The Moisture Tester Project

Name ..............................................................
Form ............
Group .............
Technology Writing Tips

<table>
<thead>
<tr>
<th>POINT</th>
<th>Looking at a single aspect of a product (<em>something it has to do</em>). This generates the starting point.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVIDENCE &amp; EXPLORE</td>
<td>You now need to use either: <em>Prior Knowledge, Experience, Research or Ask a friend</em> why the point is important.</td>
</tr>
<tr>
<td>EXPLAIN</td>
<td>Now with what you have found explain in detail using <em>Who, What, Why, When, How or Because</em> your point.</td>
</tr>
<tr>
<td>ANALYSE</td>
<td>With your point now explained <em>analyse and express</em> your opinion whether it is good or bad.</td>
</tr>
<tr>
<td>DEVELOPMENT</td>
<td>From what you now evidenced, explored, explained and analysed <em>is there anything you could improve regardless of if it is a good or bad point.</em></td>
</tr>
</tbody>
</table>

When this symbol appears it is telling you that you Will be using maths skills on this page. It could be:
- Using formulas
- Timetables/division
- Measuring and scale

When this symbol appears it is telling you that you will have some form of assessment on this page. It could be:
- Verbal
- Peer
- Self assessment.
Learning Objectives

• The need to investigate the background to a problem
• How to select appropriate components to build simple electronic circuits
• The importance of planned manufacture
• The need to build models to evaluate design ideas
• How to improve a product by evaluation

Key words

Health & Safety, Resistor, L.E.D (light emitting diode), transistor, Battery clip, cell, current, voltage, ohms law, amps, electronic Symbols, circuit diagram, modelling, solder, soldering iron.

Remember:

Draw with a pencil.

Write with a pen.
Personalise this page using graphic techniques.
Situation

Houseplants can suffer if owners do not give them the correct amount of water. Houseplants can die if they do not receive enough water and they can rot if they are over watered.

Design Brief

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
**Electronics Theory**

**Voltage** is the electromotive force (____) that exists across the terminals of a battery. It is also known as potential difference (____).

It is measured in ____ s (V) and designated with the letter ___.

**Current** is the rate of flow of electrical ____.

It is measured in ____ s (A) and designated with the letter ___.

**Power** is the rate at which ____ is done.

It is measured in ____ s (W) and designated with the letter ___.

\[ P = \text{____} \times \]

**Resistance** limits the current in a circuit.

It is measured in ____ s (Ω) and designated with the letter ___.

**Ohm's Law** is the relationship between voltage, ____ and resistance.

\[ V = \text{____} \times \]

\[ I = \text{____} \]

\[ R = \text{____} \]

To find out the voltage use: \[ V = \text{____} \times \]

To find out the current use: \[ I = \text{____} \]

To find out the resistance use: \[ R = \text{____} \]
1. In what unit is voltage (EMF) measured? (1 mark)

2. In what unit is electrical current measured? (1 mark)

3. Draw the Ohm’s Law triangle to show the relationship between voltage (V), current (I) and resistance (R). (2 marks)

4. Resistance is measured in ohms. Draw the symbol that represents ohms. (1 mark)

5. Name the following components:

- a) 

- b) 

- c) 

- d) 

- e) NPN, PNP
6. If 'k' is the symbol for kilo (1000), how would you re-write 2000 watts in a shorter form? (1 mark)

7. What do the letters LED stand for? (1 mark)

8. a) Copy and label the 'anode', 'cathode' and 'flat' parts on the LED below: (3 marks)

   ![LED diagram]

   b) What is the 'flat' on the rim of the LED used for? (1 mark)

9. The three leads on a transistor are labelled 'b', 'c' and 'e'. What do these letters stand for? (3 marks)

10. What are the colour bands on a resistor used for? (1 mark)

(Total 20 marks)
## Electronic Components Information

Using illustrations and notes (annotation) explain each of these components used in your moisture tester.

<table>
<thead>
<tr>
<th>Light Emitting Diode</th>
<th>Transistor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resistor</th>
<th>Battery Clip</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Battery Clip</th>
<th></th>
</tr>
</thead>
</table>
Understanding cells & batteries

Using illustrations and notes explain what you have learnt about different types of batteries.
Resistor Colour Codes

Chart for working out the value of fixed resistors:
(Fill in the missing information and colour in the boxes to make it easier to understand the table)

<table>
<thead>
<tr>
<th>Colour</th>
<th>1st band</th>
<th>2nd band</th>
<th>3rd band</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold</td>
<td></td>
<td>0.1</td>
<td></td>
<td>± 5%</td>
</tr>
<tr>
<td>Silver</td>
<td></td>
<td>0.01</td>
<td></td>
<td>± 10%</td>
</tr>
<tr>
<td>Black</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>± 1%</td>
</tr>
<tr>
<td>_</td>
<td>_</td>
<td>2</td>
<td>00</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>_</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow</td>
<td>4</td>
<td>_</td>
<td>0000</td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>_</td>
<td>_</td>
<td></td>
<td></td>
</tr>
<tr>
<td>_</td>
<td>_</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Violet</td>
<td>_</td>
<td>_</td>
<td></td>
<td></td>
</tr>
<tr>
<td>_</td>
<td>_</td>
<td>8</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>9</td>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Exercise

Work out the following resistor values:
• Brown, Black, Red, Gold = ____________________________
• Yellow, Violet, Black, Gold = ________________________
• Brown, Grey, Green, Gold = __________________________
• Red, Red, Yellow, Gold = ____________________________

What would be the colour order of the following values:
• 470 \( \Omega \) ±5% = ____________________________
• 330 \( \Omega \) ±5% = ____________________________
• 560 \( \Omega \) ±5% = ____________________________
**Y7 Electronics Revision**

**SYMBOLS**
*(Fill in the missing symbols)*

- Battery
- Switch
- LED
  - L ______
  - E ______
  - D ______
- NPN Transistor
  - B ______
  - C ______
  - E ______
- Resistor

**UNITS & ABBREVIATION**

<table>
<thead>
<tr>
<th>Type</th>
<th>Unit</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (EMF)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PREFIXES**

<table>
<thead>
<tr>
<th>Name</th>
<th>Power</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>kilo (1000)</td>
<td>$10^3$</td>
<td>k</td>
</tr>
<tr>
<td>mega (1 000 000)</td>
<td>$10^6$</td>
<td>M</td>
</tr>
<tr>
<td>milli (0.001)</td>
<td>$10^{-3}$</td>
<td>m</td>
</tr>
<tr>
<td>micro (0.000 001)</td>
<td>$10^{-6}$</td>
<td>μ</td>
</tr>
</tbody>
</table>

**Parts of an LED**

The flat is used to:

- __________
- __________

**Ohm’s Law**

Ohm’s Law is the relationship between:

\[ V = I \times R \]

**OHM’S LAW TRIANGLE**

**RESISTORS**

- 1st band, 2nd band, 3rd band, Tolerance

To work out the value of a resistor, the:

- 1st band is __________
- 2nd band is __________
- 3rd band is __________

The tolerance band is usually silver or __________
Specification

Aesthetics

Customer

Cost

Environment

Safety

Size

Function

Material
Design Ideas

Reminder: read your design brief!

Teacher verbal feedback:
(You must record what the teacher has said)
Development

Use the technology writing tips to help you annotate your two developed ideas.
Vacuum Forming
In the space below draw each stage of the vac forming process and explain each stage in full sentences.
Packaging Information

Looking at packaging what is it’s purpose? What details & symbols does it usually contain? What have you found out and how will this help you with your moisture tester?

Teacher comment:
Final product evaluation
Paper Modelling

Teacher feedback:
CAD/CAM:
Health & Safety Poster

Using what you have learnt in class create a health & safety poster.
How electronic circuits work

Using what you have learnt in class create a health & safety poster.
Soldering Safety

Using what you have learnt in class create a poster promoting safety when soldering.
Mr Men & Little Miss Electronics

Create your own characters for:

Is Married to:

Mr. Ampere ← Mr. Volt ← Mr. Ohms

→ Little Miss Current → Little Miss EMF

→ Little Miss Resistance
Draw the circuit symbols for:

1. Switch (open)
2. Push to Make switch
3. Cell
4. Battery
5. Lamp
6. LED (light emitting diode)
7. Resistor
8. Variable resistor
9. Voltmeter
10. Ammeter
11. Motor
12. NPN Transistor
Research existing moisture testers
Find examples of existing moisture testers and annotate them.
Research packaging symbols

Find the meaning of these symbols and add any more you can find.

![Symbol of a person throwing trash into a bin]

![Recycling symbol]

![Symbol of a heart with a "S" inside]

![CE symbol]

![Symbol with an "X" through a trash can]
Peer Assessment:

Title of work being assessed:

Two strengths:
1.
2.

LEVEL................

Suggestion to improve:
1.

Peer Assessed by:

Title of work being assessed:

Two strengths:
1.
2.

LEVEL................

Suggestion to improve:
1.

Peer Assessed by: