

CLOUDSCAPES

C L O U D S C A P E S



Reach for the sky
and collect stamps!

Beauty and knowledge out of the clear blue sky !

REMEMBER — OCTOBER IS NATIONAL STAMP COLLECTING MONTH!

CLOUDSCAPES

STAMP SERVICES



Dear Teacher,

The United States Postal Service, the Weather Channel, and Dr. Jacqueline Hansen proudly present *Cloudscapes*, an education kit celebrating weather. Your students will become weather-wise guys and gals as they learn to fearlessly forecast the weather. As an additional teaching resource, the Weather Channel has created *Look Up: Setting a Course for Sky Exploration*. To acquire this guide and a beautiful cloud poster, please go to www.weather.com.

These educational activities provide an authentic opportunity for your students to learn about a topic that will impact every day of the rest of their lives. Unit activities support these national standards:

- International Reading Association/National Council of Teachers of English Standards for the English Language Arts: 1,3,4,5,6;
- National Education Technology Standards: basic operations and concepts; social, ethical, and human issues; technology research tools; technology problem-solving and decision-making tools;
- National Science Education Standards: Earth and Space Science Content Standards D and E;
- National Council of Teachers of Mathematics Standards: measurement, data analysis and probability.

First, students will study how the five atmospheric layers make Earth a planet that can support human life. Then, they will “dive into” learning about the water cycle and water conservation strategies. Next, students will conduct research about cloud formations and create a walking-talking weather book. Then, in honor of National Stamp Collecting Month, they will begin their journeys as lifelong philatelists! Students will become amateur meteorologists when they construct a class weather station, fearlessly forecast weather, interview a professional meteorologist, and study serious storms.

We are sure your students’ reactions to these educational experiences will be **sky-high!**

Sincerely,

A handwritten signature in black ink, appearing to read "D. Failor".

David E. Failor
Executive Director
Stamp Services

Enclosure

Weather-Wise Guys

BULLETIN BOARD

Depict each fact on a raindrop or snowflake. Write weather words (and student-generated definitions) as segments on a thermometer. **Fantastic Facts:** (1) Only 3% of the Earth's water is fresh. (2) People are composed of 65% water. (3) Each American uses about 100 gallons of water a day. (4) Some deserts receive less than 1" of rain per year; rain forests get 400" per year. **Word Wall:** troposphere, stratosphere, mesosphere, ionosphere, exosphere, weather, Hadley circulation, Coriolis Effect, infiltration, transpiration, evaporation, condensation, and precipitation.

SET INDUCTION

When it gets really, really cold outside, how do you keep warm? Student responses might include wearing layers of clothing or using layers of blankets. The Earth needs protection from the intense rays of the sun and the extreme cold of outer space. That is why the Earth is wrapped in several layers of air blankets, called the atmosphere. The atmosphere is what makes Earth a planet that can support human life! Today you're going to learn about the layers of the atmosphere, what weather is, and the water cycle. It is important to learn about the weather around us because it affects us every day! As Benjamin Franklin once said, "Some are weather-wise; some are otherwise." Let's learn how to be weather-wise guys and gals!

MINI-LECTURE

The atmosphere has five layers. All of our weather occurs in the troposphere, which extends about 10 miles above the Earth's surface. It contains mostly nitrogen and oxygen, but also has smaller amounts of water vapor, carbon dioxide, methane, nitrous oxide, and other gases. These create a miniature "greenhouse" to trap heat to keep the Earth's surface warm. Some special spy planes fly in the stratosphere, 10-30 miles above the Earth's surface. In this layer, concentrated ozone molecules absorb ultraviolet radiation from the Sun to protect the Earth from too much heat. The coldest part of the atmosphere is the mesosphere, which reaches from 30-50 miles away from the Earth's surface. Space shuttles and meteorites fly in the ionosphere (thermosphere), between 50-300 miles from the surface, where temperatures can reach up to several thousand degrees Fahrenheit. Satellites orbit in the exosphere, 300-1000 miles above the surface of the Earth. Weather is caused when molecules of air are set into motion by the uneven heating of the Earth's surface. Heated tropical air rises and moves towards the North and South poles while polar air sinks and flows towards the

equator. This north-south airflow is called the Hadley circulation. Furthermore, because the earth spins at 1,038 mph at the equator and 0 mph at the poles, airflow is warped, causing the Coriolis Effect. This uneven spinning and heating of the atmosphere causes jet streams, the water cycle, and other weather phenomenon.

LITERATURE LINK

Discuss the stages of the water cycle: infiltration into the soil, transpiration through leaves and roots, evaporation, condensation, and precipitation. Read *The Magic School Bus at the Waterworks* by Joanna Cole. Visit the local water treatment plant to discover how water is recycled and how people can conserve water. After the visit, student teams demonstrate their knowledge of the water cycle and importance of water conservation. **Option 1:** Cut out two 8" circles from cardstock. Cut a "pie slice" in the top circle. Fasten the circles in the center with a brad so that they will spin. Draw and label the stages of the water cycle on the bottom circle so that only one stage shows in the pie-shaped window at a time. **Option 2:** Create water cycle mobiles. Cut a circular rim from cardstock. The top edge will be a rainbow; the bottom edge is the ground. Suspend pictures of the water cycle at appropriate points. **Option 3:** Students create water conservation posters. Display at community sites with the principal's permission.

LOOK UP

The Weather Channel has created a teacher resource guide, *Look Up: Setting a Course for Sky Exploration*. To acquire this guide and a beautiful cloud poster, go to www.weather.com. Special activities associated with this lesson include: creating hot air balloons (pp. 22-23, 32-33), making rainbows (p. 28), and music (p. 44).

Cloudscapes

BULLETIN BOARD

Fantastic Facts (1) A water molecule (H₂O) is created by two hydrogen atoms and one oxygen atom. **(2)** 95,000 cubic miles of water are moving between the sky and the earth at all times. **Word Wall:** cumulus, stratus, cirrus, altostratus, nimbostratus, cirrostratus, cirrocumulus, altocumulus, stratocumulus, and cumulonimbus.

SET INDUCTION

Take students outdoors on a partly cloudy day to gaze at the sky. What different kinds of clouds do they see? What do the clouds resemble? Today you're going to learn the names of different kinds of clouds and what kind of weather is associated with each type of cloud.

MINI-LECTURE

When the sun heats up water on the earth's surface, water droplets change into water vapor and rise into the air. As water vapor rises, the gas expands and cools, and the air pressure falls. This causes the vapor to condense into droplets affixed to microscopic debris in the air such as dust and smoke. Collections of these droplets are called clouds. When the water droplets become too heavy to float, the water precipitates to earth. There are three main types of clouds: cumulus, cirrus, and stratus. Cumulus (heaped) clouds are formed when the vapor rises quickly. These cotton ball clouds are associated with good weather. Cirrus clouds are feathery clouds high up in the sky that are formed by tiny ice crystals. They're also called mare's tails because they look like the tails of horses. Stratus (layered) clouds look like huge gray blankets hanging low in the sky. They are formed when warm, moist air rises slowly over a bank of colder air.

They usually bring storms. Different combinations of clouds derive their names from their formation (cumulus, stratus, nimbus- rain or storm) and location in the sky: alto- (midway), cirro- (high).

NATIONAL STAMP COLLECTING MONTH

1. What are some things you like to collect? Invite student responses. There are millions of people, or philatelists, who love to collect special stamps. Begin your lifelong stamp collection by going to these sites: http://shop.usps.com/cgi-bin/vsbv/postal_store_non_ssl/customer_care/contentUpload.jsp?location=/html/stampColl.html or http://www.stamps.org/kids/kid_StampFun.htm.

These sites are sponsored by the USPS and the American Philatelic Society.

2. Share this month's special stamp issue, Cloudscapes. How did the clouds get their names? Note, most of the Latin terms can be associated with everyday concepts: radiatus (radiating), fibratus (fibers), undulatus (undulating waves), mammatus (mammary glands), translucidus (translucent), castellanus (castles), lenticularis (lens), opacus (opaque), congestus (congested).

3. Students research cloud types and associated weather conditions: altostratus, nimbostratus, cirrostratus, cirrocumulus, altocumulus, stratocumulus, and cumulonimbus. Create stamps depicting each cloud type. Post in the room.

LOOK UP

The Weather Channel has created a resource guide and poster available for classroom use (www.weather.com). Related activities include: cloud in a bottle (p. 26), sky collage (p. 11), sky murals (pp. 12, 40), sky paintings (p. 13), sky photos (p. 14).

LITERATURE LINK

Share children's picture books related to weather. Discuss how the authors used simple vocabulary, word placement and related illustrations to tell the story. Books include: *It Looked Like Spilt Milk*, by Charles G. Shaw; *The Cloud Book*, by Tomie de Paolo; *Rain*, by Peter Spier; *A Drop Around the World*, by Barbara Shaw McKinney; *The Snowy Day*, by Ezra Jack Keats; and *The Adventures of Drippy the Runaway Raindrop*, by Sidney Sheldon. Create a class walking-talking storybook about weather. Cooperatively write a simple story line. On a large piece of white paper, each student creates a brightly colored illustration and phrase or sentence. Copy the text on the back of the page. Students line up in the order of the story, holding their illustrated pages in front of them. When it's their turn, they say their line. Perform the story for primary grade students. Bind the pages into a big book to house in the school library.

WEATHER ART

Create cloudscapes using white paper, rain water, watercolor paint sets, black construction paper, glue, and scissors. Cover the paper with watercolor clouds. Then, create a foreground on the bottom third of the paper with black paper silhouettes. Students may also use wallpaper, corrugated paper, material, batting, and cotton to create 3-D cloudscapes.

Fearless Forecasters

BULLETIN BOARD

Funky Forecasts: (1) Clear moon, frost soon; (2) A sunshiny shower won't last half an hour; (3) When a cow tries to scratch her ear it means a shower is very near; (4) Red sky at morning, sailors take warning. Red sky at night, sailor's delight. **Word Wall:** thermometer, rain gauge, barometer, anemometer, weather vane, weather map, hygrometer, weather balloon, weather satellite, and Doppler radar.

SET INDUCTION

How do you decide what the weather is going to be each day? Why is weather prediction important to some people? Before satellites were invented, people used their knowledge of the world around them to predict what the weather would be. The first puppet weather forecaster was televised on a NYC station in 1941. Since then, weather has become an integral part of the daily news. Throughout the next few weeks, we'll be constructing a class weather station and using it to predict the weather!

LITERATURE LINK

Folklore enthusiasts believe that animal behavior can help them predict the weather. They think that when a herd of cows is laying down in a pasture or when lots of frogs are hopping about, rain is on its way. They also believe that woolly caterpillars grow thicker coats and beavers build sturdier dams in anticipation of cold winters. Perhaps the most famous animal forecaster is Punxsutawney Phil, the nation's official groundhog. Read *The Story of Punxsutawney Phil "The Fearless Forecaster"* by Dr. Julia Spencer Moutran.

Do these animals actually forecast the weather? Invite students to conduct research at home to debunk funky forecasts.

CREATE A WEATHER STATION

1. Today's meteorologists, or weather experts, use multiple instruments to gather weather information. Invite

students to brainstorm a list of weather instruments.

Discuss what each instrument measures: thermometer (temperature), rain gauge (precipitation), weather vane (wind direction), eyes (clouds and conditions), barometer (air pressure), weather map (atmospheric conditions), anemometer (wind speed), hygrometer (humidity), weather balloon (conditions in upper atmosphere), weather satellite (large-scale air movements), and Doppler radar (intensity of precipitation). You can learn more about these instruments at www.learner.org/exhibits/weather/index.html.

2. Create a class weather station using everyday items. Directions are located at: www.weatherwizkids.com/wzinstruments.htm

3. Create individual student journals and/or a class weather chart to record weather conditions over the next two weeks. Set aside time each day to measure and record weather conditions. Select a "sister city" somewhere in the nation or world. Watch The Weather Channel or go online to find out this location's weather conditions (www.weather.com). Use data to determine average precipitation, temperature, and weather trends.

4. Create cloudscape postcards. Students select cities from across the United States that are at the same or different latitudes. Write to the Chambers of Commerce to ask questions about the general climatic conditions in the selected cities.

LOOK UP

The Weather Channel has created a resource guide and poster available for classroom use (www.weather.com). Related activities include: multiple journal ideas (pp. 3-5), weather watcher graph (pp. 19, 23-25), cloud watcher chart (p. 31), data chart (p. 35), heat index (35), wind chill (36), Beaufort Wind Scale (37).

COMMUNITY CONNECTION

Invite a local meteorologist to visit the class. To prepare for the visit, go to www.weatherwizkids.com, a website designed by Crystal Wicker, a meteorologist, to learn more about pursuing a weather-related career. Watch multiple clips of weather forecasts from local stations and The Weather Channel. Children compose interview questions to ask the meteorologist. After the visit, divide students into small teams including a weather anchor, scriptwriter, and camera operator. Students present and videotape weather forecasts.

Stormy Daze

BULLETIN BOARD

Fierce Storms: Gather news articles of storms around the world. **Word Wall:** hurricane, tornado, blizzard, and flood.

SET INDUCTION

Students quickwrite responses to these questions: What is the stormiest weather you've ever experienced? What made it so memorable? How did you feel? What did you do? Invite volunteers to share their responses. Good weather and rain help crops grow and give us gentle breezes for kite-flying. Not all weather is friendly, though. Today we're going to investigate what causes stormy weather and how we can prepare ourselves to weather the storm.

LITERATURE LINK

Explore the different ways people react to stormy conditions by reading these books: *Winnie the Pooh* (Ch. 9) by A.A. Milne; *Storm in the Night* by Mary Stolz; *Night of the Twisters*, by Ivy Ruckman; *Brave Irene* by William Steig; and *Thundercake* by Patricia Polacco.

RESEARCH ACTIVITY

1. Determine what students already know about stormy weather through a class discussion. Create a concept map (interconnecting circles) to structure the conversation. The center circle should be labeled "stormy weather". The connected circles could include hurricanes, tornadoes, blizzards, etc. In keeping with the weather theme, the circles could be cloud shapes and the interconnecting lines could be lightning bolts!

2. Brainstorm a list of questions students would like to answer. Questions might include: What causes this type of stormy weather? What are the effects of this kind of storm? How can people keep safe during this storm?

3. Divide students into research teams. A fun site with information about each kind of storm is www.ucar.edu/40th/webweather. Once research is completed, student teams create brochures or posters to share information about their selected storm.

LOOK UP

The Weather Channel has created a resource guide and poster available for classroom use ([www. Weather.com](http://www.Weather.com)). Related activities include: thunderstorm in a bottle (p. 27, 41), literature ideas (p. 42), sky drama (p. 16), and sky writing (pp. 8-10).

WRITE ON

Did you know there have been recorded instances of storms that rained frogs and frozen ducks? Sometimes weather isn't only stormy, it's downright weird! Read one of these books about wacky weather: *Cloudy With a Chance of Meatballs* by Judi Barrett or *Bartholomew and the Oobleck* by Dr. Seuss. Students write and share their own weird weather stories. Share these stories using sound effects. Another option would be to create weather poems: sensory, haiku, diamante, or sky-shape.

CULMINATING ACTIVITY: WEATHER WORD WIZARDS

Test students' knowledge of weather terminology by playing Weather Word Wizards. Prepare two complete sets of the Weather Word Wall words. Divide the class into two teams. Call up two contestants from each team to sit at a table up front. Each team will have a clue-giver and a guesser. Clue-givers should sit back-to-back and hide their word-cards from the guessers. Give an identical Weather Wall word-card to each clue-giver. Clue-givers take turns giving single word clues to their partners. Clues can be rhyming or descriptive words. Clue-givers can build upon previous clues. If a partner guesses on the first clue, the team earns 4 points. If the partner guesses on the second clue, the team earns 3 points. Proceed until they have tried four clues. Then ask the audience for input if the word was not guessed. Trade contestants for each new word. The team with the most points wins.