

<p>Lesson Title: Electric Current</p> <p>Lesson Summary: Introduce circuits and how electrons flow through a circuit, using an activity in which the entire class can participate. Introduce concepts that are related to electricity, including current and resistance.</p> <p>Purpose: Introduce new concepts and prepare students for the Electricity unit.</p>	<p>Course: SNC 1P (Grade 9 Applied Science)</p> <p>Curriculum Document: The Ontario Curriculum Grades 9 and 10 Science Physics: Electrical Applications (pg 68-69)</p>
<p>Expectations</p> <p>Overall: E3: Demonstrate an understanding of the concepts and principles of static and current electricity.</p> <p>Specific: E3.3: Identify the components of a simple direct current (DC), electrical circuit (eg. electrical source, electrical load, switch, fuse), and describe their function</p>	
<p style="text-align: center;">Learning Goals</p> <p>I will know:</p> <ul style="list-style-type: none"> - how electricity flows through a circuit - what current is and how it is measured in a circuit - what voltage is and how it is measured in a circuit - what resistance is and how it is measured in a circuit - how to use a voltmeter in a circuit - how to use an ammeter in a circuit - how to use an ohmmeter in a circuit 	<p style="text-align: center;">Student Success Criteria</p> <p>I can explain:</p> <ul style="list-style-type: none"> - how electricity flows through a circuit - how a load affects a circuit - how an ammeter is used to measure electric current in a circuit - how a voltmeter is used to measure voltage/electric discharge in a circuit - how an ohmmeter is used to measure resistance in a circuit
<p style="text-align: center;">Assessment</p> <p>For learning: Introduction, sticky notes to answer What is electricity? How does electricity move?</p> <p>As learning: Think/Pair/Share with handout</p> <p>Of learning: Exit Card at end of lesson</p>	<p style="text-align: center;">Materials / Resources</p> <p>Sticky Notes 25 Film Canisters 5 headbands with labels (cell, load, switch, voltmeter, ammeter, ohmmeter) 2 boxes (labels positive, negative) Meter Stick</p> <p>Class Handouts (T/P/S, Lyrics, Exit Card) Nelson Science Connections 9, page 500-503, 508-510</p>

<p style="text-align: center;">Prior Knowledge</p> <p>Basic introduction into electricity, as seen in grade 6, is beneficial but not necessary. Basic understanding of what electricity is and how it is used (for example, it powers items in the home).</p>	<p style="text-align: center;">Procedure/Organization</p> <p><u>X</u> Individual, <u>X</u> partners, <u>X</u> small group, <u>X</u> class group</p> <p>Literacy Strategies used: Think/Pair/Share (p. 152-153 <i>Think Literacy</i>) Finding Signal Words (p. 24-25 <i>Think Literacy</i>) (Underlined words on handouts correspond with bolded words in textbook).</p>	
<p>Introduction:</p> <p>What is electricity? How does electricity move through a circuit?</p> <ul style="list-style-type: none"> - students write ideas on sticky notes - teacher collects sticky notes and makes a class list - small discussion <p>Electricity is the movement of electrons. It uses a source, such as a battery to provide energy, and electrons flow from the negative side to the positive side.</p> <p>Draw circuit diagram on the board, including a cell and a load to demonstrate. Add a switch and explain how a switch works in a circuit.</p>	<p style="text-align: center;">Time</p> <p>12 minutes</p>	<p style="text-align: center;">Teacher Notes</p> <p>Place two sticky notes on each student's desk prior to class. Have instructions written on board prior to class starting: <i>Using the sticky notes on your desk, try to answer the following questions:</i></p> <ol style="list-style-type: none"> 1) <i>What is electricity?</i> 2) <i>How does electricity move through a circuit?</i> <p><i>No name is required. You have 3 minutes. Point form is fine, jot down whatever comes to mind.</i></p> <p>Expected Response: <i>Transfer of energy</i> <i>Movement of electrons</i> <i>What powers your light/playstation/etc</i> <i>Current</i> <i>Batteries</i> <i>Plugs</i></p>

Lesson Steps	Time	Teacher Notes
<p>Instruction: Class Activity – Modeling the Flow of Electricity</p> <ul style="list-style-type: none"> - get the class to circle up in the middle of the class, desks pushed to the sides - set the box labeled positive on a chair and the other box labeled negative on a desk - one student is the battery/cell, wears the headband labeled ‘cell’, and stands between the two boxes - each student is given a film canister which represents one coulomb - practice passing and receiving ‘coulombs’, the teachers announces when to pass on the count of 3 – “<i>One, Two, Three, Pass</i>” - the student representing the battery/cell gets a ‘coulomb’ from the positive box and passes it into the negative box – representing how a battery/cell re-energizes the charge <ul style="list-style-type: none"> o the students beside the boxes pass into a box or receive from a box - After practicing passing, get a student to be the load (a light bulb) and wear the corresponding headband, standing opposite the student representing the cell in the circle <ul style="list-style-type: none"> o This student spins every time they receive a ‘coulomb’ (Receive, spin, pass) o Receive the ‘coulomb’ at shoulder height and pass it at waist height - Practice passing ‘coulombs’ again, ensuring the light bulb is spinning and that students are understanding how electrons flow, and how a load uses some energy from the current - Now have a student represent a switch, wearing the corresponding headband and standing anywhere in the circle <ul style="list-style-type: none"> o They turn sideways to stop the flow after 10 seconds - Have another student represent a voltmeter, wearing the corresponding headband and holding the meter stick. They stand behind the student representing the light bulb. They 	<p>30 minutes</p>	<p>Have the headbands, meter stick, boxes, and film canisters readily accessible. Add notes to the circuit diagram on the board as the activity goes on. Have instructions written/posted for Rina to follow along. Be prepared for clarifying questions, and ensure questions are asked after each step:</p> <ul style="list-style-type: none"> - <i>Does everyone understand?</i> - <i>Does anyone have any questions?</i> - <i>Can anyone repeat/explain what is happening right now?</i> <p>Students may ask/inquire for clarification:</p> <ul style="list-style-type: none"> - <i>What is a coulomb?</i> - <i>Why does electricity flow from negative to positive?</i> - <i>Why are the boxes at different heights?</i> - <i>Why does the light bulb spin?</i> - <i>Why is the voltmeter outside of the circle but the ammeter is in the circle?</i> - <i>What is the voltmeter measuring?</i> - <i>What is the ammeter measuring?</i>

<p>measure the drop in voltage, as seen by the ‘coulombs’ being passed from shoulder height to waist height</p> <ul style="list-style-type: none"> - Another student is chosen to represent an ammeter, wearing the corresponding headband and standing in the circle where they were standing <ul style="list-style-type: none"> o They count how many ‘coulombs’ they receive/pass - Resume passing electrons, having the switch close every 10 seconds <ul style="list-style-type: none"> o The light bulb spins, the ammeter counts the flow of current, and the voltmeter measure the drop in voltage across the light bulb o Talk about what is happening in the circuit every time the switch closes - Pass ‘coulombs’ for about 5 rounds, ensuring students understand what is going on. When students appear to be grasping the concepts, conclude the activity. <p>Application or practice (<i>Seatwork, group work</i>) Think/Pair/Share, with handout related to activity</p> <ul style="list-style-type: none"> - textbook reference, pages 500-503, 508-510 - Give students 3 minutes to answer questions individually - Answer questions from what they remember from the activity, as well as using their textbook for extra help. - Have them partner up and given them 5 minutes to discuss the answers - Take up the handout as a class 	<p>15 minutes</p>	<p>Have students put desks back and sit at their seats.</p> <p>Pass out the handouts, telling the students they will be working on the handouts individually. (Modified handout for Rina). After 3 minutes, partner the students up. (Rina with Rachel). After 5 minutes have the students return to their seats and take up the answers on the board.</p> <p>Possible inquiries:</p> <ul style="list-style-type: none"> - <i>I don't remember what happened. I can't answer this!</i> (That's okay, answer what you can). - <i>I don't remember what the device is called but I remember who was standing there.</i> (Great! Jot down anything that you remember that relates to the question).
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