

**KEY ELEMENTS: PHYSICAL SCIENCE***Characteristics of Electricity (22-25 hours)****Vocabulary***

acetate, amperes, coulombs, current, electric force, electrons, energy, joules, kilowatt-hours, ohms, Ohm's Law, power, resistance, series and parallel circuits, static charge, Van de Graaff generator, voltage, volts

***Knowledge***

- static electrical charges
- relationships between charged objects
- electricity
- movement of charged particles
- electric current
- resistance and voltage
- Ohm's Law
- series and parallel circuits
- power and energy consumption

***Skills and Attitudes***

- measure voltage and current using appropriate equipment
- perform calculations
- draw circuit diagrams

## GRADE 9 PHYSICAL SCIENCE: CHARACTERISTICS OF ELECTRICITY

PRESCRIBED LEARNING OUTCOMES	SUGGESTED ACHIEVEMENT INDICATORS
<p><i>It is expected that students will:</i></p>	<p><i>The following set of indicators may be used to assess student achievement for each corresponding prescribed learning outcome.</i></p> <p><i>Students who have fully met the prescribed learning outcome are able to:</i></p>
<p>C5 explain the production, transfer, and interaction of static electrical charges in various materials</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> explain, with illustrations, how static charges are separated because of transfer between various materials</li> <li><input type="checkbox"/> describe types of static electrical charge (positive, negative) and no charge (neutral) with reference to atomic theory</li> <li><input type="checkbox"/> describe how the electric force between two objects depends on types of charge, size of charge, and the distance between the two objects</li> </ul>
<p>C6 explain how electric current results from separation of charge and the movement of electrons</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> distinguish between <ul style="list-style-type: none"> <li>- potential and kinetic energy</li> <li>- static electricity and electric current</li> <li>- conventional current and electron flow</li> </ul> </li> <li><input type="checkbox"/> relate the charge on electrons to electron flow in a circuit (i.e., from negative to positive)</li> <li><input type="checkbox"/> define <i>current</i> in terms of the amount of electric charge that passes a point in a given time interval</li> </ul>
<p>C7 compare series and parallel circuits involving varying resistances, voltages, and currents</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> define resistance</li> <li><input type="checkbox"/> draw circuit diagrams using appropriate symbols that are properly placed</li> <li><input type="checkbox"/> conduct experiments to <ul style="list-style-type: none"> <li>- measure voltage and current, using appropriate equipment and units (e.g., volts, amperes)</li> <li>- determine resistance, using current and voltage data</li> </ul> </li> <li><input type="checkbox"/> perform calculations using Ohm's Law</li> <li><input type="checkbox"/> for a fixed supply voltage, differentiate qualitatively between series and parallel circuits in terms of <ul style="list-style-type: none"> <li>- current (may change from resistor to resistor in parallel; remains the same in series)</li> <li>- voltage (may change from resistor to resistor in series; remains the same in parallel)</li> <li>- total resistance (increases with the number of resistors in series; decreases in parallel)</li> </ul> </li> </ul>
<p>C8 relate electrical energy to power consumption</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> define electrical energy and power</li> <li><input type="checkbox"/> calculate the following: <ul style="list-style-type: none"> <li>- power—using voltage and current data</li> <li>- energy consumption—given the power rating of a device and duration of use</li> </ul> </li> </ul>