

Lesson Title: Weather-Wise

Brief: Students will learn about different types of weather and identify different clouds in order to predict the weather.

Grade: 4-6

Duration of Lesson: 2 days

Materials:

Tray of ice cubes
tea kettle of boiling water
A pan
Clean glass quart jar

Key Terms: Meteorology: is the study of weather. Professional weather forecasters understand and predict the weather. They are also involved with weather-related concerns such as ancient climates, air pollution, allergies, crop growth, building, road construction and human comfort.

Standards / Objectives

NGSS MS. Weather and Climate: Science and Engineering Practices

Developing and Using Models: Develop and use a model to describe phenomena. (MS-ESS2-6)

NGSS MS. Weather and Climate

Disciplinary Core Ideas, ESS2.D: Weather and Climate

Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. Interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MS-ESS2-6)

NGSS MS. Weather and Climate

Crosscutting Concepts: Systems and System Models

Models can be used to represent systems and their interactions—such as inputs, processes and outputs,—and energy, matter, and information flows within systems. (MS-ESS2-6)

<p><u>Understanding(s) /Big Ideas:</u> Weather is an important part of our lives, but we often do not pay attention to it. Weather can be helpful, but sometime destructive. It is important to know precautions to take to avoid problems that may results from bad weather.</p>	<p><u>Essential Question(s):</u> What are different types of weather? Where can you find the forecast? How do clouds form and how can you use clouds to predict the weather?</p>
<p><u>Students will know:</u> Weather is an important part of our daily lives. Clouds can be used to predict the weather. Different types of weather.</p>	<p><u>Students will be able to:</u> Identify clouds and use them to predict the weather. Simulate clouds to make rain. List various types of weather and explain how they can be affected by the weather.</p>
Performance / Observations	
<p><u>Performance Task(s):</u> Students will discuss various types of weather. Students will observe and assist with weather demonstrations.</p>	<p><u>Other Evidence:</u> Students will write a summary about each weather experiment.</p>
Learning / Inquiry Activities	

Introduction: Weather is so much a part of our lives that we don't pay much attention to it. Most weather is helpful, but sometimes weather is destructive. Often we don't take precautions to avoid problems that may result from bad weather.

Learning / Inquiry Activities:

1. Talk about the many different kinds of weather that your students can think of (precipitation; rain, snow, sleet, hail, drizzle, storms and winds- blizzards, hurricanes, tornados).
2. Discuss the weather at school today. Your students should consider the season, year, month, date, hour, temperature, wind (direction and speed), precipitation (form and amount), and humidity.
3. Show students where the forecast may be found in the newspaper. Collect and discuss weather forecasts and weather maps.
4. **The rain process – making rain.** As the teakettle boils, steam or water vapor will emerge from its spout. If you hold the tray of ice cubes over the teakettle, the vapor will condense on the tray and collect into drops. As the drops become larger and heavier, they will fall. The pan is to collect your raindrops as they fall. As a cloud appears or perhaps is pushed by another air mass, the tiny droplets come together and form larger drops. Finally, the drops get too heavy and they fall. This is how rain is formed.
5. **Cloud process - make clouds.** Use the quart jar and fill it with hot water. Now pour

- 3/4ths of the water out. After about five minutes, place an ice cube over the mouth of the bottle and hold it firmly.
- a. The ice cube cools the air around the bottle. Since the cool air is heavier, it moves down and touches the warm air. The warm air is full of moisture called water vapor. As water vapor cools, it forms little droplets and we see the moisture as a cloud in the bottle
6. **Snow and ice.** Like droplets of rain, snowflakes form around dust particles. Melt a pan full of snow, and you will find many specks of dirt in the water.
- a. Snow looks different from ice. Snow is frozen water vapor, but ice is frozen water. Put the pan of snow that you melted into water in your freezer and the water will freeze to ice.
 - b. Notice: the ice is clear while snow is white. A snowflake is a crystal which is formed around a particle of dust. It is frozen vapor- a mixture of air and very tiny droplets of water. The mixture of air and water makes the snow look white. Ice is only frozen water; therefore, ice looks clear. When water begins to freeze, tiny crystals form. These crystals arrange themselves in a tight-knit pattern. This is what makes blocks of ice so hard. If possible, have students look closely at snowflakes using a magnifying glass for close examination.
7. Have students write up a summary for each of the experiments that were preformed.
8. Have students explain how the experiments relate to a career as a meteorologist.

We invite you to send photos or information on your experience teaching the lesson to the Montana Department of Agriculture's Ag in the Classroom lbrenneman@mt.gov
This lesson was adapted from Agriculture in Montana Schools, aginmontanaschools.com.