpox.

James got better.

Describe what Dr Jenner must have done next and also describe the evidence needed to show that his statement was true.

Dr Jenner tested other people.

Why did Dr Jenner test other people?
Not everyone had Dr Jenner’s treatment.

In 1844 many people died from smallpox.

The table shows how many people died from smallpox at different ages in London.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Number of people who died from smallpox</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>226</td>
</tr>
<tr>
<td>20</td>
<td>240</td>
</tr>
<tr>
<td>30</td>
<td>98</td>
</tr>
<tr>
<td>40</td>
<td>43</td>
</tr>
<tr>
<td>50</td>
<td>13</td>
</tr>
<tr>
<td>60</td>
<td>19</td>
</tr>
<tr>
<td>70</td>
<td>10</td>
</tr>
<tr>
<td>80</td>
<td>10</td>
</tr>
</tbody>
</table>

How many people who were 30 years old died from smallpox?

__________________________

Holly looks at the information in the table.

The younger the person the more likely they were to die of smallpox.

Holly

Explain why Holly cannot be sure of her conclusion.

__________________________

__________________________
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## Science sampling

### Booklet 5B

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Middle name</td>
<td></td>
</tr>
<tr>
<td>Last name</td>
<td></td>
</tr>
<tr>
<td>Date of birth</td>
<td>Day</td>
</tr>
<tr>
<td>School name</td>
<td></td>
</tr>
</tbody>
</table>
[BLANK PAGE]

Please do not write on this page.
Instructions

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Marks
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Please do not write on this page.
Camels can live in hot places.

Some features of a camel’s body help it to survive in a hot desert.

Match each feature below to show how it helps the camel survive in the desert.

One has been done for you.

<table>
<thead>
<tr>
<th>Camel’s features</th>
<th>How feature helps</th>
</tr>
</thead>
<tbody>
<tr>
<td>long legs</td>
<td>keep the camel’s body further from the hot sand</td>
</tr>
<tr>
<td>wide feet</td>
<td>protect camels when eating prickly plants</td>
</tr>
<tr>
<td>thick fur</td>
<td>help camels stay on top of the sand</td>
</tr>
<tr>
<td>long eyelashes</td>
<td>protect camels against sand blowing in the air</td>
</tr>
<tr>
<td>thick, leathery lips</td>
<td>protects camels from getting sunburnt</td>
</tr>
</tbody>
</table>
Ella is looking at some leaves.
The key below identifies which tree each leaf comes from.

**Key to tree leaves:**

1. Is the leaf long and thin?  
   - Yes: GO TO 2  
   - No: GO TO 3  

2. Is the edge of the leaf smooth?  
   - Yes: Laurel  
   - No: Sweet chestnut  

3. Is the edge of the leaf smooth?  
   - Yes: Lilac  
   - No: Silver birch

Look at this picture of a leaf from one of the trees.

(i) Use the key above to identify the tree it comes from.

The leaf is from a ____________________________ tree.

(ii) Tick ONE box to show why it is useful to identify plants and put them into groups.

- so we know where to find a plant  
- because there is a large variety of plants

- in case the plants become extinct  
- so we can observe the plants in their habitats
b  Complete the sentences below to show the function of the leaves and roots.

(i) The tree uses its leaves to ____________________________.
(ii) The tree has roots to ____________________________.

c  Ella finds a seed.

Why does the tree need to produce seeds?

__________________________________________________________

d  Squirrels live in trees.

Give ONE feature of the squirrel from the picture. Describe how this feature helps the squirrel to live in a tree.

Feature of the squirrel that helps it live in a tree: ______________

How the feature helps: _________________________________________
a

Ella is learning about the human life cycle.

She collects pictures of people of different ages.

Label the photographs to name stages B and D in the human life cycle.

A baby B teenage C D old age

b

Ella wonders if pulse rate is affected by the different stages in the human life cycle.

Complete the sentence below about pulse rate.

Pulse rate measures how quickly the ___________ pumps blood around the body.

Ella measures the resting pulse rate of people from each of the life stages.

Ella's test would not be fair if she measured some people’s pulse rates after they were exercising instead of after resting. Explain why.

________________________________________________________________________________________

________________________________________________________________________________________
The table shows Ella’s results.

<table>
<thead>
<tr>
<th>Stage of the human life cycle</th>
<th>Average resting pulse rate (beats per min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (baby)</td>
<td>135</td>
</tr>
<tr>
<td>B</td>
<td>97</td>
</tr>
<tr>
<td>C</td>
<td>84</td>
</tr>
<tr>
<td>D</td>
<td>72</td>
</tr>
<tr>
<td>E (old age)</td>
<td>76</td>
</tr>
</tbody>
</table>

Ella concludes, ‘The older you are, the slower your resting pulse rate is.’

The evidence in Ella’s results does not support her conclusion.

Use Ella’s results to explain why they do not support her conclusion.

People who are fit have lower resting pulse rates than people who are unfit.

Write yes or no on each row of the table to show if the activities are likely to affect a person’s resting pulse rate.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Will the activity affect a person’s resting pulse rate? Yes or no?</th>
</tr>
</thead>
<tbody>
<tr>
<td>swim every day</td>
<td></td>
</tr>
<tr>
<td>go for a walk every day</td>
<td></td>
</tr>
<tr>
<td>read every day</td>
<td></td>
</tr>
</tbody>
</table>
In 1928 a scientist called Alexander Fleming grew micro-organisms called bacteria. Growth shows that bacteria are living things.

The bacteria grew on agar (jelly) in glass dishes.

After a few days Fleming saw mould growing in one of the glass dishes.

(i) Sort the five things in the box below into living and non-living things. One has been done for you.

<table>
<thead>
<tr>
<th>bacteria</th>
<th>glass dish</th>
<th>mould</th>
<th>agar (jelly)</th>
<th>human</th>
</tr>
</thead>
</table>

(ii) Growing is a life process.

Name ONE other life process.
Bacteria can cause disease.

Fleming thought he could use the mould to help cure disease caused by bacteria.

Look at the pictures opposite for Day 1 and Day 6.

Use the evidence in the pictures opposite to explain why Fleming thought the mould could be used to cure disease.

Fleming used the mould to make a medicine called penicillin.

It took over 10 years for penicillin to be first used by doctors.

Write true or false next to each statement to show why it took a long time for penicillin to be used as a medicine.

True or false?

The medicine had to be tested to make sure it was safe. __________

Scientists had to find a way of making lots of penicillin at a time. __________

It took 10 years for the mould to start growing. __________

Fleming needed to check that his ideas were correct. __________
5 Plants on the school field

Some children are finding out about plants. They get three buttercup plants. They put each plant in a place with different conditions.

After two weeks, the buttercup plants look like this:

![Place A: yellow leaves](image)

![Place B: green leaves](image)

![Place C: green leaves](image)

Write A, B, and C in the table below to match each place to the conditions found there.

<table>
<thead>
<tr>
<th>Place</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Does the plant have light?</td>
</tr>
<tr>
<td>A</td>
<td>✓</td>
</tr>
<tr>
<td>B</td>
<td>✓</td>
</tr>
<tr>
<td>C</td>
<td>✗</td>
</tr>
</tbody>
</table>

There are differences between plants. These differences help people sort plants into groups.

Write true or false next to each reason that explains why plants need to be sorted into groups.

Plants need to be sorted into groups...

- to stop plants becoming extinct. **True**
- to help people identify plants. **True**
- to help plants reproduce. **False**
The children look at different plants on the school field.

They record the number of common plantain and buttercup plants in 1m² in different places.

The children think they see a pattern in the place that the plants grow.

The table shows their results.

<table>
<thead>
<tr>
<th>How many children are playing in each place?</th>
<th>Number of plants (in 1m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>common plantains</td>
</tr>
<tr>
<td>lots</td>
<td>12</td>
</tr>
<tr>
<td>some</td>
<td>4</td>
</tr>
<tr>
<td>few</td>
<td>1</td>
</tr>
</tbody>
</table>

Describe the relationship between how many children are playing in a place and the number of common plantains found there.

The buttercup plant has a long thin stem.

The long thin stem of the buttercup plant stops it surviving in places where lots of children play. Explain why.
[END OF TEST]

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## Science sampling

**Booklet 8C**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>First name</td>
<td></td>
</tr>
<tr>
<td>Middle name</td>
<td></td>
</tr>
<tr>
<td>Last name</td>
<td></td>
</tr>
<tr>
<td>Date of birth</td>
<td>Day</td>
</tr>
<tr>
<td>School name</td>
<td></td>
</tr>
</tbody>
</table>
Questions and answers
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Marks
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Tom puts some soil and water in a jar with a lid. He sees bubbles rising to the surface.

Complete the labels. Write **solid**, **liquid** or **gas** in each box.

Tom shakes the jar and then leaves it to stand. After a day, the soil in the jar has separated into layers: sand, gravel and clay. The gravel particles are the heaviest. The clay particles are the lightest.

Draw **THREE** lines to match each label to the correct layer in the jar. One has been done for you.
Alice and Karim want to find out which type of paper tears most easily. Look at their plan.

**Plan**
1. Make a small hole 1 cm from the edge of the paper.
2. Attach a forcemeter to the piece of paper.
3. Pull the forcemeter.
4. Measure the size of the pull needed to tear the paper.
5. Repeat with different pieces of paper.

Alice and Karim put their results in a table.

Complete the table by writing the headings of the columns.

<table>
<thead>
<tr>
<th>paper type</th>
<th>force (newtons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>paper tissue</td>
<td>2</td>
</tr>
<tr>
<td>tracing paper</td>
<td>5</td>
</tr>
<tr>
<td>newspaper</td>
<td>4</td>
</tr>
<tr>
<td>paper towel</td>
<td>3</td>
</tr>
</tbody>
</table>

Tick **ONE** box to show which paper was most difficult to tear.

- paper tissue
- tracing paper
- newspaper
- paper towel
c Alice and Karim want to make sure their results are reliable.

Tick ONE box to show how the children can make sure their results are more reliable.

- Use the same size of each paper.
- Test more than four types of paper.
- Test each type of paper three times.
- Draw a graph of their results.

d Alice says, ‘It took 4 newtons to tear the newspaper.’

I wonder what will happen if I make changes to the newspaper.

Complete the table below to show how the changes to the newspaper will affect how easy or hard it is to tear. Tick ONE box in each row.

<table>
<thead>
<tr>
<th>Change to newspaper</th>
<th>The newspaper will be...</th>
</tr>
</thead>
<tbody>
<tr>
<td>use two sheets of newspaper (one on top of the other)</td>
<td>easier to tear.</td>
</tr>
<tr>
<td>use a wet piece of newspaper</td>
<td></td>
</tr>
<tr>
<td>use a longer piece of newspaper</td>
<td></td>
</tr>
</tbody>
</table>
Class 6 are finding out about separating mixtures.

The teacher mixes sand and salt together.

She asks the children to separate the sand and salt.

(i) What happens to the salt when water is added to the mixture?

(ii) What is this method of separation called?

(iii) Describe how the sand is separated from the liquid.

The sand

The liquid
We should pour the liquid from the beaker into a dish and put it in a warm place for a few days.

Tick **TWO** boxes to show what will happen when the dish has been in a warm place a few days.

Tick **TWO** boxes.

- The liquid will be less salty. ✗
- The salt will melt. ✗
- Bubbles will be produced. ✗
- The water will change to gas. ✗
- Salt crystals will form. ✗
- A new material is made. ✗

The teacher mixes sand and iron nails together.

She asks the children to separate the sand from the iron nails.

Write **TWO** ways the sand could be separated from the iron nails.

1. __________________________________________
2. __________________________________________

2 marks S000350_06
4 Pond depth

Ben’s class go to the school pond every day for five days.

At midday their teacher measures the depth of water in the pond.

The children measure the air temperature.

They always take the measurements at the same place.

<table>
<thead>
<tr>
<th>Day</th>
<th>Air temperature (°C)</th>
<th>Depth of water (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>17</td>
<td>52</td>
</tr>
<tr>
<td>Tuesday</td>
<td>19</td>
<td>50</td>
</tr>
<tr>
<td>Wednesday</td>
<td>21</td>
<td>49</td>
</tr>
<tr>
<td>Thursday</td>
<td>22</td>
<td>48</td>
</tr>
<tr>
<td>Friday</td>
<td>12</td>
<td>55</td>
</tr>
</tbody>
</table>

Ben plots a bar chart.

Complete the missing axis label with the unit.

On one morning it rained.

On the morning of which day of the week was it most likely to have rained? How can you tell?

Day: ____________________

I can tell because ____________________
(c) 

(i) Heat is needed to raise the temperature of the air. Where does this heat come from?

(ii) Look at the table. Describe the pattern in the data between the air temperature and the depth of the water in the pond.

(d) Ben’s class collect rainfall in the school garden. They could use jam jars or measuring cylinders.

(i) Write ONE advantage of using a jam jar.

(ii) Write ONE advantage of using a measuring cylinder.
Class 6 find out about processes that happen on mountains.

### Processes that happen on mountains

A – Water vapour in the air cools down to form water droplets.
B – Water droplets change into snow.
C – Snow on mountains changes into water.
D – Water changes into ice.

Tick **ONE** box in each row to match each process to its correct name.

<table>
<thead>
<tr>
<th>Process</th>
<th>Name of process</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>melting</td>
</tr>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

2 marks
[END OF TEST]

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# Science sampling

Booklet 9C

<table>
<thead>
<tr>
<th>First name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle name</td>
<td></td>
</tr>
<tr>
<td>Last name</td>
<td></td>
</tr>
<tr>
<td>Date of birth</td>
<td>Day</td>
</tr>
<tr>
<td>School name</td>
<td></td>
</tr>
</tbody>
</table>
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You can come back to it later, if you have time.

If you finish before the end, go back and check your work.

Marks
The number under each box at the side of the page tells you the maximum number of marks for each question.
Kate wants to test how much time it takes for four different types of fabric to dry.

1. She soaks the different types of fabric in water.
2. She hangs the fabrics on a washing line outside.
3. She measures how much time it takes for the fabrics to dry.

Kate’s results are shown in the table below.

<table>
<thead>
<tr>
<th>Fabric type</th>
<th>silk</th>
<th>cotton</th>
<th>nylon</th>
<th>polyester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drying time (minutes)</td>
<td>60</td>
<td>100</td>
<td>50</td>
<td>35</td>
</tr>
</tbody>
</table>

Which fabric dried the fastest?

Kate carried out a fair test.

Read the four statements below.
1. Use fabrics that cost the same amount of money.
2. Use fabrics that are the same size.
3. Hang the fabrics up at the same time.
4. Hang the fabrics in the same place.

Which of these things would have helped make Kate’s test fair? Tick ONE box.

1 only  
1 and 3 only  
2 and 4 only  
2, 3 and 4 only
Drops of water fall from the bottom of very wet washing hanging on a washing line.

Write **true** or **false** for each of the statements about the drops of water.

The drops…

- form because liquids can flow. **__________**
- may change shape as they fall. **__________**
- form because the water becomes warm. **__________**

Harry dries some T-shirts indoors on a radiator.

Name the process that happens to the water in Harry’s T-shirts as they dry.

**__________________________**

Harry saw that liquid water formed on the windows in the room when the T-shirts were drying on the radiator.

Name the process that causes liquid water to form on the windows.

**__________________________**
Jay and Lana want to find out how quickly cooking oil flows at different temperatures.

Jay has some oil at room temperature. He pours it into a cup with a hole in the bottom.

Lana measures the time it takes for 20 ml of oil to drip out of the cup.

They repeat this with oil heated to 30°C, 35°C and 40°C.

They record their results on a graph.

Use the graph to estimate how long it would take for the oil heated to 25°C to drip out of the cup.

_________________________ seconds
As the oil becomes hotter, it flows more easily.
This changes the time it takes to drip out of the cup.

Use the graph. Describe how the **temperature** of the oil affects the **time** taken for the oil to drip out of the cup.

Describe **ONE** thing that Jay and Lana did to make their test fair.

The teacher told Jay and Lana to heat the oil by putting it in a bowl of hot water.

Give **ONE** reason why it could be dangerous to heat the oil over a flame.
Patrick collects some objects made of different materials. The photograph below shows what he collects.

Patrick groups his materials in a diagram to help him sort them by their properties.

Write cotton wool and steel in the correct places on the diagram below.

[Diagram of Venn diagram with leather, glass, wood, good thermal conductor, and hard properties]
b

The shoes below are used for different activities. They are made out of different materials.

![Tap dancing shoes](image1)

![Wellington boots](image2)

The table below gives a property of steel and explains why this property is useful for tap dancing shoes.

<table>
<thead>
<tr>
<th>Material</th>
<th>Shoe</th>
<th>Property</th>
<th>Why the property is useful</th>
</tr>
</thead>
<tbody>
<tr>
<td>steel</td>
<td>tap dancing shoe</td>
<td>hard</td>
<td>it makes a noise when hit</td>
</tr>
<tr>
<td>plastic</td>
<td>wellington boot</td>
<td>impermeable</td>
<td></td>
</tr>
</tbody>
</table>

Complete the table below to explain why it is useful for wellington boots to be impermeable.


c

This tea towel is made of a soft material.

Name **TWO** other properties of the soft material that make it good to use for a tea towel.

1. ____________________________________________

2. ____________________________________________
Copper, glass, iron and salt are solids.

Complete the flow chart with the names of these four solids. Write the names on the dotted lines.

- Does it dissolve in water?
  - Yes
  - No
    - Does it conduct electricity?
      - Yes
      - No
        - Is it attracted to a magnet?
          - Yes
          - No
            - Copper
            - Salt

- Iron

- Glass

2 marks

S000340_01
5 Science activity

a

Sara adds vinegar to bicarbonate of soda and watches what happens.

The mixture fizzes and bubbles form.

Before mixing

After mixing

bicarbonate of soda

vinegar

bubbles

Explain why the bubbles show that a non-reversible change has happened.

________________________

________________________

b

Put a tick in each row of the table to show if each material is a solid, liquid or gas.

<table>
<thead>
<tr>
<th>Material</th>
<th>Solid</th>
<th>Liquid</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>glass</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vinegar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bicarbonate of soda</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>the inside of a bubble</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Jenny has three different types of soil. She tries to squeeze each soil into different shapes. The table below shows her results.

<table>
<thead>
<tr>
<th>Soil</th>
<th>Can the soil be squeezed into a...</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ball?</td>
<td>fat sausage?</td>
<td>thin sausage?</td>
</tr>
<tr>
<td>A</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>B</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>C</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

This key identifies the soils:

- Can the soil be made into a ball shape?
  - Yes
  - No
  - sand

- Can the soil be made into a thin sausage shape?
  - Yes
  - No
  - clay
  - peat

Use the key above to identify the soils in the table.

Soil A is ________  Soil B is ________  Soil C is ________

Jenny measures the time it takes water to go through each soil. She uses a stopwatch and this equipment:
Jenny needs to make sure her results are reliable.

**Tick ONE box to show how Jenny can make sure her results are more reliable.**

- Use the same equipment each time. □
- Record her results in a table. □
- See if the results match her predictions. □
- Test each soil several times. □

Here are Jenny’s results:

<table>
<thead>
<tr>
<th>Type of soil</th>
<th>clay</th>
<th>peat</th>
<th>sand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of water put into the funnel (cm³)</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Volume of water collected in the bottle (cm³)</td>
<td>40</td>
<td>47</td>
<td>49</td>
</tr>
<tr>
<td>Time for water to stop dripping out of the funnel (minutes)</td>
<td>9</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

How much water stayed in the peat soil?

<table>
<thead>
<tr>
<th>cm³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Circle the correct boxes to complete each conclusion below. Use the results table to help you.

- Water takes longer to pass through **sand** soil than through **clay** soil.
- More water stays in **sand** soil than in **clay** soil.
[END OF TEST]

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Science sampling

Booklet 12P

<table>
<thead>
<tr>
<th>First name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle name</td>
<td></td>
</tr>
<tr>
<td>Last name</td>
<td></td>
</tr>
<tr>
<td>Date of birth</td>
<td>Day</td>
</tr>
<tr>
<td>School name</td>
<td></td>
</tr>
</tbody>
</table>
Instructions

Please read this carefully.

Questions and answers
You have **25 minutes** to complete this test.

Follow the instructions for each question.

 pena This pencil shows where you will need to put your answer.

For some questions you may need to draw an answer instead of writing one.

Do not write or draw over any barcodes or in the grey margins.

If you cannot do one of the questions, **go on to the next one**.

You can come back to it later, if you have time.

If you finish before the end, **go back and check your work**.

Marks
The number under each box at the side of the page tells you the maximum number of marks for each question.
1 Magnetic forces

a

Ali has four different magnets and some paperclips.

The paperclips are attracted to the magnets.

Draw ONE arrow on the photograph to show the direction of the magnet's force on the paperclip.

b

Name the force on the paperclip that pulls in the opposite direction to the magnet.

______________________________

1 mark

1 mark

1 mark

c

Ali wants to find the strongest magnet. He adds paperclips to a magnet one at a time so they make a chain. He stops when no more paperclips stick.

He repeats this with the other three magnets.

How will Ali know which magnet is the strongest?

______________________________

______________________________
d The graph below shows Ali’s results.

One axis on the graph has been labelled.

Write the label for the other axis.

__________________________

e Ali moves magnet A towards magnet B. Magnet B moves away from magnet A even though Ali does not touch magnet B.

Why did magnet B move away from magnet A?

__________________________

f Ali tries different ways of putting the magnets together.

Tick ONE box on each row of the table to show if the magnets move together, move apart or do not move.

The first one has been done for you.

<table>
<thead>
<tr>
<th>Magnets</th>
<th>Move together</th>
<th>Move apart</th>
<th>Do not move</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lena has this equipment:

1 switch
3 cells (batteries)
6 wires
1 bulb

Tick **THREE** boxes to show which questions Lena could investigate using only the equipment shown above.

Tick **THREE** boxes.

- Do different cells affect the brightness of a bulb?
- How many bulbs can be lit by one cell?
- Does the number of cells affect the brightness of a bulb?
- Does the number of switches affect the brightness of a bulb?
- Does the direction of cells affect the brightness of a bulb?

Draw **FOUR** lines to match the electrical components to their symbols.

**Electrical component**: bulb, wire, cell, switch

**Symbol**: [diagram of symbols for bulb, wire, cell, switch]
Lena collected these wires. The wires are made of **different metals**.

Lena says, ‘I want to know if the wires made of different metals will change the brightness of the bulb in the circuit.’

What must Lena do to the wires to make her test fair?

- [ ]

Lena makes her test fair.

Tick **TWO** boxes to show the two pieces of evidence Lena should collect for her results.

Tick **TWO** boxes.

- [ ] how quickly the bulb lights up
- [ ] how bright the bulb is
- [ ] how many wires there are
- [ ] what metals the wires are made of
3 The solar system

Joe is finding out about the solar system. He writes four statements about the Sun.

Write true or false next to each statement about the Sun.

True or false?

The Sun is a light source. ________

The Sun orbits the Earth. ________

The Sun is smaller than the Earth. ________

The Sun is a circle. ________

b

Joe finds out that days and years take different amounts of time on different planets.

<table>
<thead>
<tr>
<th>Planet</th>
<th>Time for one day (Earth days)</th>
<th>Time for one year (Earth days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>59</td>
<td>88</td>
</tr>
<tr>
<td>Venus</td>
<td>243</td>
<td>225</td>
</tr>
<tr>
<td>Earth</td>
<td>1</td>
<td>365</td>
</tr>
<tr>
<td>Mars</td>
<td>1</td>
<td>687</td>
</tr>
<tr>
<td>Jupiter</td>
<td>0.4</td>
<td>4329</td>
</tr>
</tbody>
</table>

Look at the table.

(i) Which planet has the shortest day?

______________________________
(ii) Which planet orbits the Sun quickest?

The planets with shorter days have shorter years.

Joe

Look at the table opposite.

Do the planets with shorter days have shorter years? Tick **one** box.

- yes
- no

Use the information in the table to explain your answer.

All of the planets in our solar system have days and nights.

What movement in space causes day and night on Earth?
Andy and Jun have different ways of testing how well different shoes grip.

**Andy’s plan**
1) Ask someone to run in the playground.
2) Time how long it is before they fall over.
3) Do the test again with different shoes.

**Jun’s plan**
1) Put the shoe on a table and tie string to it.
2) Add a weight to the other end of the string and let it hang over the edge of the table.
3) See how much weight it takes to move each shoe.

Complete the table below to show the units that Andy and Jun could use to measure their results.

<table>
<thead>
<tr>
<th>What will be measured?</th>
<th>What is the unit of measurement?</th>
</tr>
</thead>
<tbody>
<tr>
<td>how much time it takes to fall over</td>
<td>____________</td>
</tr>
<tr>
<td>how much weight it takes to move the shoe</td>
<td>____________</td>
</tr>
</tbody>
</table>

Andy and Jun both plan to make their tests fair.

**Suggest ONE reason why Jun’s plan is better than Andy’s plan.**

Jun’s plan is better because _________________________________

_______________________________
They decide to use Jun's plan to test some shoes.

Jun predicts that shoe D will have the least grip. Look at the shoes.

Explain why shoe D is likely to have the least grip.

---

Look at the table of results.

<table>
<thead>
<tr>
<th>Shoe</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight needed to move the shoe (units)</td>
<td>250</td>
<td>100</td>
<td>125</td>
<td>25</td>
</tr>
</tbody>
</table>

Do the results support Jun's prediction that shoe D will have the least grip? Tick ONE box.

- yes [ ]
- no  [ ]

Explain how the results support or do not support Jun's prediction.
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## Science sampling

**Booklet 14P**

<table>
<thead>
<tr>
<th>First name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle name</td>
<td></td>
</tr>
<tr>
<td>Last name</td>
<td></td>
</tr>
<tr>
<td>Date of birth</td>
<td>Day</td>
</tr>
<tr>
<td>School name</td>
<td></td>
</tr>
</tbody>
</table>
Questions and answers
You have **25 minutes** to complete this test.

Follow the instructions for each question.

This pencil shows where you will need to put your answer.

For some questions you may need to draw an answer instead of writing one.

Do not write or draw over any barcodes or in the grey margins.

If you cannot do one of the questions, **go on to the next one**.

You can come back to it later, if you have time.

If you finish before the end, **go back and check your work**.

Marks
The number under each box at the side of the page tells you the maximum number of marks for each question.
**a** Two children investigate the distance four different cars travel when they let them roll down the slope.

What equipment should they use to measure how far a car has travelled?

________________________________________________________________________

**b** Linda says, ‘It is better to measure how far each car goes than just look.’

Why is measuring the distance better than just looking to find out how far each car goes?

________________________________________________________________________

________________________________________________________________________

**c** John wants to push one car down the slope. Linda thinks that all four cars should roll down the slope.

Why will the test be unfair if John pushes one of the cars down the slope?

________________________________________________________________________

________________________________________________________________________
The children carry out their investigation.

What is the **ONE** variable the children **change** as they carry out their investigation?

Linda and John record their results in a bar chart.

They discuss the results in the bar chart and write some conclusions.

Look at the results to decide whether each conclusion is **true**, **false** or you **can’t tell**.

Tick **ONE** correct box for each conclusion.

- Car C went the shortest distance.
  - True
  - False
  - Can’t tell

- Car C was the smallest.
  - True
  - False
  - Can’t tell

- Car D went furthest.
  - True
  - False
  - Can’t tell
a What shape is the Sun?

_______________________________

b Galileo developed the equipment that scientists use to see the Sun, Moon, stars and planets in more detail.

Name the equipment that scientists use to see into space.

_______________________________

c The Moon orbits the Earth.

Tick ONE box to show how much time the Moon takes to orbit the Earth.

1 day  [ ]  24 days  [ ]

28 days  [ ]  365 days  [ ]
People used to think the Sun orbited the Earth because the Sun seems to move across the sky every day.

What movement in space makes the Sun seem to move across the sky every day?

Galileo believed the Earth orbited the Sun. His observations into space gave evidence to support his idea.

Why is it important to get evidence to support a scientific idea?

Galileo said that the Earth stays in the same orbit as it travels around the Sun.

Write true or false next to each sentence to show what it would be like if the Earth’s orbit was further away from the Sun.

If the Earth’s orbit was further away from the Sun... True or false?

- the Earth would be colder. _______
- the Earth would be darker. _______
- the Earth would not have night-times. _______
- the Earth would have longer years. _______
a

George makes a model lighthouse using a cardboard tube and a yoghurt pot.

He makes a circuit to make his lighthouse light up.

The yoghurt pot lets some light through.

What is the name given to a material that lets only some light through?

___________________________

b

George wants to make his lighthouse have a brighter light.

Tick ONE box to show what George could use instead of a yoghurt pot to make the lighthouse appear brighter.

- plastic cup
- tin can
- china egg cup
- part of cardboard egg box
George uses one bulb, one cell (battery) and two wires to make the circuit for his lighthouse.

Draw the circuit diagram using the correct symbols for the lighthouse.

Write **true** or **false** next to each sentence about the circuit.

George's circuit will only work if...

- the cell is connected to the bulb. [True or false?]
- there are gaps in the circuit. [True or false?]
- he uses wires of the same length. [True or false?]
- the wires are connected to the same end of the cell. [True or false?]

What component should George add to his circuit to make the light brighter?

_________________________________________________________________
Avi has two magnets.

The magnets have holes in them so they can slide onto a base. They can be put on a wooden base either way up.

Which of the following items could Avi pick up with the magnets? Tick ONE box.

- plastic pen
- iron nail
- glass marble
- rubber ball

Avi puts the two magnets on the base. The magnets do not touch. The top magnet hovers above the bottom magnet.

Write N (North) or S (South) in each box to show the poles of the magnets.

The first one has been done for you.
Avi has a metal disc. It is exactly the same size as the magnets. He puts the metal disc and a magnet on the base in two ways. Look at the pictures.

It is not possible to tell from the pictures if the disc is made of a magnetic metal.

Explain why you cannot tell if the metal disc is made of a magnetic metal.
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