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| Electricity and circuits | | |
| Content | Electricity is created by the presence and movement of charged particles. Electric current is created by the flow of electrons through the conducting wires of an electric circuit. Circuit diagrams use standard symbols to represent circuit elements. In this lesson students learn how to construct and graphically depict open circuits, closed circuits, and short circuits. | |
| Learning objectives | The student will be able to:define electric current;identify the electrical symbols for basic circuit elements;  1. identify and construct open circuits, closed circuits, and short circuits. | |
| Materials/technology resources | 1. Slide presentation: “CircuitsAndElectricity.ppt” 2. Investigation: Modular Circuits: battery, bulb, four corner wires,   straight wires, six jumpers, bare wire   1. Student work: “CircuitsAndElectricityAssignment.pdf” | |
| Lesson plan segments | * Whole group discussion: Introduce the unit by asking students to help list all the devices in the classroom that use electricity, including personal battery-powered devices. All these devices function by controlling the flow of charged particles, a topic they will begin to learn about today. | Macintosh HD:Users:tomhsu:Desktop:Icon_Tiffs:Visual.tif **Macintosh HD:Users:tomhsu:Desktop:  TeacherMaterials:Icon_Tiffs:Auditory.tif** |
|  | * Slide presentation: The presentation introduces the topic of electricity, defines electric current, and presents diagrams of electric circuits that illustrate the differences between open, closed, and short circuits. Students create a human circuit and measure its “current.” * Investigation: Students investigate how to use the Modular Circuits kit to create a simple circuit to light a lamp. The circuit is modified by adding a switch to construct open and closed circuits. A wire is used to create short circuits. | Macintosh HD:Users:tomhsu:Desktop:Icon_Tiffs:Visual.tifMacintosh HD:Users:tomhsu:Desktop:Icon_Tiffs:Auditory.tif Macintosh HD:Users:tomhsu:Desktop:Icon_Tiffs:Kinesthetic.tif  Macintosh HD:Users:tomhsu:Desktop:Icon_Tiffs:Kinesthetic.tif |
|  | * Student work: *Electricity and circuits* assignment   The assignment sheet provides a place for students to record the results of their investigation. Encourage students to complete the problem set at the end of the assignment by working together in groups of three. When the class has finished, representatives from each group could volunteer to read answers aloud. | Macintosh HD:Users:tomhsu:Desktop:  TeacherMaterials:Icon_Tiffs:linguistic.tif Macintosh HD:Users:tomhsu:Desktop:  TeacherMaterials:Icon_Tiffs:Interpersonal.tif  Macintosh HD:Users:tomhsu:Desktop:  TeacherMaterials:Icon_Tiffs:Logical.tif |
|  | * Reading: from the *Essential Physics* textbook, pages 472-474 | Macintosh HD:Users:tomhsu:Desktop:  TeacherMaterials:Icon_Tiffs:linguistic.tif |

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| Assessment evidence | **Objective 1**: Which statement below is a correct definition of electric current? Electric current is . . .(*in slide presentation*)   1. the energy of moving electrical charges. 2. the flow of electric charges through a wire or circuit. 3. the number of electrons in a circuit element. 4. the attraction between charged particles in a wire.     **Objective 2**: Label each of the electrical symbols below with the name of the electrical component it represents: battery; resistor; lamp; switch; or wire.  (*in slide presentation*)    **Objective 3:** (*in slide presentation*)  Open,-Closed,-and-Short-Circuits.png    answers: short circuit open circuit closed circuit | | | | | | | | | |
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| Prior knowledge | No specific concepts are required prior to this lesson. | | | | | | | | | |
| Vocabulary | electric current open circuit ampere closed circuit  electric circuit short circuit multimeter | | | | | | | | | |
| Standards | The student is expected to:   * demonstrate the use of course apparatus and equipment.  construct electric circuit elements connected in series and parallel. | | | | | | | | | |
| Crosscutting concepts | Patterns | Cause  and  Effect | | Systems  and  Models | Energy  and  Matter | | Structure  and  Function | Stability  and  Change | | Scale, Proportion, Quantity |
| * Circuit diagrams are tools for modeling electrical systems. * The structure of the circuit determines how it will function. | | | | | | | | | |
| Key to differentiated instruction: | | | visual Macintosh HD:Users:tomhsu:Desktop:  TeacherMaterials:Icon_Tiffs:Visual.tif | | | linguistic Macintosh HD:Users:tomhsu:Desktop:  TeacherMaterials:Icon_Tiffs:linguistic.tif | | | auditory Macintosh HD:Users:tomhsu:Desktop:  TeacherMaterials:Icon_Tiffs:Auditory.tif | |
| interpersonal Macintosh HD:Users:tomhsu:Desktop:  TeacherMaterials:Icon_Tiffs:Interpersonal.tif | | | intrapersonal Macintosh HD:Users:tomhsu:Desktop:  TeacherMaterials:Icon_Tiffs:Intrapersonal.tif | | | kinesthetic Macintosh HD:Users:tomhsu:Desktop:  TeacherMaterials:Icon_Tiffs:Kinesthetic.tif | | | logical Macintosh HD:Users:tomhsu:Desktop:  TeacherMaterials:Icon_Tiffs:Logical.tif | |