

Weather Wizards

Standard II

Students will gain an understanding of Earth and Space Science through the study of earth materials, celestial movement, and weather.

Objective 3

Observe, describe, and measure seasonal weather patterns and local variations.

Intended Learning Outcomes

Knowing in Science: Understanding the nature of science.

Content Connections: Math

Background Information

Weather is the condition of the air that surrounds Earth. Meteorologists can predict the weather by using certain tools such as a thermometer, which measures the temperature; a wind vane, which tells from what direction the wind blows; and anemometer which measures the wind speed, and a barometer, which measure air pressure.

Storms come from clouds, and they display themselves in many forms including the following: Rain (water falling from the sky), hail (ice chunks), snow (ice crystals), sleet (a mixture of rain and snow), fog (droplets of water vapor suspended in the air near the ground), tornados (violently destructive windstorms), and hurricanes (severe tropical storms that include heavy rain and wind).

Research Basis

Johnson, D., Johnson, R. (1999). *Making Cooperative Learning Work. Theory Into Practice*, Vol. 38, No 2, Building Community through Cooperative Learning. 9Spring (1999), pp.66-73.

Formal cooperative learning is when students work together for one class period or several weeks to achieve shared learning goals and complete specific tasks and assignments. Informal cooperative learning is when students work together temporarily to achieve a joint learning goal. These groups may last only a few minutes. The five essential elements of cooperative groups are as follows. Positive interdependence, individual accountability, face-to-face interaction, social skills, and group processing.

Winn, J.A. (1994). Promises and Challenges of Scaffolded Instruction. *Learning Disability Quarterly*, Vol. 17, No. 1. (Winter 1994), pp. 89-104.

Scaffolded instruction includes challenging students to engage in tasks that they are unable to complete independently, and providing the support needed to enable students to successfully carry them out.

Invitation to Learn

Distribute the worksheet entitled *Find Someone Who* to each student. Tell them to read each storm statement and then find someone in the class who has experienced the described statement and have him/her sign his/her name on the corresponding statement. Tell the students that their goal is to see how fast they can fill up their paper with the different names from the class. This is a good way to get students up and moving and start a discussion about storms.

Instructional Procedures

1. Read *What Will the Weather Be?*, by Lynda DeWitt, to your students.
2. Talk about the job of a Meteorologist. Can weather be predicted? Do meteorologists really know exactly what the weather will be like? Meteorologists need to know what kind of air is coming, and be able to plan and prepare for the weather that follows.
3. Talk about the tools a meteorologist uses to help predict the weather: A thermometer, which measures the temperature; a wind vane, which tells from what direction the wind blows; an anemometer, which measures the wind speed; and a barometer, which measures air pressure. (In my classroom I have a daily Weather Reporter who reports on the temperature for the day, checks the wind direction, checks the wind speed and checks the air pressure using our classroom weather tools.)
4. Make an anemometer with your students. Each student will need five 3 oz. paper cups. Instruct them to punch a hole one-half inch below the rim of four of the cups. Tell them to punch out four equally spaced holes about one-fourth inch below the rim of the fifth cup. Tell them to punch a hole in the center of the same cup. Take one of the single holed cups and push a plastic straw through the hole. Fold the inserted end of the straw so that it lies on the inside of the cup across from the hole and then staple it. Repeat this procedure with another one of the single holed cups and the second straw. Tell them to

Materials

- What Will the Weather Be?*
- 3 ounce paper cups
- New sharp pencil
- Plastic straws
- Scissors
- Stapler
- Straight pins
- Single paper punch
- Wide mouth container
- Balloon
- Rubber band
- Cardboard
- Tape
- Index cards
- It's Raining Cats and Dogs*
- Small portable fan
- Find Someone Who*
- Weather Reporter Page*



slide one cup and straw assembly through two opposite holes of the cup with four holes. Tell them to push one of the single holed cups onto the end of the straw that was just pushed through the four-holed cup. Bend the straw and staple it to the single holed cup after making certain that the cup faces in the opposite direction from the first cup. Tell them to repeat this procedure using the other cup and straw assembly and the remaining single holed cup. Have them align the four cups so that their open ends face in the same direction (clockwise or counterclockwise) around the center cup. Tell them to push the straight pin through the two straws where they intersect. Tell them to push the eraser end of a pencil through the bottom hole in the center cup and push the pin into the end of the pencil eraser as far as it will go. Tell them that their anemometers are ready to use. Take the students outside and find somewhere they can stick their anemometers into the ground and have them observe what happens. This is a great way to generate a class discussion on wind speed.

5. Make a barometer with your class. Cut the neck off of a balloon and stretch it over the mouth of a jar. Fasten it tightly with a rubber band so the air can't get out. Cut off one end of a straw to make it pointed. Stick the other end to the middle of the stretched balloon using tape. Tape a piece of cardboard behind the jar so the pointer touches it. Make a mark at the point. Draw a scale above and below this mark from 1 to 10. This is your starting measurement for air pressure. Explanation: The barometer shows when the air pressure outside the jar becomes higher and lower. When it becomes higher, the air pushes hard on the balloon so the straw points up. When the air pressure is lower the air inside the jar pushes up on the balloon more than the air outside pushes down. This causes the straw to move so it points down. Have students keep a record in their journals on the daily barometer readings.
6. Make a wind vane with your students. Cut a point and tail of an arrow out of an index card. Tape them onto the ends of a straw. Push the pin through the middle of the straw and put the pin into the eraser of a pencil. Make sure the straw can turn freely. Take your students outside and find a spot where they can stick their wind vanes in the ground. Observe the wind direction on the wind vanes. What do you see?
7. Discuss the types of storms that come from clouds, such as rain, snow, wind, fog, hail, sleet, tornados, and hurricanes. Make a class graph of "Storms We Don't Like."

8. Introduce the *It's Raining Cats and Dogs* experiment. The idiom 'Raining Cats and Dogs' comes from the 1500's. Dogs and cats used to hide in the roofs of houses to keep warm. The roofs in the houses in the 1500s were thatch roofs—thick straw, piled high, with no wood underneath. They were the only place for the little animals to get warm. So all the pets; dogs, cats and other small animals, mice, rats, bugs, all lived in the roof. When it rained it became slippery so sometimes the animals would slip and fall off the roof, thus the saying, "it's raining cats and dogs." Tell the students to get with a partner to cut out their dog/cat raindrop. Students will drop their raindrop to the ground and graph which side it lands on. What are the results? Compare with other students in the class.
9. Wind exploration class experiment. Make a chart and title it "Will the Wind Blow It?" Subtitle the two columns YES and NO. Ask students to find objects in their desk or around the room to test if the air can move them. Turn on a small portable fan and set it on a table, desk or cart. Have students come up and drop their object in front of the fan. Watch what the air does to the object. If their object falls to the ground, students will place their object to the side of the chart labeled NO. If the fan moves their object, students will place their object to the YES side of the chart.

Assessment Suggestions

- Watch to see how students put together their wind vanes. Does the wind push the arrow in the direction of the wind?
- Look to see how students filled out their *It's Raining Cats and Dogs* chart. Were they able to record the way the raindrop fell?

Curriculum Extensions/Adaptations/Integration

- Making Fog in a Jar - Fill a glass jar full of hot water. Wait one minute and pour out the water leaving only one inch in the bottom. Put a strainer over the top of the jar. Place three to four ice cubes in the strainer. Watch as fog appears. Explanation: The cold air from the ice cubes collides with the warm, moist air in the bottle causing the water to condense and form a fog.
- Bottle Tornado - Fill one two-liter bottle two-thirds full of water. Add food coloring to the water for easier observation.

Place another two-liter bottle on top of the bottle filled with water. Duct tape the two openings together. Turn the bottle with water upside down and make quick circular movements. As the water leaves the bottle through the small opening, stop the circular movements and watch the tornado move from one bottle to the other. Explanation: The swirling motion you give the bottle forms a vortex like an actual tornado.

- Hurricane Movement - Cut a spiral from a sheet of paper. Sew a piece of thread through the top. Turn on a lamp. Hold the thread directly above the light bulb. Watch the movement of the spiral. Explanation: The life of a hurricane begins when the hot tropical sun heats up the air over the ocean and the hot air rises.
- Lightning and Static Electricity - Sprinkle some pepper on a plate. Blow up a balloon; tie it off. Rub the balloon on your hair, a sweater or carpet. Hold the balloon above the plate and slowly lower it towards the pepper. What happens? Now add some water to the plate and sprinkle it with some more pepper. Blow up the second balloon and rub it on your hair, a sweater or carpet. Predict what you think will happen when you lower the balloon over the plate. Explanation: Lightning is caused by static electricity. Static electricity is an electrical charge that is produced when two things rub together.
- Snow Fall versus Rain Fall - materials: Two equal sized pieces of paper and a chair. Crumple up one piece of paper. This is your raindrop. Get another piece of paper to represent a snowflake. Stand on a chair. Hold the crumpled paper in one hand and the other piece of paper in the other. Let go of the two pieces of paper at the same time. Did the rain fall faster or did the snowflake? What role does the shape of the raindrop and that of the snowflake play in this experiment?

Family Connections

- Wet chalk drawings: Use black or dark colored paper. Have your student dip colored chalk in a sugar water mixture and color with the chalk. The sugar water makes the chalk colors more vibrant. This activity demonstrates how vibrant colors are a rainbow.
- Help your student fill out the *Weather Reporter Page* the night before for the next day's weather.

Additional Resources

Books

What Will the Weather Be?, by Lynda De Witt; ISBN-13: 978-0-06-445113-0

Storms, by Seymour Simon; ISBN 13: 9780688117085

Tornado Alert, by Franklyn M. Branley; ISBN 0064450945

Flash, Crash, Rumble, and Roll, by Franklyn M. Branley; ISBN 0-8085-3579-X

Henry and Mudge And the Wild Wind, by Cynthia Rylant; ISBN 0-689-80838-0

Snow, by Marion Dane Bauer; ISBN 0-689-85437-4

Wind, by Marion Dane Bauer; ISBN 0-689-85443-9

Feel the Wind, by Arthur Dorros; ISBN 0064450953

Puddle Jumpers: Fun Weather Projects for Kids, by Jennifer Storey Gillis; ISBN: 0882669389

Web sites

www.scholastic.com/weather

<http://teacher.scholastic.com/activities/wwatch/>

<http://www.weatherwizkids.com>

<http://www.wildwildweather.com>

www.energyquest.ca.gov/projects/thermometer.html

Find Someone Who...

Directions: Find someone who has personally experienced the described storm before. Ask him/her to sign his/her name on your paper. You may not repeat any names and you may not use your own name to fill a spot. When finished, bring your paper to your teacher. Good Luck!

1. Find someone who has been in a snow storm before _____



2. Find someone who has been in a rain storm before _____



3. Find someone who has been in a blizzard before _____



4. Find someone who has been in a lightning storm before _____



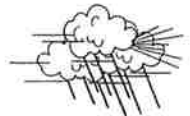
5. Find someone who has been in a wind storm before _____



6. Find someone who has been in a tornado before _____



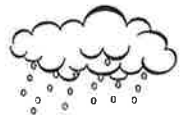
7. Find someone who has been in a hurricane before _____



8. Find someone who has driven in fog before _____



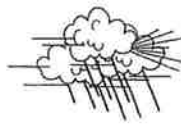
9. Find someone who has been in a hail storm before _____



10. Find someone who has been in a sleet storm before _____



Weather Reporter



Weather Reporter's Name _____

Today is _____

The temperature outside right now is _____

The high for today will be _____. The low for today will be _____.

Today will be (partly cloudy, cloudy, rainy, windy, sunny, snowy) _____ with a chance of (snow, rain, wind, sleet, hail) _____.

The cloud formation outside is (good weather, rainy or stormy clouds) _____.

The barometer is (high, low, average) _____ today.

The wind vane is pointing (North, South, East, West) _____.

The anemometer is/is not spinning today. It is moving (fast, slow) _____.

Suggested clothing for today would be _____.

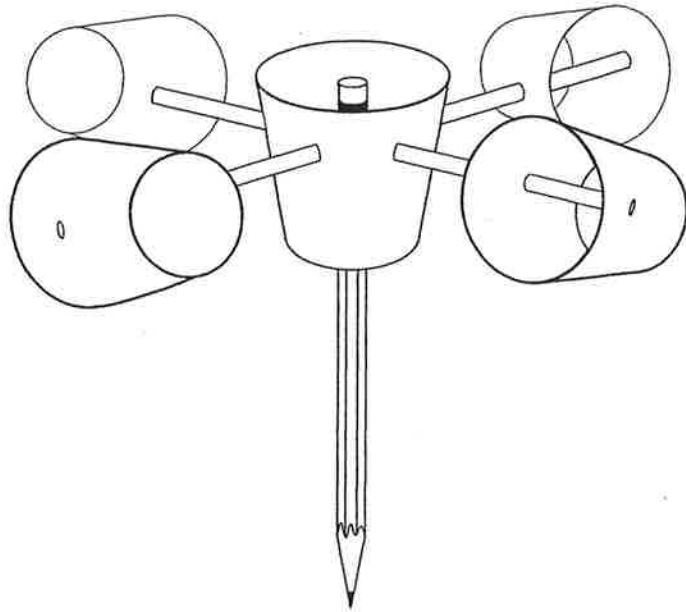


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Anemometer

Materials

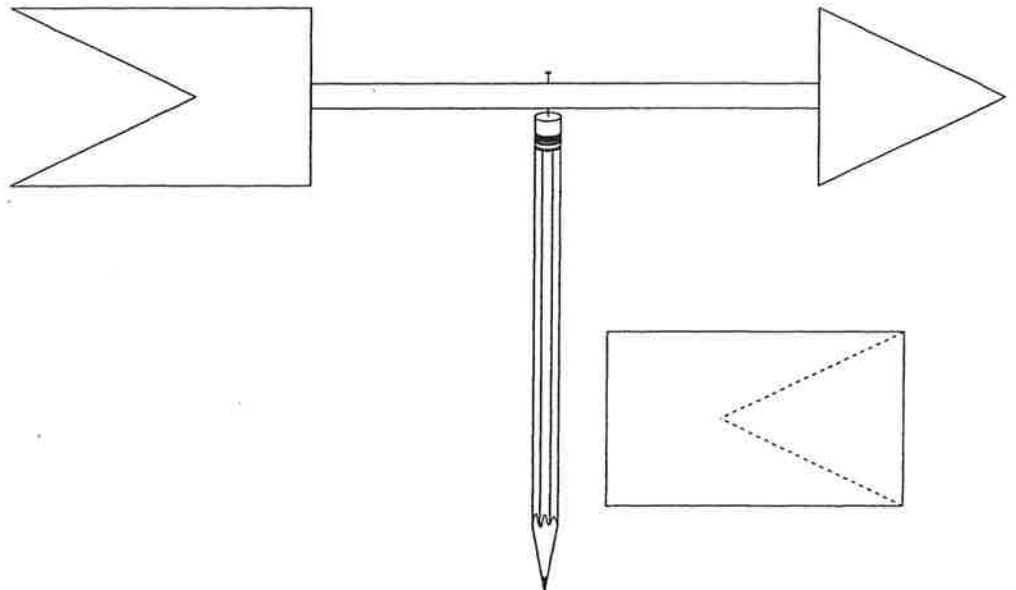
five 3 ounce paper Dixie cups
two straight plastic soda straws
a pin
scissors
paper punch
small stapler
sharp pencil with an eraser



Wind Vane

Materials

1 straw
1 straight pin
1 index card
pencil with eraser
tape
scissors



2nd 2-3 3.9

