**Weather and Climate**

**Lesson #5:** **Types of Precipitation**

**Essential Question:  How does weather affect our lives?**

**Standards:**

**3-ESS2-1**. Use graphs and tables of local weather data to describe and predict typical weather during a particular season in an area.

**3.MD.B.3**  Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how  many more” and “how many less” problems using information presented in bar graphs. (3-ESS2-1)

**Student will be able to:**

1.      Describe precipitation and compare and contrast the different types of precipitation.

2.   Use a bar graph to answer questions and make predictions about average temperature in North Adams.

**WIDA Language Objectives:**

**Speaking:**

**Level 1:** Recite words from the diagram or top-down web. Answer yes or no questions from the diagrams or top-down web.

**Level 2**: Using the diagrams, top-down web, restate to a partner the following sentences:

**Hail** is a large frozen raindrop.

**Snow** is ice crystals that form into flakes.

**Level 3:** From top-down web or diagram, answer these questions:

·         What is hail?

·         What is sleet?

·         What is snow?

·         What is rain?

**Level 4**: Compare and contrast snow and rain

**Reading** :

Level 4 • Interpret information or data from charts and graphs

**Vocabulary**:

Hail is a large frozen raindrop produced by intense thunderstorms where snow and rain can coexist.  As the snowflakes fall, liquid water freezes onto them forming ice pellets that will continue to grow as more and more droplets are accumulated.  The hailstone reaches the ground as ice because it is not in contact with the warm air below the thunderstorm long enough to melt before reaching the ground.

Sleet is frozen raindrops that bounce when they hit the ground or hit something else.  Sleet begins as snow high in the atmosphere and then partially melts in warmer layers of air but then refreezes in colder areas of air as it falls.

Snow is ice crystals that form into flakes.  Snow forms at temperatures below freezing.  For snow to reach the earth's surface the temperature in the troposphere needs to be at or below freezing.  It can be slightly above freezing in some layers if the layer is not warm or deep enough to melt the snowflakes too much.

Once students have a conceptual understanding of the vocabulary word they should create a 4-Square (Frayer Method from Key Vocabulary Routine) for the above word(s).

**Assessment:** Class discussion, top down web and graphing worksheet

**Resources and Materials:**

|  |  |
| --- | --- |
| **Item** | **Amount** |
| Pictures of different precipitation | 3 sets (in bin) |
| Rulers (not provided) | (in classroom) |
| Paper (not provided) | (in classroom) |

**Activator:**What types of water fall out of the sky?  Discuss the answers as a class and talk about how some types of **precipitation** are liquid (rain) and some are solid (snow, sleet, and hail). Then discuss what types of precipitation are most common during different times of the year, making connections between types of precipitation and temperature.  When does it snow in North Adams?  How does it feel outside when it is snowing?  What about sleet?  Hail?  When does rain occur?  Does it need to be cold for it to rain?  How can you tell when a rainstorm might be coming?  Does the air feel humid (damp and heavy)?

**Activity:**

1.   From the previous lesson, students should know that water in the atmosphere (from the water cycle) falls back to the earth as precipitation.  Water evaporates from the earth to forms clouds that create precipitation.  Discuss the different types of precipitation as a class, using the pictures provided as a visual aid.  Precipitation can be either liquid (rain) or solid (hail, sleet, or snow).

a.       **Rain** falls when growing water droplets become too heavy to remain in clouds, and fall toward the earth’s surface.  Rain can also begin as ice crystals that come together to form large snowflakes.  As the falling snow comes into contact with warmer air, the flakes melt and collapse into raindrops.

b.         **Hail** is a large frozen raindrop produced by intense thunderstorms where snow and rain can coexist.  As the snowflakes fall, liquid water freezes onto them forming ice pellets that will continue to grow as more and more droplets are accumulated.  The hailstone reaches the ground as ice because it is not in contact with the warm air below the thunderstorm long enough to melt before reaching the ground.

c.        **Sleet** is frozen raindrops that bounce when they hit the ground or hit something else.  Sleet begins as snow high in the atmosphere and then partially melts in warmer layers of air but then refreezes in colder areas of air as it falls.

d.      **Snow** is ice crystals that form into flakes.  Snow forms at temperatures below freezing.  For snow to reach the earth's surface the temperature in the troposphere needs to be at or below freezing.  It can be slightly above freezing in some layers if the layer is not warm or deep enough to melt the snowflakes too much.

e.       Make sure that students understand that there exist layers of warm and cool air in the troposphere.  The temperature of these layers do not necessarily relate directly to their altitude, although on average temperature decreases when altitude increases.

2.   Discuss how to measure precipitation. Tell students that they can collect precipitation in a tool called a gauge, and they can measure precipitation by reading the value in millimeters. Show a picture of rain gauges.  The gauge can measure precipitation as long as there is no barrier or extreme wind. Tell students that  a rain gauge was the tool that was used to collect the inches of precipitation that fell in North Adams MA in 2012. Use the graph about average precipitation in North Adams to answer the questions.



Whole Class Activity

Average Precipitation for North Adams, MA in 2013

Was there more precipitation in July or November?

About how many inches of precipitation fell in February?

Do you think there will be more than 24 inches of rain that will fall next August?  Explain your reasoning.

As a class complete a top down web or a two column note sheet about precipitation. Use word banks as a modification for students.

**Closure:**  Discuss the following questions as a class.  Which type of precipitation is water in its liquid form?  Which types of precipitation are made of water in its solid form?  How is sleet different from hail?  How is rain different from snow?  How are rain, sleet, snow, and hail similar? Ask students what happens if there is too much rain? Too little?

Student Worksheet

Complete the top down web about precipitation.