3055 BA SANGAM COLLEGE

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Worksheet 26

School: Ba Sangam College **Year/Level**: 11

Subject: Physics

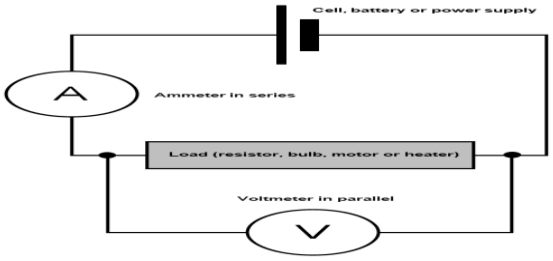
Strand	Current Electricity
Sub Strand	Power
Content Learning Outcome	Apply knowledge and develop skills in the concept of current electricity

MEASURING CURRENT AND VOLTAGE

- To measure current we use an ammeter**.** It is placed in series in a circuit to measure the amount of charge flowing through it per second.
- To measure voltage we use a voltmeter. It is placed in parallel to compare the potential at two different points, either side of a component. It can then measure the potential difference or voltage across the component.

CIRCUIT DIAGRAM

The diagram shows the correct connections for an ammeter and a voltmeter. The ammeter is connected in series with the load and the voltmeter is connected in parallel with the load.



When you make up the circuit connect the cell, load (resistor etc.) and the ammeter first. When this is correct **THEN** connect the voltmeter across the load.

ELECTRICAL POWER

Most appliances are usually marked with the power at which they run and we can work out how much energy they will use in a certain time. We can do this using the formula:

$$P = \frac{W}{t}$$

[Power in Watts(Joules/second), time in seconds, work done (energy) in Joules]

Power is the rate of doing work. It is the amount of energy supplied every one second. It is given by:

$$P = VI = I^2R = \frac{V2}{R}, \text{ thus}$$

$$W = P \times t = V \times I \times t = V^2/R$$

NOTE

A light bulb may be marked 100 W. A normal electric jug heater is usually 1 kW. A TV may be rated at 250 W. These figures tell you how POWERFUL the appliance is or HOW much electrical energy it uses in a second. In other words, the RATE at which electrical energy is converted to other forms. In one second the 100 W light bulb uses 100 J of electrical energy and converts some of it into light energy. However, in one second the normal electric jug heater uses 1 kW (1000 W) of electrical energy and converts it into heat energy.

Examples

1. How much energy is used by a 150 W black and white television if is turned on for 4 hours?
2. Calculate the electrical power used by an electric motor running from a 240 V supply and taking a current of 0.2 A.

ACTIVITY (8 marks)

1. How much energy is used by a 3 kW immersion heater in 45 minutes?

2. Calculate the current drawn from a 12 V battery by a 24 W light bulb.

3. Calculate the power of a torch bulb that operates on a current of 60 mA and a voltage of 3 V.

4. Calculate the power of a torch bulb of resistance 9Ω that operates on 3V.

THE END