

i3 STC Kit Extension Activities

North Carolina

Grade: 6	
Kit Name: Properties of Matter	
Essential Standard(s): 6.P.3.1 Illustrate the transfer of heat energy from warmer objects to cooler ones using examples of conduction, radiation and convection and the effects that may result. 6.P.3.3 Explain the suitability of materials for use in technological design based on a response to heat (to include conduction, expansion, and contraction) and electrical energy (conductors and insulators).	
Unpack the Standard What is the “Big Idea”? 6.P.3.1 Energy can be transferred from one system to another (or from a system to its environment) in different ways: <ul style="list-style-type: none">• thermally, when a warmer object is in contact with a cooler one• mechanically, when two objects push or pull on each other over a distance• electrically, when an electrical source such as a battery or generator is connected in a complete circuit to an electrical device• by electromagnetic waves. Thermal energy is transferred through a material by the collisions of atoms within the material. Heat flows through materials or across space from warm objects to cooler objects, until both objects are at equilibrium. Heat travels through solids, primarily by conduction. Heat is circulated in fluids, both liquids and gases, through the process of convection. Radiation is energy that travels across distances in the form of electromagnetic waves. Over time, thermal energy tends to spread out through a material and from one material to another if they are in contact (conduction). Thermal energy can also be transferred by means of currents in air, water, or other fluids (convection). 6.P.3.3 Thermal energy is transferred through a material by the collisions of atoms within the material. Over time, thermal energy tends to spread out through a material and from one material to another if they are in contact (conduction). Thermal energy can also be transferred by means of currents in air, water, or other fluids (convection). In addition, some thermal energy in all materials is transformed into light energy and radiated into the environment by electromagnetic waves; that light energy can be transformed back into thermal energy when the electromagnetic waves strike another material. As a result, a material tends to cool down unless some other form of energy is converted to thermal energy in the material. There are some things that we use daily that we want to conduct heat easily. Most of these items are made of materials that conduct heat readily: aluminum, steel, copper. We call these materials thermal conductors. Similarly, there are things that we do not want to conduct heat (pot handles, spatula, cooking utensils) and these items are generally made of materials that limit heat transfer. We call such materials thermal insulators. Expansion joint strips in bridges allow for the bridge to expand in hot weather and not break. These same joint strips allow for the bridge to contract in cold weather and not break. Electrical energy also passes through conductors. An electrical conductor is a material through which an electrical current can flow easily. An electrical insulator is a material through which electrical current does not readily flow. Electrical conductors include most metals, while most nonmetallic solids (rubber, glass, porcelain, ceramic) are insulators.	
What is the Engaging Essential Question?: Use Mountain Jim story about soup in rocks to engage students in a discussion.	
Which activities in the kit touch on the Standard(s) and how can they be adjusted to better address the Standard(s)? Lesson 5.1 Lesson 7 Lesson 9	
Kit Activity	Extension Suggestions

<p>Do extensions activities after lesson 5, be sure to complete before starting lesson 7</p>	<p>You-tube video Convection Currents:(watch for demonstration of lesson) Use a 5 gallon fish tank half full of water. Under one side is a bowl of boiling water, on the other is a bowl of ice. Place several drops of red food coloring over the hot side and blue food coloring over the cold side. Students will be able to see convection currents.</p>
	<p>Use beaker and Flask activity from training... Heat energy... To address radiation go outside and discuss the how the Sun heats the earth</p>
<p>Lesson 9</p>	<p>Completed the project and making standard 6.P.3.3 part of the criteria will address this standard.</p>
<p>Additional Suggestions (Literature connections; online resources): Interactive Video for instruction: http://www.wisc-online.com/Objects/ViewObject.aspx?ID=sce304 Extension readings from kit: P64-68 Density creates currents P70-72</p> <p>Web Resources: Interactive assessment heat transfer</p>	