

# Cold Weather Science

## How Cold is Alaska??

### *Lesson Plan*

#### **Purpose:**

To demonstrate the dangers of getting wet in Alaska during the winter, through comparing ice water temperatures with temperatures of Alaskan rivers and lakes.

#### **Objectives:**

Students will:

- \* Understand how to use a thermometer
- \* Record temperature predictions and recordings
- \* Learn descriptive words involving temperature
- \* Compare the data they have collected with temperatures measured in Alaska
- \* Reflect on how cold weather affects people in Alaska

#### **Necessary Materials:**

- \* Lesson Plan
- \* Thermometer (Submersible)
- \* Ice in Large Container
- \* Water
- \* Refrigerator/Freezer

#### **Main themes to emphasize:**

- \* How cold do you think it gets in Alaska in the winter?
- \* What are the temperatures of things around us, where we live?
- \* How does the weather influence people's activities in Alaska?

#### **Procedure:**

**1. Show** the video segment, 'Exploring the Denali Region', to students (or instruct them to watch it at a time before the lesson).

**2. Introduce** the assignment:

"As you saw in the video segment, the cold weather in Alaska dramatically affects the people who live there. Do you have any idea how cold it is up there? Do you think Alaska gets as cold as your freezer? In the video, you heard that rafting in the winter isn't a good idea, because the water is so cold. How cold do you think the water is? How would it feel if you fell in? Using a thermometer, we are going to try to 'feel' what an Alaskan river feels like."

**3. Discuss** thermometer use and freezing point:

"Now, at what temperature does water turn into ice? How cold do you think rivers in Alaska are? As cold as a glass of ice water? Any guesses?"

**4. Write** on the board, or pass out, observed temperatures of Alaskan rivers

**5. Instruct** student/students to take the temperature of the ice water sample: Instruct them to record the temperature (on the provided handouts and/or the board).

**6. Discuss** what the water 'feels' like Have students feel how cold the ice water is by having them place their hands into it – ask them to describe how it feels.

Words to encourage: (Definitions taken from Dictionary.com)

\* Numbing: Is the water making you lose feeling in your hand?

\* Penetrating: Is the cold feeling 'deep', or just on the surface of your hand?

\* Frigid: Does the water feel extremely cold?

\* Cool: Is the water not hot or cold, but in the middle?

\* Stinging: Does your hand feel like things are poking into it?

- \* Brisk: Does the water wake you up? Is it stimulating?
- \* Nippy: Is the water pleasantly cold?
- \* Tingling: Does your hand have a prickly sensation?
- \* Lukewarm: Is the water mildly warm?
- \* Refreshing: Does the cold wake you up?

Introduce the concept of 'hypothermia', where an individual has an exceptionally low body temperature. (This is another good vocabulary word)

**7. Relate** observations to Alaska and the video segment:

Ask students how it would feel if they had their entire body in water that cold

"How long do you think you could survive?"

**8. Real Life** Scenarios:

Inform them that many dog mushers, fishermen and boaters have fallen into water that cold, and that this can be very dangerous when they are far away from a place where they can dry off.

Stories that involve getting wet in the winter:

North of Reliance – by Dave Olesen  
Excerpt from chapter 'November Ice'

While running dogs on a lake, dog musher Dave Olesen fell through a thin area of ice. As he tried to climb out, the ice kept giving way, and the cold water sucked him back in. Here he describes how he climbed out:

"The water filled the layers of my heavy clothing. I gasped and began to kick and sprawl, kick and spral, clawing at the ice as it gave way in wide plates beneath me. My breath came in short tight gulps."

**Extending the project:**

## Take Additional Measurements:

### 1. **Instruct** students to take more measurements

Potential things/places to measure:

(Note: Many require parental supervision if done at home)

- \* Freezer
- \* Refrigerator
- \* Outside temperature
- \* Indoor temperature
- \* A glass of water left on a table for an hour
- \* A glass of hot water
- \* Nearby Streams/Lakes

**2. Provide** students with the temperature hypothesis/observation sheet Instruct them to list places / objects they intend to measure, and ask them to guess the temperatures they will observe

### 3. **Describe** what certain things/places feel like

If it is safe for students to 'feel' the area or thing they are measuring (i.e. stick hand in refrigerator or freezer), ask them to describe how the temperature 'feels' (Note: Again, this may require adult supervision)

**4. Ask** students to compare the temperatures they observed to temperatures measured in Alaska and elsewhere, as provided on the extended temperature listing

## Compare Air temperature with Water temperature:

**Preparation:** Allow water to sit at room temperature for several hours Have students predict the air and water temperature

- \* Measure and record the observed temperatures – have students construct charts showing their data
- \* Have students place their hands in the room temperature water

**1. Ask:** How cool does this water feel compared to the air?  
Is it colder or warmer?

**2. Demonstrate** how the same temperature can feel different  
After students pull their hands out of the water, ask them to compare how the wet hand feels compared to the dry hand

**3. Have** students describe how warm or cold the air 'feels'

**4. Discuss** how the water 'changed' what the air temperature felt like

*If it was 40 below zero and then you fell into freezing water, how would it feel when you got out?*

### **Additional Resources:**

Just How Cold is it?:

<http://mathforum.org/paths/measurement/cold.html>

### **Extensions:**

- \* Use the vocabulary above in a spelling test
- \* Ask students to keep a log of the temperature at their house
- \* Introduce students to web-based weather websites  
([www.wunderground.com](http://www.wunderground.com))
- \* Integrate a language arts lesson on similes:  
\_\_\_ feels as cold as \_\_\_