1. Complete this table.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="cell" alt="symbol" /></td>
<td>cell</td>
</tr>
<tr>
<td><img src="ammeter" alt="symbol" /></td>
<td>ammeter</td>
</tr>
</tbody>
</table>

2. Draw a circuit diagram for each circuit.

What name is given to each type of circuit?

![circuit diagram 1](parallel) ![circuit diagram 2](series)

3. Tick the lamps that will light up.

![lamps](parallel) ![lamps](series)

4. Complete these sentences by crossing out the wrong words.

   a. In a series circuit, as more lamps are added the lamps **get brighter/get dimmer/stay the same brightness** and the current through each lamp **increases/decreases/stays the same**.

   b. In a parallel circuit, as more lamps are added the lamps **get brighter/get dimmer/stay the same brightness** and the current through each lamp **increases/decreases/stays the same**.
5 Write in the missing reading for each ammeter opposite.

X ..........................  Y .......................... 

6 Bob has a battery-operated electric toothbrush which has stopped working. List three things for him to check to see what is wrong.

............................................................................................................................................
............................................................................................................................................
............................................................................................................................................

7 You are given a box of components to sort out which are working and which are broken.

a Draw a circuit diagram for a test circuit with a lamp, that you could use to test lamps, switches and connecting wires from the box.

b How would you use your circuit to find out if a lamp was faulty?
............................................................................................................................................
............................................................................................................................................

c How would you use your circuit to find out if a wire was faulty?
............................................................................................................................................
............................................................................................................................................

8 When a battery goes flat, what is used up? Circle the correct letter.
A energy  B current  C voltage  D mass

9 Complete these sentences.

In a cell, ......................... energy is converted to ......................... energy.
In a lamp, ......................... energy is converted to ......................... energy and ......................... energy.

10 Look at the circuit opposite. Circle the correct letter(s) each time. Which lamp or lamps will light when:

a only switch A is closed?  X  Y  Z
b only switch B is closed?  X  Y  Z
c switches A and B are closed?  X  Y  Z
Test yourself

**Electrical circuits (continued)**

11 Complete these sentences to explain how a fuse protects an electrical appliance. Choose from the words below to fill the gaps.

- mends
- wire
- high
- low
- stops
- current
- melt
- resistance
- breaks

A fuse contains a piece of ________________ which has a higher ________________ than the rest of the circuit. If the current gets too ________________, the fuse will _________________. This ________________ the circuit so that the current ________________, protecting you from harm.

12 For a summer party, some friends are putting up a string of lights in the garden. What will happen if a bulb blows:

a) if the lights are wired in series? ________________________________

b) if the lights are wired in parallel? ________________________________

13 Which of these arrangements will give the brightest light from the lamp? Circle the correct letter.

A B C D

A \[\text{[diagram]}\]  B \[\text{[diagram]}\]  C \[\text{[diagram]}\]  D \[\text{[diagram]}\]

14 Some children are given three different pieces of wire, A, B and C. They connect up a circuit like this. The table shows their results.

\[\text{[diagram]}\]  wires A, B, and C connected in here

<table>
<thead>
<tr>
<th>Wire</th>
<th>Lamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>dim</td>
</tr>
<tr>
<td>B</td>
<td>no light</td>
</tr>
<tr>
<td>C</td>
<td>bright</td>
</tr>
</tbody>
</table>

a) Which piece of wire allows the current to pass through it easily? __________

b) Which piece of wire has the highest resistance? __________
**Electrical circuits**

1. Complete this table.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>![symbol_1]</td>
<td>lamp or bulb</td>
</tr>
<tr>
<td>![symbol_2]</td>
<td>switch</td>
</tr>
<tr>
<td>![symbol_3]</td>
<td>cell</td>
</tr>
<tr>
<td>![symbol_4]</td>
<td>battery</td>
</tr>
<tr>
<td>![symbol_5]</td>
<td>ammeter</td>
</tr>
</tbody>
</table>

2. Draw a circuit diagram for each circuit.

What name is given to each type of circuit?

- ![circuit_diagram_1] **series** circuit
- ![circuit_diagram_2] **parallel** circuit

3. Tick the lamps that will light up.

- ![tick_1] **series** circuit
- ![tick_2] **parallel** circuit

4. Complete these sentences by crossing out the wrong words.

a. In a series circuit, as more lamps are added the lamps
   **get brighter/get dimmer/stay the same brightness**
   and the current through each lamp **increases/decreases/stays the same**.

b. In a parallel circuit, as more lamps are added the lamps
   **get brighter/get dimmer/stay the same brightness**
   and the current through each lamp **increases/decreases/stays the same**.
5 Write in the missing reading for each ammeter opposite.

\[ \begin{align*}
X & \quad 2.5 \text{ A} \\
Y & \quad 1 \text{ A}
\end{align*} \]

6 Bob has a battery-operated electric toothbrush which has stopped working. List three things for him to check to see what is wrong.

Is the battery flat?

Are the contacts to the battery wet/dirty/corroded?

Are the contacts to the switch wet/dirty/corroded/Does the switch work?

7 You are given a box of components to sort out which are working and which are broken.

a Draw a circuit diagram for a test circuit with a lamp, that you could use to test lamps, switches and connecting wires from the box.

b How would you use your circuit to find out if a lamp was faulty?

Put the lamp in the gap to complete the circuit. If the lamp lights, it is working. If neither lamp lights, it is faulty.

C How would you use your circuit to find out if a wire was faulty?

Put the wire in the gap to complete the circuit. If the lamp lights, the wire is working. If not, the wire is faulty.

8 When a battery goes flat, what is used up? Circle the correct letter.

A energy   B current   C voltage   D mass

9 Complete these sentences.

In a cell, \textit{chemical} energy is converted to \textit{electrical} energy.

In a lamp, \textit{electrical} energy is converted to \textit{light/heat} energy and \textit{heat/light} energy.

10 Look at the circuit opposite. Circle the correct letter(s) each time. Which lamp or lamps will light when:

a only switch A is closed? \[ X \ Y \ Z \]

b only switch B is closed? \[ X \ Y \ Z \]

c switches A and B are closed? \[ X \ Y \ Z \]
Electrical circuits (continued)

11 Complete these sentences to explain how a fuse protects an electrical appliance. Choose from the words below to fill the gaps.

mends  wire  high  low  stops

current  melt  resistance  breaks

A fuse contains a piece of wire which has a higher resistance than the rest of the circuit. If the current gets too high, the fuse will melt. This breaks the circuit so that the current stops, protecting you from harm.

12 For a summer party, some friends are putting up a string of lights in the garden. What will happen if a bulb blows:

a if the lights are wired in series? They will all go out.

b if the lights are wired in parallel? Only one will go out.

13 Which of these arrangements will give the brightest light from the lamp? Circle the correct letter.

A  B  C  D

14 Some children are given three different pieces of wire, A, B, and C. They connect up a circuit like this. The table shows their results.

a Which piece of wire allows the current to pass through it easily? C

b Which piece of wire has the highest resistance? B