5E Lesson Plan
3rd Grade Science Lesson – Weather
Making an Anemometer to Measure Wind Speed

Lisa Ciraldo Fall 2018

Essential Questions

- How do we measure changes in weather?
- How do I use patterns/information to make predictions?
- How does severe weather affect us and our community?

Goals/Objectives

- Students will describe what an anemometer is and what it measures.
- Students will construct a handmade anemometer.
- Students will create a chart of data from their recorded “wind” speeds.
- Students will report on the relationship between wind speed and how fast an anemometer rotates.

Science Standards addressed (Common Core):

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

3-PS2-2. Make observations and/or measurements of an object’s motion to provide evidence that a pattern can be used to predict future motion.

NGSS:

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations. Make predictions about what would happen if a variable changes. **Analyzing and Interpreting Data.** Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (3-PS2-2)	**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. **PS2.A: Forces and Motion** • The patterns of an object’s motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.) (3-PS2-2)	**Patterns.** Patterns of change can be used to make predictions.

MATH Integration:

MP.2 Reason abstractly and quantitatively.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

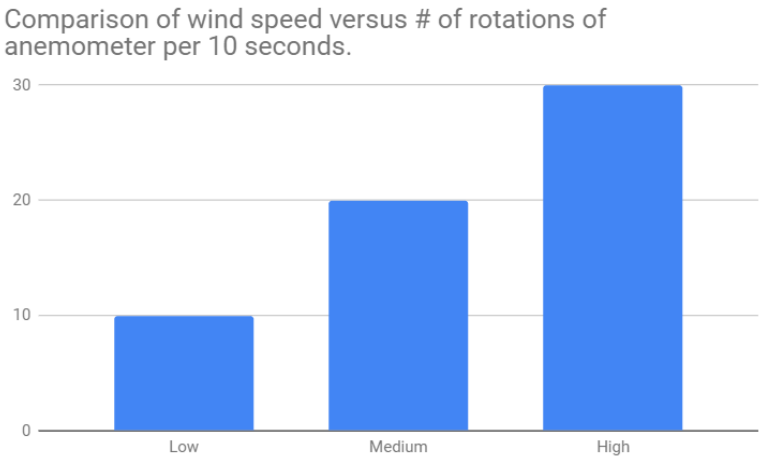
There is a natural integration of math during this science lesson. Students will make reasonings and inferences abstractly during the outdoor engage portion and discussion, based on their prior knowledge and new information. Students will also reason quantitatively when they use their anemometers to test wind speed and record data points based on the variable fan speed used. The plotted graph at the end of this lesson will show mathematics modeling and teach the students to use the necessary tools for

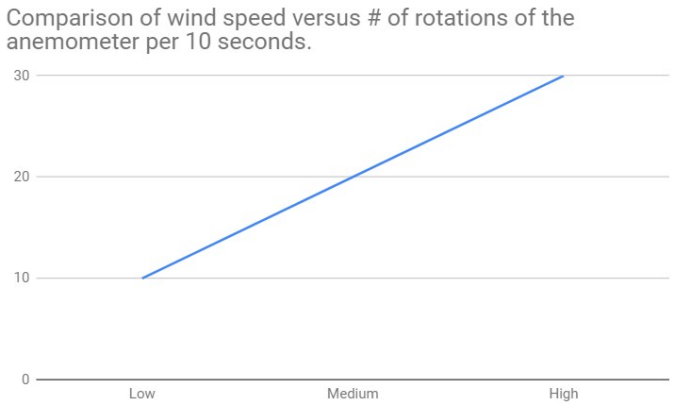
Google Sheets Data and Graphing Examples

Example to show students how to format and input data into Google Sheets to use for graph creation.

	# Rotations per 10 seconds
Low	10
Medium	20
High	30

Examples of graphs students can create for their final project:
(Have them come up with their own title for graph)





Anemometer Experiment Data Sheet

Name:		Date:
Other group members:		
	# Rotations per 10 seconds	
Low		
Medium		
High		
Notes and observations:		

DIRECTIONS FOR BUILDING ANEMOMETERS

1. Use a hole punch or the tip of a sharpened pencil to punch four holes in a paper cup just below the rim, forming a "+" shape (two pairs of holes opposite each other).

2. Press two straws through the holes as shown in Figure 2.

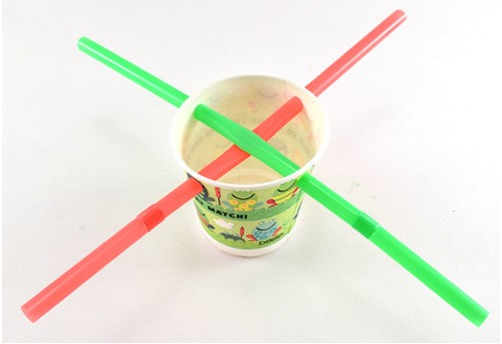


Figure 2. Cup with straws inserted through holes.

3. Use a sharpened pencil to poke a hole in the center of the bottom of the cup, as shown in Figure

Figure 3. Hole in bottom of cup.

4. Use the hole punch or pencil to punch two adjacent holes in each of the other four cups. The holes should be about 2–3 cm apart, and about halfway along the cup's height, as shown in Figure 4.

5. Push the end of a straw through the two holes in each one of the cups, as shown in Figure 4. Make sure the cups are all facing in the same direction (all clockwise or all counterclockwise). There should be enough friction to hold the cups in place so they do not twist on the straws. If the cups twist easily, use a bit of tape to secure them.

Figure 4. Cups mounted to anemometer arms.

6. Push the pencil, eraser end first, through the hole in the bottom of the central cup.

7. Press a pushpin lightly through both of the straws and into the eraser, as shown in Figure 5. Do not press the pushpin into the eraser all the way, or there will be too much friction and your anemometer will not spin.

Figure 5. Straws attached to eraser with pushpin.

8. Use a marker to draw an easily recognizable symbol (for example, a dark circle or band) on the side of one of the cups, so you can easily tell it apart from the other cups. This will make it easier to count revolutions when the anemometer is spinning.

Test The Anemometer

Troubleshooting

Anemometer does not spin

- Make sure the pushpin is not pressed into the eraser too far. If it is, it will cause too much friction.
- Try wiggling the pencil to enlarge the hole in the bottom of the cup. Make sure the pencil can spin freely in the hole without rubbing the sides too much.
- Try holding the anemometer closer to the fan.
- Make sure the cups are all facing the same direction around a circle (all clockwise or all counterclockwise).

Anemometer spins too fast to count rotations

- Try holding the anemometer farther away from the fan. If you change this distance, you will need to re-do your tests at other fan speeds, so all your tests are at the same distance.

Rubric for Presentation

Name: _____

Topic:_____

	1	2	3	Total and Comments
Organization	Audience cannot understand presentation because there is no sequence of information.	Audience has some difficulty following presentation because student jumps around.	Student presents information in logical, interesting sequence which audience can follow.	
Subject Knowledge & Interaction with Audience	Student does not have grasp of information; student cannot answer questions about subject.	Student is uncomfortable with information and is able to answer only very basic questions.	Student demonstrates full knowledge by answering all class questions with explanations and elaboration.	
Eye Contact	Student reads all of report with no eye contact.	Student occasionally uses eye contact, but still reads most of report.	Student maintains eye contact with audience, seldom returning to notes.	
Elocution	Student mumbles and speaks too quietly for students in the back of class to hear.	Student's voice is low. Audience members have difficulty hearing presentation.	Student uses a clear voice and audience members can hear presentation.	
Visual Aids	No visual aids to enhance presentation.	One (1) visual aid to enhance presentation.	2 or more visual aids to enhance presentation.	
			Total Score:	

References

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