

LCM Lesson Plan: Are Mittens Warm?  Performance Standards: Science: B1, A8c Math: A2, Cultural : E2 and E4  Science Concept: Mittens act as insulators to keep hands warm.		Name: Angela Pirtle Sitka School District Keet Gooshi Heen Elem. School Grades 2 and 3 Adapted from <u>Teaching Chemistry with Toys: Activities for Grades K-9</u> by Sarquis, Sarquis, and Williams	
		<b>Process Skills</b>	<b>Materials</b>
<b>Gear Up</b> <ol style="list-style-type: none"> <li>1. Read <i>The Mitten</i> by Jan Brett out loud to class.</li> <li>2. Discuss the story and the wearing of appropriate clothing for the weather. Include at least three different types of weather, warm and sunny, rainy, and snowy.</li> <li>3. Ask students to predict how wearing mittens will keep their hands warm. Record responses on board or chart paper.</li> </ol>		Prediction Communication	- <i>The Mitten</i> by Jan Brett -1 metal or alcohol thermometer per group of students -1 clock for the class -1 mitten per group of students -1 data sheet per group of students -optional overhead transparency of the data sheet for demonstration purposes -class set of <i>Are All Mittens Alike?</i> and <i>Temperature Levels</i> Assessment sheets
<b>Explore</b> Have students in groups of 4. <ol style="list-style-type: none"> <li>1. Each group determines the air temperature of the room using a thermometer and records it on their data sheet.</li> <li>2. Ask students what will happen to the temperature when the thermometer is placed in the palm of a hand without a mitten. Have the groups record this prediction on their data sheet. Teacher can record the prediction of the majority on the overhead for demonstration purposes.</li> <li>3. Have a student in each group hold the stem of a thermometer in the palm of an open hand for two minutes (teacher times). Then have another student from the group read the temperature and record it on the Data Sheet.</li> <li>4. Ask students to predict what will happen to the temperature if a fist is closed completely around the thermometer, and have them record their group's prediction. Then have another student in each group hold a fist around the stem of the thermometer for 2 minutes. Remind students to keep their fists shut while reading the thermometers. Ask the students why this is important (to reduce the heat lost to the air). Have each group record the temperature on their data sheets.</li> <li>5. Continue this procedure with each of the following: thermometer in an empty mitten, and a thermometer on the palm of a student wearing a mitten.</li> </ol>		Measurement Communication Predicting	

<p><b>Generalize</b> Ask and discuss with students:</p> <ol style="list-style-type: none"> <li>1. What was the temperature of an open hand versus a closed fist?</li> <li>2. What were the temperatures of the empty mitten and the mitten that was on a hand?</li> <li>3. Why was the temperature of the mitten that was on a hand higher than the empty mitten?</li> <li>4. Ask the students to think of ways the Tlingit might have kept their hands warm during the winter long ago. Compare and contrast their responses to how people keep their hands warm today.</li> </ol>	<p>Communication Inferring</p>	<p>Vocabulary  Prediction</p>
<p><b>Apply/Assess</b></p> <ol style="list-style-type: none"> <li>1. Have students complete the Temperature Levels assessment sheet. In this assessment students color in thermometers to correspond to the actual temperature for each temperature taken (air, palm, fist, empty mitten, hand in mitten), and respond to the question, "Which temperature is the highest? and "Why do you think it was the highest?".</li> <li>2. Have students complete the assessment sheet, "Are All Mittens Alike?" The students are asked to compare and contrast oven mitts with winter mittens.</li> </ol>	<p>Making inferences Communicating</p>	
<p><b>Extensions</b></p> <ol style="list-style-type: none"> <li>1. Repeat the exploration using mittens made from different fibers (wool, polyester, etc) to see which fibers will make the warmest mittens.</li> <li>2. To further demonstrate insulation, have students stand with one bare foot on the carpet and one bare foot on the uncarpeted floor. Even though they are both the same temperature, the uncarpeted surface feels colder because it conducts heat away from your body more rapidly.</li> <li>3. Research Tlingit clothing.</li> </ol>	<p>Observing Predicting</p>	

## Scoring Guide for “Are Mittens Warm?”

Parameter	2 Developing	3 Proficient	4 Advanced
Records Temperature	Temperature accurately recorded on 4 or fewer thermometers to the nearest 2 degrees.	Temperature accurately recorded on all 5 thermometers to the nearest 2 degrees.	Temperature recorded accurately to the degree or all five thermometers.
Makes Inferences	Student does not identify the highest temperature, or student doesn't offer a reasonable explanation for why the mitten covered hand had the highest temperature.	Student correctly tells which temperature is the highest, and offers a reasonable explanation (the mitten holds the cold air away from your hand, or the mitten holds in the heat from your hand) for why the mitten covered hand had the highest temperature.	Same as a 3, but the explanation given by the student shows a higher level of understanding.
Compare and Contrast Oven Mitts with Winter Mittens	Student only tells how the oven mitts and winter mittens are alike OR different.	Student tells at least one way oven mitts and winter mittens are alike, and one way they are different. Student response must say mittens protect hands from hot and cold temperatures.	All of the requirements of a 3 plus student tells more than one way oven mitts and winter mittens are alike and more than one way how they are different.

# Are Mittens Warm?

## Data Sheet

Adapted from Teaching Chemistry with Toys

Predict what the temperature will be and record the actual temperature.

Condition	Prediction	Actual Temperature	Was your prediction high or low?
Temperature of the room			
Temperature of your palm without the mitten on			
Temperature of hand with closed fist			
Temperature of the empty mitten			
Temperature of your palm with mitten on			

# Are All Mittens Alike?

Adapted from Teaching Chemistry with Toys

Please tell how winter mittens and oven mitts are alike and how they are different.

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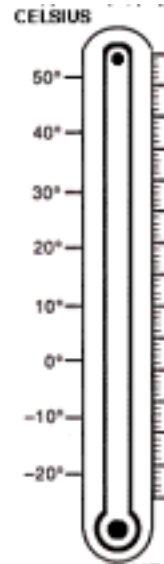
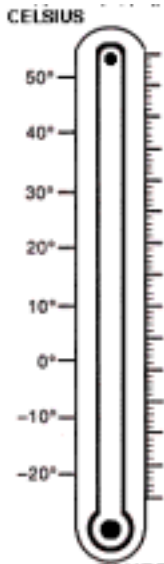
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# Temperature Levels Assessment Sheet

Adapted from Teaching Chemistry with Toys

Record the actual temperature for each measurement and color in the liquid to show each temperature on the thermometers:



Temperature of the room \_\_\_\_\_ °C

Temperature of your palm  
without the mitten \_\_\_\_\_ °C

Temperature of hand  
with closed fist \_\_\_\_\_ °C



Temperature of empty  
Mitten \_\_\_\_\_ °C

Temperature of palm  
with mitten on \_\_\_\_\_ °C

Which temperature is the highest? \_\_\_\_\_ Why do you think this one had the highest temperature?