1) When making the following items, the materials they are made from must be carefully selected. Name two of the material properties that are important for each item and the materials they are made from if they are to do their job properly. The words below will help you. You may also use your own material property words. (4 marks)

| Item                      | Material Properties | Suitable Material
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rubber hot water bottle</td>
<td>hard, impermeable</td>
<td>Plastic</td>
</tr>
<tr>
<td>Copper kettle</td>
<td>hard, magnetic</td>
<td>Copper</td>
</tr>
<tr>
<td>Net curtains</td>
<td>transparent, flexible</td>
<td>Net</td>
</tr>
<tr>
<td>Wooden bowl</td>
<td>smooth, rigid</td>
<td>Wood</td>
</tr>
<tr>
<td>Leather jacket</td>
<td>soft, impermeable</td>
<td>Leather</td>
</tr>
<tr>
<td>Fridge magnets</td>
<td>magnetic, permeable</td>
<td>Metal</td>
</tr>
<tr>
<td>Drinking glass</td>
<td>transparent, impermeable</td>
<td>Glass</td>
</tr>
<tr>
<td>Bath towel</td>
<td>flexible, soft</td>
<td>Cloth</td>
</tr>
<tr>
<td>Steel keys</td>
<td>rigid, impermeable</td>
<td>Metal</td>
</tr>
<tr>
<td>Plastic umbrella</td>
<td>permeable, transparent</td>
<td>Plastic</td>
</tr>
</tbody>
</table>

2) Wires are usually made from two materials, copper and plastic. Explain why? (1 mark)

Copper wire is used because it is conductive and plastic cover is used because it is insulating.

3) Which of the following materials will dissolve in water? (1 mark)

Tick TWO boxes.

- butter
- sugar
- granite
- salt
- oil
- sand
4) Lucy and Pip investigated how much sugar dissolved in 100ml of water at room temperature. This table shows their results:

<table>
<thead>
<tr>
<th>Number of spoonfuls of sugar</th>
<th>Did it all dissolve in 100ml of water?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>yes</td>
</tr>
<tr>
<td>2</td>
<td>yes</td>
</tr>
<tr>
<td>3</td>
<td>yes</td>
</tr>
<tr>
<td>4</td>
<td>yes</td>
</tr>
<tr>
<td>5</td>
<td>no</td>
</tr>
<tr>
<td>6</td>
<td>no</td>
</tr>
</tbody>
</table>

a. Lucy says that when they added the sugar to the water at the beginning of their investigation, it disappeared. Explain why this statement is incorrect. (1 mark)

b. Explain why 5 spoonfuls of sugar stopped dissolving in 100ml of water. (1 mark)

5) a. The table below shows the time it takes one sugar cube to dissolve in 400ml of water, but at different temperatures. Plot these results into a block graph. (3 marks)

<table>
<thead>
<tr>
<th>Temperature °C</th>
<th>0</th>
<th>20</th>
<th>40</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time taken to dissolve (seconds)</td>
<td>65</td>
<td>50</td>
<td>30</td>
<td>10</td>
</tr>
</tbody>
</table>
b. What do the results tell you about the temperature of water and the rate at which sugar cubes dissolve? (2 marks)


c. Write down three things that you would have to do when carrying out this investigation to make sure you carried out a fair test. (2 marks)

- 
- 
- 

6) a. Four teaspoons of salt dissolve in 500ml of cold water. The water looks clear but tastes salty. Describe how this salt could be separated from the water? (2 marks)


b. Look at the mixtures below and the equipment. Explain how you would separate each mixture using the equipment available. You can use any of the equipment available more than once. (4 marks)

**Equipment**

- Mug
- Spoon
- Sieve
- Magnet
- Ladle
- Jug

Iron filings and sand

This is the equipment I would select: _________________

This is how I would separate this mixture:

___________________________

___________________________

___________________________

Small pebbles and sand

This is the equipment I would select: _________________

This is how I would separate this mixture:

___________________________

___________________________

___________________________
7) Heating causes some materials to change. Some of these changes are reversible and some are irreversible. Look at the changes caused to these materials by heating and say whether these changes are reversible or irreversible. (2 marks)

Melting chocolate
This is a ___________ change.

Melting chocolate
This is a ___________ change.

8) Explain what will happen to this puddle on a warm sunny day. (1 mark)

______________________________

______________________________

______________________________

9) When designing certain items and products it is vital that the materials selected are transparent, translucent or opaque. Look at the products below and say whether it is important for them to be transparent, translucent or opaque. (1 marks)

Sleeping mask
It is important that the sleeping mask is __________________

Reading glasses
It is important that the reading glasses are __________________

Sun glasses
It is important that the sun glasses are __________________