

Wind Watching

Student Objective

The student:

- understands how the Sun’s radiation, is the source that powers the wind
- will be able to explain how nature is designed to make use of solar energy.

Key Words: solar radiation wind
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Materials:

- outdoor area with grass and trees
- blanket or tarp for sitting

Time:

30 minutes

Background Information

Wind is caused by the sun heating the earth and its effect on the atmosphere. The Sun heats the surface of the Earth unevenly, so some places are warm while other places are cold. As the air in an area gets warmer, its particles spread out. This makes the air less dense (lighter), so it rises. As warm air rises, air from cooler areas flows in to take the place of the heated air. This process is called convection and causes air to move. The differential heating of the Earth's surface and the resulting convection is what causes wind on this planet.

Procedure

1. Take the class outside and form a circle.
2. Tell the students to take 20 steps away from the circle, stop, and look for something being moved by the wind. When they spot something, they are to return to the circle, without saying what they observed.
3. Ask the children one at a time to stand in the center of the circle and move like the object that they spotted. The rest of the class is to try and guess what they observed.
4. After everyone who wants to participate has a turn, have the children create a “wind dance” together. Each child should do the wind movement that they liked the best.
5. As they do their wind dance, call out different wind conditions such as “gentle breeze”, “strong gust”, “still air” and “tropical storm”.
6. After a few minutes of their wind dance, have the children sit in the circle, and lead a discussion on their personal experiences with wind. You may include hurricane experiences here if you wish, however, have the students limit their observations to the effects of the wind.
7. Points to cover and questions to ask may include:
 - What is wind? (*Air moving*)
 - What moves the clouds? (*The wind*)

- Is there wind up high in the air where the clouds are? (*Yes*)
- Is there wind on the Moon or in space? (*No, there isn't any air on the Moon or in space*)
- When the wind blows over your body, do you feel hotter or colder? (*Colder*)
- When the wind moves something, is it using energy? (*Yes*)
- Does the wind in a hurricane have more energy than a gentle breeze? (*Yes*)
- Where does the energy to power the wind come from? (*The Sun*)
- How does the Sun power the wind? (*The Sun warms the air which makes it move*)

Key Words & Definitions

- **solar radiation** - the heat energy that comes from the Sun
- **wind** - the movement of air from one area to another caused by the Sun heating the Earth and its atmosphere

Further Activities

1. Make pinwheels with the class. Take them outside and watch them spin for three or four minutes. Take the pinwheels inside and have the students imitate the wind by blowing on their pinwheels. Tell them to keep them spinning as long as they can. When they finally give up, lead a discussion on how the wind can keep their pinwheels spinning long after they get tired, and how we can use wind as an energy source.
2. 'Fly' a Solar Tube. A Solar Tube is a thin plastic bag, 50 feet long and 30 inches in diameter, that will rise in the air and float powered by the thermal energy of the Sun. Solar Tubes are available from science suppliers such as Educational Innovations.
3. Fly kites!
4. Discuss wind direction. Have the students guess (hypothesize) which way the wind is blowing, then blow bubbles to see if they are correct.

Related Reading

- ***How Does the Wind Blow?*** by Lawrence Lowery (NSTA Kids, 2013)
In text that flows like poetry, this book introduces the different forces of the wind, from gentle breezes that make flags flutter to powerful tornadoes that can hoist a house. As the book progresses, attentive readers discover how wind can be measured and even indirectly experience the Beaufort wind scale meteorologists use.
- ***I Face the Wind*** by Vicki Cobb and Julia Gorton (HarperCollins, 2003)
This book explains the properties and characteristics of wind in an easy-to-read format. The writing is clear and the explanations are age-appropriate. "Air is made of a gazillion tiny balls floating in space. These balls are so small that they can't be seen. They have to be imagined." A young girl gets pushed by it, has her umbrella turned inside out, watches leaves shake on a tree, and engages in lots of other activities that illustrate the movement of air.

Wind Watching

Florida NGSS Standards & Related Subject Common Core

			.1	.2	.3	.4	.5	.6
Grade K								
The Practice of Science	Big Idea 1	SC.K.N.1		X		X	X	
Motion of Objects	Big Idea 12	SC.K.P.12	X					
Grade 1								
The Practice of Science	Big Idea 1	SC.1.N.1	X	X				
Motion of Objects	Big Idea 12	SC.1.P.12	X					
Organization & Development of Living Organisms	Big Idea 14	SC.1.L.14	X					
Grade 2								
The Practice of Science	Big Idea 1	SC.2.N.1	X					
Earth Systems and Patterns	Big Idea 7	SC.2.E.7				X	X	
Language Arts Standards	Kindergarten: LAFS.K.W.3.8, LAFS.K.SL.1.1, LAFS.K.SL.2.4, LAFS.K.SL.2.6 First Grade: LAFS.1.W.3.8, LAFS.1.SL.1.1, LAFS.1.SL.2.4 Second Grade: LAFS.2.W.3.8, LAFS.2.SL.1.1, LAFS.2.SL.2.4							

Kindergarten Benchmarks

Science--Big Idea 1: The Practice of Science

- SC.K.N.1.2 - Make observations of the natural world and know that they are descriptors collected using the five senses.
- SC.K.N.1.4 - Observe and create a visual representation of an object which includes its major features.
- SC.K.N.1.5 - Recognize that learning can come from careful observation.

Science--Big Idea 12: Motion of Objects

- SC.K.P.12.1 - Investigate that things move in different ways, such as fast, slow, etc.

Language Arts--Writing Standards

- LAFS.K.W.3.8 - With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

Language Arts–Standards for Speaking and Listening

- LAFS.K.SL.1.1 - Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.
- LAFS.K.SL.2.4 - Describe familiar people, places, things, and events and with prompting and support, provide additional detail.
- LAFS.K.SL.2.6 - Speak audibly and express thoughts, feelings, and ideas clearly.

First Grade Benchmarks

Science–Big Idea 1: The Practice of Science

- SC.1.N.1.1 - Raise questions about the natural world, investigate them in teams through free exploration, and generate appropriate explanations based on those explorations
- SC.1.N.1.2 - Using the five senses as tools, make careful observations, describe objects in terms of number, shape, texture, size, weight, color, and motion, and compare their observations with others.

Science–Big Idea 12: Motion of Objects

- SC.1.P.12.1 - Demonstrate and describe the various ways that objects can move, such as in a straight line, zigzag, back-and-forth, round-and-round, fast, and slow.

Science–Big Idea 14: Organization and Development of Living Organisms

- SC.1.L.14.1 - Make observations of living things and their environment using the five senses.

Language Arts–Writing Standards

- LAFS.1.W.3.8 - With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

Language Arts–Standards for Speaking and Listening

- LAFS.1.SL.1.1 - Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.
- LAFS.1.SL.2.4 - Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.

Second Grade Benchmarks

Science–Big Idea 1: The Practice of Science

- SC.2.N.1.1 - Raise questions about the natural world, investigate them in teams through free exploration and systematic observations, and generate appropriate explanations based on those explorations.

Science–Big Idea 7: Earth Systems and Patterns

- SC.2.E.7.4 - Investigate that air is all around us and that moving air is wind.
- SC.2.E.7.5 - State the importance of preparing for severe weather, lightning, and other weather related events.

Language Arts–Writing Standards

- LAFS.2.W.3.8 - Recall information from experiences or gather information from provided sources to answer a question.

Language Arts–Standards for Speaking and Listening

- LAFS.2.SL.1.1 - Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
- LAFS.2.SL.2.4 - Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.

National Next Generation Science Standards

Kindergarten Standards

Science–Earth and Human Activity

- K-ESS3-2 - Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.

Science–Energy

- K-PS3-1 - Make observations to determine the effect of sunlight on Earth’s surface.

Note: Related Common Core Language Arts Standards are listed in the Florida section above.

First Grade Standards

Note: Related Common Core Language Arts Standards are listed in the Florida section above.

Second Grade Standards

Note: Related Common Core Language Arts Standards are listed in the Florida section above.

Wind Watching



Old Mill in Nantucket Massachusetts, built in 1746.
The mill was used to grind corn into meal.



Windmill currently in use in the prairies to pump water for cattle.



Modern wind farm in Albany, New York
(Image courtesy of Western Power Corporation)



Modern wind farm in California