

Weather Works

Grades: 5th-8th

Duration: 60 minutes

Program Description

Working in pairs or small groups, students use construction paper to simulate cloud cover. They estimate the percentage of cloud cover represented by torn pieces of paper on a contrasting background and assign a cloud cover classification to the simulations created by their classmates. Students will visit atmospheric study site and observe which of ten types of clouds are visible and how much of the sky is cloud covered. In addition, students will determine the amount of moisture input to the local environment, measure relative humidity, air pressure, minimum, maximum, and current air temperature.

Louisiana GLE:

English Language Arts:

Grade 5

Speaking and Listening

Standard 4

32. Adjust diction and enunciation to suit the purpose for speaking
33. Use complete sentences and standard English grammar, diction, syntax, and pronunciation when speaking
35. Restate or describe oral directions/procedures for tasks
36. Adjust volume and inflection to suit the audience and purpose of presentations
38. Demonstrate active listening strategies
39. Deliver formal and informal presentations for a variety of purposes, including:
41. Participate in group and panel discussions

Science:

Grades 5th-8th

Science as Inquiry

6. Select and use appropriate equipment, technology, tools, and metric system units of measurement to make observations (SI-M-A3)
7. Record observations using methods that complement investigations (e.g., journals, tables, charts) (SI-M-A3)
9. Use computers and/or calculators to analyze and interpret quantitative data (SI-M-A3)
16. Use evidence to make inferences and predict trends (SI-M-A5)
21. Distinguish between observations and inferences (SI-M-A7)
22. Use evidence and observations to explain and communicate the results of investigations (SI-M-A7)
29. Explain how technology can expand the senses and contribute to the increase and/or modification of scientific knowledge (SI-M-B3)
31. Recognize that there is an acceptable range of variation in collected data (SI-M-B3)

34. Recognize the importance of communication among scientists about investigations in progress and the work of others (SI-M-B5)
36. Explain why an experiment must be verified through multiple investigations and yield consistent results before the findings are accepted (SI-M-B5)
39. Identify areas in which technology has changed human lives (e.g., transportation, communication, geographic information systems, DNA fingerprinting) (SI-M-B7)
40. Evaluate the impact of research on scientific thought, society, and the environment (SI-M-B7)

Grade 6

Physical Science

1. Measure and record the volume and mass of substances in metric system units (PS-M-A1)

Grade 8

Physical Science

24. Investigate and explain how given factors affect the rate of water movement in the water cycle (e.g., climate, type of rock, ground cover) (ESS-M-A10)
26. Describe and illustrate the layers of Earth's atmosphere (ESS-M-A11)
29. Make predictions about future weather conditions based on collected weather data (ESS-M-A12)

Key Terms:

Alto cumulus: A cloud formation of rounded, fleecy, white or gray masses.

Alto stratus: An extended cloud formation of bluish or gray sheets or layers.

Cirrocumulus: A high-altitude cloud composed of a series of small, regularly arranged cloudlets in the form of ripples or grains.

Cirrostratus: A high-altitude, thin, hazy cloud, usually covering the sky and often producing a halo effect.

Cirrus: This is the most elevated of all the forms of clouds; is thin, long-drawn, sometimes looking like carded wool or hair, sometimes like a brush or room, sometimes in curl-like or fleecelike patches. It is the cat's-tail of the sailor, and the mare's-tail of the landsman.

Cumulonimbus: a dark cloud of great vertical extent charged with electricity; associated with thunderstorms

Cumulus: This form appears in large masses of a hemispherical form, or nearly so, above, but flat below, one often piled above another, forming great clouds, common in the summer, and presenting the appearance of gigantic mountains crowned with snow. It often affords rain and thunder gusts.

Contrail: A visible condensation of water droplets or ice crystals from the atmosphere, occurring in the wake of an aircraft, rocket, or missile under certain conditions.

Nimbostratus: a dark gray cloud bearing rain

pH: A measure of the acidity or alkalinity of a solution, numerically equal to 7 for neutral solutions, increasing with increasing alkalinity and decreasing with increasing acidity. The pH scale commonly in use ranges from 0 to 14.

Relative Humidity: the ratio of the amount of water in the air at a give temperature to the maximum amount it could hold at that temperature; expressed as a percentage

Stratocumulus: A low-lying cloud formation occurring in extensive horizontal layers with rounded summits.

Stratus: A low-altitude cloud formation consisting of a horizontal layer of gray clouds.

Temperature: the degree of hotness or coldness of a body or environment (corresponding to its molecular activity)

Thermometer: An instrument for measuring temperature, especially one having a graduated glass tube with a bulb containing a liquid, typically mercury or colored alcohol, that expands and rises in the tube as the temperature increases.

Weather: The state of the atmosphere at a given time and place, with respect to variables such as temperature, moisture, wind velocity, and barometric pressure.

Connections to Permanent Exhibits:

Red River Gallery

Count the Years: Examine a large section of a cypress tree; count the rings to determine the tree's age.

Physical Sciences Gallery

Rising Bubbles: Pump air bubbles into the bottom of a column of viscous liquid and watch them rise slowly. notice that the bubbles are spheroids (surface tension), that they rise (flotation), and that large bubbles catch up with small ones (Stokes' law).

Ned Kahn Art-Science: These sculptures engage students in the beauty of the forces in our physical world: Tornado, Turbulent Orb (in the Lobby Balcony), Making Waves (in the Lobby Balcony) and Chaotic Pendulum (in the Lobby Balcony)

Technology Gallery

Internet Stations: Students can use our new Internet stations to access websites providing additional information concerning many topics encountered in the science center. This exhibit area launches visitors on an infinite journey of information available from sources throughout the world.

Planet Earth Cluster....Our Amazing Home

Earth Computer Stations: Click on "Earth's City Lights" on Visible Earth. What major highways can you see on this map of the United States?

Filtered Earth...The Electromagnet Spectrum/Radar: What can the reflection of radar waves tell us?

Filtered Earth...The Electromagnet Spectrum/Infrared: Where are the warmest areas in the picture on this exhibit?

Filtered Earth...The Electromagnet Spectrum/Visible Light: What cities can you see in this picture?

Satellite Mural: What satellite measure wind speed and direction over the ocean? What is the objective of the satellite Terra?

John T. Palmer Sky High Cluster....Things in Near and Far Space

Bernoulli's Bowling Balls: Place the air hose above the bowling balls and turn on the blower. What happens? Why? Can you make the balls spread apart?

AEP SWEPCO Light and Color Lab: Program area for educational programming.

The Sun: Read about the sun and ancient cultures.

Interactive Sun: Check out this computer program. What are three characteristics of the sun? Take the Sun Fact Quiz!!

Abby and Joe Averett Solar Observatory: What are two types of solar telescopes that we have in our rooftop solar observatory? Can you see any sunspots today?

Earth: What phase of the moon can you see in the sky today? Why did the Apollo astronauts have to have a horizontal support for the American flag when they planted it on the moon? (Hint: See the photomontage outside the second floor space bathrooms.)

Sundial: What is a gnomon? Look up at the skylight and find the shadow of the gnomon. What time is it?

Comcast Deep Space Cluster...The Far Reaches of Our Universe

Beat the Heat: Put a rectangular piece of material on the plate under the light. What is the best insulator? What is the best heat conductor?

Images of Heat: Look at the infrared image on the plasma television. Hold out your hand or look at your face. What part is coldest? What part is warmest?

Electromagnet Spectrum Mural: Where does visible light fall on the electromagnetic spectrum? What is infrared radiation? Which is longer X-ray or gamma rays?

Mud Family Designer's Workshop: A program area for educational programming.

Units of Length: How many centimeters in an inch? How many decimeter in a foot?

Units of Mass: How many grams in a pound?

Units of Volume: How many blue squares fit in the front clear box? What is the relationship between the back two boxes?

Volume Table: Calculate the volume of the cube and the cylinder? How do they relate?

Web Resources:

GLOBE: Global Observations to Benefit the Earth: www.globe.gov

National Oceanic and Atmospheric Administration's National Weather Service: Enter your zip code and get the latest weather information from your local weather service.

www.noaa.gov

Discovery Education: Build your own Weather Station:

<http://school.discovery.com/lessonplans/activities/weatherstation/index.html>

Pre-Visit Activities

Unscramble the Clouds

This is an on-line game where students drag the misplaced pieces of the picture to where you think they belong to make pictures of different types of clouds. Once the picture is made the name of the type of cloud is revealed. (For Macintosh users, this game works best with Internet Explorer.)

Your students may play the game at the following website:

http://spaceplace.jpl.nasa.gov/en/kids/cloudsat_puz.shtml

Weather Forecast

Watch the local weather report and have your students record the important information like high temperature, low temperature, relative humidity. When you return to class see how this information compare to what you experienced.

Post-Visit Activities

Wild Weather Adventure

Have your students play the Wild Weather Adventure game. Their weather research blimp will explore Earth and its weather. With luck, skill, and strategy, they will race other weather research blimps to be first to travel all the way around the world and win the game. They can play with one person and a computer opponent or with their friends;

Objective:

Be the first to pilot your Weather Airship from San Francisco, California, USA, all the way around the world and back across the USA to Miami, Florida.

Ways to Play:

You can play against the computer by choosing 1 player, or against your friends by choosing 2 or more players.

If you play against the computer, pick whether you want the computer to be an easy, medium, or hard opponent.

How to Play:

After picking the number of players, you will take turns picking a name and color for your Weather Airship. The computer will randomly choose who goes first. Then the game begins. Each player in turn will start by spinning the spinner. Your airship will move the number of spaces shown on the spinner, and, depending on what kind of space you land on, an event will occur:

Yellow Markers

- You answer a question. Select easy, medium, or hard. A correct answer to an easy question moves you ahead one space, for a medium question two spaces, and for a hard question three spaces. If you answer wrong, you do not get to move ahead, and your turn is over.
- Hint:** You may want to look at a map for some questions. Click on the words "Reference Map" at the top of the game. When you have found the answer on the map, click "Back to game."

Reference Map

([Back to game](#))



To move the map, hold down your mouse button over the map and drag your mouse. Release the button to stop.

Red Marker

- You have a special adventure. Your airship will move forward or backward, depending on how the adventure turns out. If the adventure lands you on a yellow space, you may not answer another question. Your turn is over.
- Blue Marker
- If your last spin was an even number, you move ahead one space on the main route. If your last spin was an odd number, you move ahead one space on the alternate route. If you land on a yellow space you answer a question. If you land on a red space, you get an adventure. The alternate routes join the main route further ahead on the path.

How to Win

The first person to reach the Finish point, regardless of what you spun last, is the winner.

You can find this computer weather game at the following website:
<http://spaceplace.jpl.nasa.gov/en/kids/goes/www/index.shtml#>

Weather Journal

Keep a weather journal keeping track of temperature, relative humidity, and cloud cover.