Adaptations and Preparations – how Vermont animals prepare, adapt or behave for the cold of winter
Grade 3: Weather Prediction

Description

Students gather information to learn about weather patterns and predictions. Specifically, students will focus on the seasonal statistics of Vermont weather (temperature) from November through March. Students will use that data to predict what the upcoming winter's temperature might be. Students will use graphic illustrations to show their data and use this illustration while explaining their predictions to the class. A class chart will be drafted from this and a prediction will be made for the coming winter temperature, week to week!

Lesson

- Read "Woolly Bear Winter: How North Woods Creatures Weather the Cold" as a hook for the lesson.
- Students gather data as it pertains to different weeks (where each student is accountable for gathering the data from their week) for a number of years.
    - >Students can access information through internet sources such as: wunderground.com
    - >Help students search for, and organize, content with graphic organizers or simple worksheets.
- Students learn about mathematical averages. Students come up with an average temperature for their week over multiple years.
- Students create a graph that shows their average temperatures for each week in their data.
- Discuss how using historical information like this can have an impact on predictions. Averages may give a hint to what is in store for the coming winter. But patterns do too… did your students notice any patterns in gathering data that would make them predict a different answer than the average? If so, have them explain.
- Have students create a prediction for what the average temperature would be for their week.
- Have students present their data to the class and add to the classroom weather prediction chart.
- Ask students how people in days of old came up with ideas about what to expect the coming winter to be like. No internet, no data, no charts. Yet what to expect for winter was far more important to people who relied upon the land.
- Read the story "Woolly Bear Winter" and have students identify some olden methods for weather prediction.

- Extension: have students research whether or not these predictions are at all scientifically based or if they are “old wives tales” after all!

Performance Expectations

3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.

Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.
Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.

Tips for Including the Performance Expectation
In this lesson students are researching and tabulating data on temperature for a given week between November and March. They will use this data to create an average and then a prediction. In this way, this lesson has students describe a typical weather condition expected during their upcoming winter. To go deeper with this Performance Expectation, students could consider how people predicted weather before data collection.

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

> Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. (3-ESS2-1)

Tips for Including the Science and Engineering Practice
To connect with Science and Engineering Practice, students must not only collect but also analyze data. Students will represent data in tables and present their drawings and explain their findings to the class.

Disciplinary Core Ideas

ESS2.D: Weather and Climate

> Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. (3-ESS2-1)

Tips for Including the Disciplinary Core Idea
Teachers need to emphasize the idea that observing weather patterns and trends can help to predict what is coming next. Students will be taking data

they collected and analyzed to use as predictors for the coming winter. This allows connections to be made between information learned, and communication of learned concepts through verbal presentations and graphic illustration.

Crosscutting Concepts

Patterns

Patterns of change can be used to make predictions (3-ESS2-1)

Tips for Including the Crosscutting Concept

Be sure to engage students in careful observation of patterns, not only averages, to connect to this crosscutting concept.

Common Core State Standard Connections

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 scaled bar graphs. (3-ESS2-1)
MP.2 - Reason abstractly and quantitatively. (3-ESS2-1)
MP.4 - Model with mathematics. (3-ESS2-1)
MP.5 - Use appropriate tools strategically. (3-ESS2-1)

Assessment:

Frequent formative assessment is important to be sure students data collection, computation and analysis is done correctly. Summative assessment can be done by observing the prediction, looking at their final drawings and hearing their explanation.

Note: This lesson format originally appeared in the NGSS@NSTA website titled “Cats and Their Coats” with free access. To view this resource in it’s entirety and without changes visit:
http://ngss.nsta.org/Resource.aspx?ResourceID=121