

SKY WATCH

Invite kids to become sky watchers as they observe nature's incredible atmosphere. Teach valuable science lessons about the sky and experience first-hand the changes that occur day by day.

Weather Machine

The Earth is surrounded by a huge ocean of air known as the atmosphere. It stretches 600 miles from the Earth's surface to outer space. The atmosphere is made up of gases—mainly oxygen, nitrogen, and carbon dioxide. Human beings could not exist on Earth without the atmosphere. It protects us from the intense rays of the Sun and insulates us from the icy chill of night. About 99% of the atmosphere is calm and unchanging, but this is not true of the very lowest layer, which is about 6 miles high and provides the air that we breathe. The air in this layer is continually whirling and mixing, creating our weather. And what a variety of weather we get! It can be as forceful as a

hurricane, as sweltering as a heat wave, as frigid as a winter freeze, or as breathtaking as a rainbow. The sky is our forecaster of the force and the beauty of this natural phenomenon.

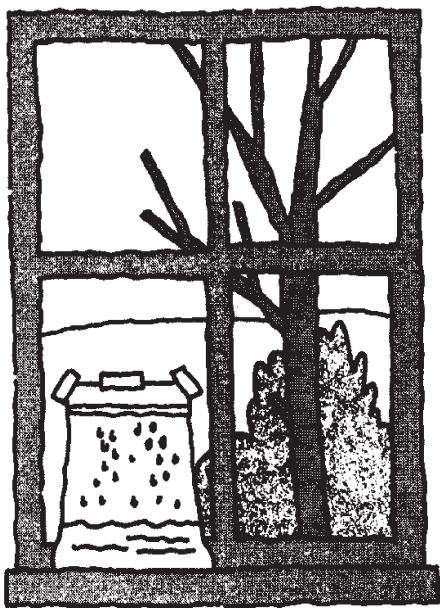
Have kids think of the Earth as a complex weather machine. The Sun is the engine that powers the changes in the atmosphere, and the atmosphere is the great recycler of the air. When the sunlight heats the ground, it heats the air next to it. Water from oceans, lakes, rivers, and plants evaporates from this heat and bubbles of hot air rise. The bubbles cool high in the air and the water vapor in the air condenses to form a cloud. Tiny droplets grow as more moisture condenses on its surface. When the cloud is full, it will rain. This

water returns to the ground, where the water cycle begins again. Refer to the unit "Water: The Never-Ending Journey" for a great unit on the water cycle.

Weather Bag

Simulate the water cycle in your classroom by placing 1/2 cup of water in a zippered plastic bag. Place the bag on a sunny windowsill and tape the top of the bag to the windowpane. Tell children that this bag of water simulates a pond and it is their job to observe what happens to the water. Allow the bag to sit in the sunlight for several hours. Then ask the children to feel the bottom of the bag to test the warmth of the water. Kids should observe that the water is warmer and that little droplets of

water have formed or condensed on the inside of the bag. These are like clouds that form when rising warm air cools. Next, hold an ice cube up against the condensation and observe what happens. More water droplets should form inside the bag and some will begin to roll down the sides of the bag to the “pond,” like raindrops falling to the ground. The ice cube is like the cool air high in the sky that causes so many droplets to form that it eventually rains. The rain falls to the ground and the water cycle continues.



Sky Inventory

Take students outside and ask them to lie down on the ground and look up at the sky. Challenge the kids to observe the sky using all their senses. Then make a list of their observations. The list should include Sun, Moon, clouds, air, wind, dust, pollen, etc. You could also add phenomena that occur only periodically (rain, snow, sleet, hail, fog, smog, mist, thunder, lightning, rainbows) to your sky inventory. Be sure to have students note the colors in the sky, the shapes of the clouds, the position of the Sun in the sky, and any other objects that might be floating or flying in the sky

(birds, planes, leaves, etc.). Give each child a sheet of blue construction paper and chalk or pastels. Instruct the kids to draw a sky picture that includes all the things they observed. Mount the pictures on a bulletin board with the heading “Sky Watch” or “Sky Spy.”

Adapted from “101 Ways to Celebrate Sky Awareness Week” by H. Michael Mogil and Barbara Levine

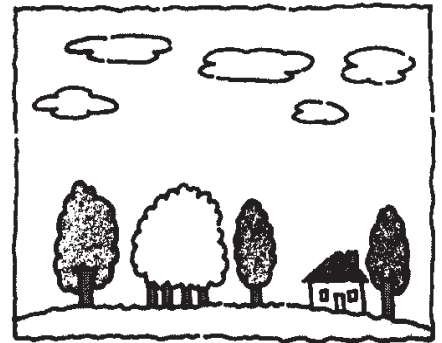
Cloud Cuckooland

Clouds float across the sky in a wide variety of shapes and sizes. It’s fun to look up at clouds and observe different shapes in them. People have their own perceptions of what they see, and it’s not unusual to hear lots of laughter over these perceptions. Because of this, the phenomenon has become known as *nephelococcygia*. It comes from the Latin *nephelo*, which means “cloud,” and *coccygia*, which means “cuckooland.” While kids are lying on the ground watching the sky, see what shapes they see in the sky. Does anyone see animals, plants, or cars in this cloud cuckooland?

Cloud Formations

What are clouds? Clouds are really countless tiny droplets of water. You can see a cloud but you can’t touch one. If you could get close to a cloud, it would look like fog. There is an incredible variety of clouds, and no one system of classifying clouds does them justice. One classification system, devised by an English pharmacist named Luke Howard in 1803, is used most often. It classifies clouds into ten distinct categories, all of which are variations of three basic cloud forms.

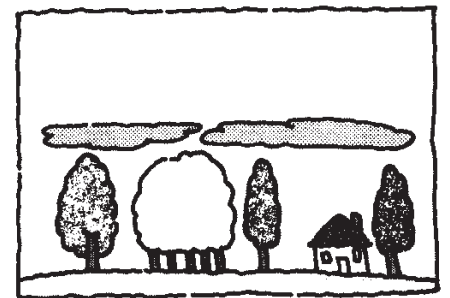
Cirrus, which means “curl,” is the name given to wispy clouds made from ice crystals because they form so high in the sky. Strong winds blow them into feathery “mares’ tails.”



Cirrus clouds are considered fair weather clouds unless they thicken or occur with other clouds.



Cumulus, which means “heap” or “pile,” are cottony, puffy clouds indicating rising air currents. They are generally indicators of fair weather unless they become tall and dark.



Stratus, which means “stretched out,” are clouds formed in layers. A blanket of dull gray, low-lying clouds, they may provide a damp drizzle, but no real rain. When stratus clouds touch the ground, it is known as fog. Teach the kids these basic cloud forms by having them make their own cloud chart. Duplicate a cloud chart on light blue paper for each student. Talk about the characteristics of the basic cloud types and then have students complete the details using cotton balls, pencils, and glue.

Sky Photography

Another hands-on way of observing our wonderful sky and incredible clouds is to take photographs of them. Kids love to take photos and with digital cameras readily available these days it's so easy. Challenge students to use a digital camera to capture the many beautiful and different cloud formations they observe in the day time sky on film. Then create a unique bulletin board where children can display their amazing cloud photographs under the title "Sky Cam."

Making Mini-Clouds

On a cold day we can make mini-clouds with our breath. The moisture in the warm air from our lungs condenses when it comes in contact with the cold outside air and forms mini-clouds. See if your students can think of other ways people make clouds, such as taking a hot shower and filling the bathroom with steam or boiling water in a pot to create steam. Clouds in the sky appear white because they are made up of countless water droplets that reflect sunlight, just as snow does. You can simulate a cloud by boiling water in a kettle and letting the kids watch the steam rise.

Make clouds in the classroom by having students work in small groups, following these steps:

1. Fill a 2-liter plastic soda bottle about three-fourths full of very warm tap water.
2. Light a match and drop it into the bottle. Twist the cap on the bottle immediately.
3. Set the bottle on the desktop. Have a student gently squeeze and then release the bottle.
4. Have students describe what they see. As the bottle is squeezed and released, a tiny cloud should appear.

5. Reapply the squeeze and have students describe what they see. The cloud should disappear when the squeeze is reapplied.



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Sky Awareness Week

Sky Awareness Week (SAW) is celebrated each April with a different sky-related theme as its focus every year. The idea of this celebration is to encourage people to appreciate the sky's natural beauty and to protect this amazing natural resource. A particular week is selected each April to capitalize on the dramatic and changeable skies that occur in late spring.

Sky Resources

For more information on Sky Awareness Week, contact Barbara Levine at:

HOW THE WEATHERWORKS
301 Creek Valley Lane
Rockville, MD 20850

This group has a variety of hands-on products available for purchase, such as Cloud Flash Cards, Cloud Post Cards, and an Elementary Cloud Chart. Visit them at www.weatherworks.com/skyawareness.week.html or call HOW THE WEATHERWORKS at 1-800-8CLOUD9 to order.

Window on the Weather

The day sky is our window on the weather, so encourage children to become more familiar with the sky and its changes. It's easy! All they need to do is look up and observe. But remind students that they should never look directly at the Sun because it will damage their eyes. Have kids notice the shape, color, location, and movement of clouds. Explain that when they see a change in the cloud type, a change of weather is on the way. Children can feel the wind and air temperature as well as any precipitation. A change in temperature and moisture brings on a change in the weather. It can change dramatically during the course of a single day.



Sky Diary

Invite students to create their own sky diaries. Reproduce a Sky Diary cover label and several diary pages for each student. Glue the cover label to a sheet of colored construction paper and stack the diary pages—one for each day—behind it. Punch holes through the pages and bind them together with paper fasteners. Instruct students to go outside in the morning and also the late afternoon to observe the sky. Ask them to describe in pictures and words what they observe. Have children share their observations each day. Then, at the end of the week, see what conclusions can be drawn about the sky and the week's weather.

Sky Colors

Although we joke about children asking the question, "Why is the sky blue?", few people really know the answer. The answer centers on the Sun and our air. Our sky is blue because as sunlight enters the atmosphere, it encounters air. All the colors of the sunlight (except blue) travel straight to the ground. The blue light, however, tends to bounce off the air molecules. It eventually reaches our eyes from all parts of the sky, making the sky appear blue.

But not all skies in the galaxy are blue. If you were on the Moon, the sky would look black because there's no air. On Mars the sky would look pinkish because of the dust in the Martian atmosphere, and on Venus the sky would appear yellow because of the planet's clouds.

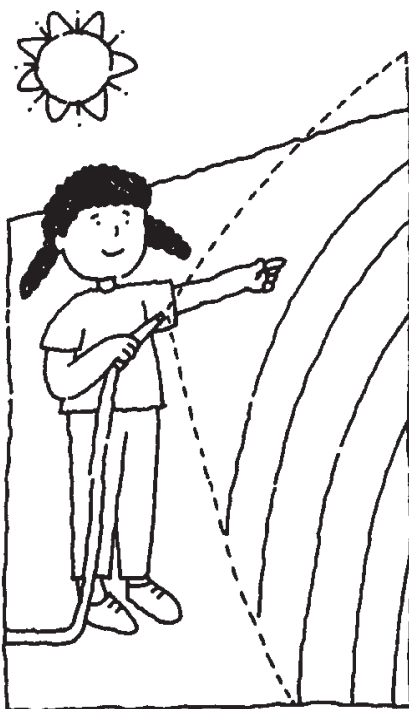
Back on Earth, our skies can change from a deep blue to a pale blue. The amount of water vapor or dust particles in the air cause the variation in the shade of blue. Sunset skies may be bright red and orange. The most spectacular sunsets occur following a volcanic eruption because the wind scatters volcanic dust around the world. The volcanic dust in turn scatters the colors of sunlight. Blue is affected the most and red and orange the least. At sunset, only red and orange get through to our eyes since all other colors are blocked by the scattering. Ironically, pollutants in the air have a similar affect on sunsets. High clouds also enhance the beauty of a sunset.

Have children observe a sunset each night for one week. Instruct them to write down their observations. Have students refer to their observations to decide how valid the old weather lore, "Red sky at night, sailor's delight," is in predicting the weather.

Rainbows

A rainbow is one of nature's spectacular picture shows. All the colors of sunlight are broadcast into an arch across the sky. Rainbows are simply the reflection of the Sun in the raindrops in the sky. To see a rainbow, three things must happen all at the same time—the Sun must be low in the sky, falling water drops must be in front of the sunlight, and the observer must be standing with his back to the Sun. As the sunlight reflects off the back of the water droplet, the light bends and separates into the colors of the spectrum. Rainbows are curved because raindrops are curved and you see only part of a circle. You would be able to see a complete rainbow if you were flying in an airplane looking down on a rain-storm!

To make a garden hose rainbow with your class, take the kids outside early in the morning or late in the afternoon and have them stand with their backs to the Sun. Use the finest spray of a garden hose and turn the nozzle until the spray is at its widest angle. You should see a rainbow in the spray!



Non-Fiction Books

Exploring the Sky by Day

by Terence Dickinson
(Firefly Books)

Exploring the Night Sky

by Terence Dickinson
(Firefly Books)

Weather Whys

by Mike Artell
(HarperCollins)

The Cloud Book

by Tomie dePaola
(Holiday House)

Eyewitness Books: Weather

by Brian Cosgrove (DK Children)

The Kid's Book of Weather

Forecasting

by Mark Breen (Williamson)

Weather Forecasting

by Gail Gibbons
(Aladdin)

The Skywatcher's Handbook

by Colin A Ronan
(Crown)

Storms

by Seymour Simon
(HarperTrophy)

Picture Books

Cloudy with a Chance of Meatballs

by Judi Barrett
(Aladdin)

C.L.O.U.D.S.

by Pat Cummings
(Morrow)

It Looked Like Spilt Milk

by Charles G. Shaw
(HarperTrophy)

Thunder Cake

by Patricia Polacco
(Paperstar Books)

Mushroom in the Rain

by Mirra Ginsburg
(Aladdin)

Bartholomew and the Oobleck

by Dr. Seuss
(Random House)

Listen to the Rain

by Bill Martin, Jr. and John Archambault (Holt)

Storm in the Night

by Mary Stolz
(HarperTrophy)

The Napping House

by Audrey Wood
illustrated by Don Wood
(Red Wagon)

Rainy Rainy Saturday

by Jack Prelutsky
(Greenwillow)

Bailey's Window

by Anne Linbergh
(Harcourt)

Sky-High View

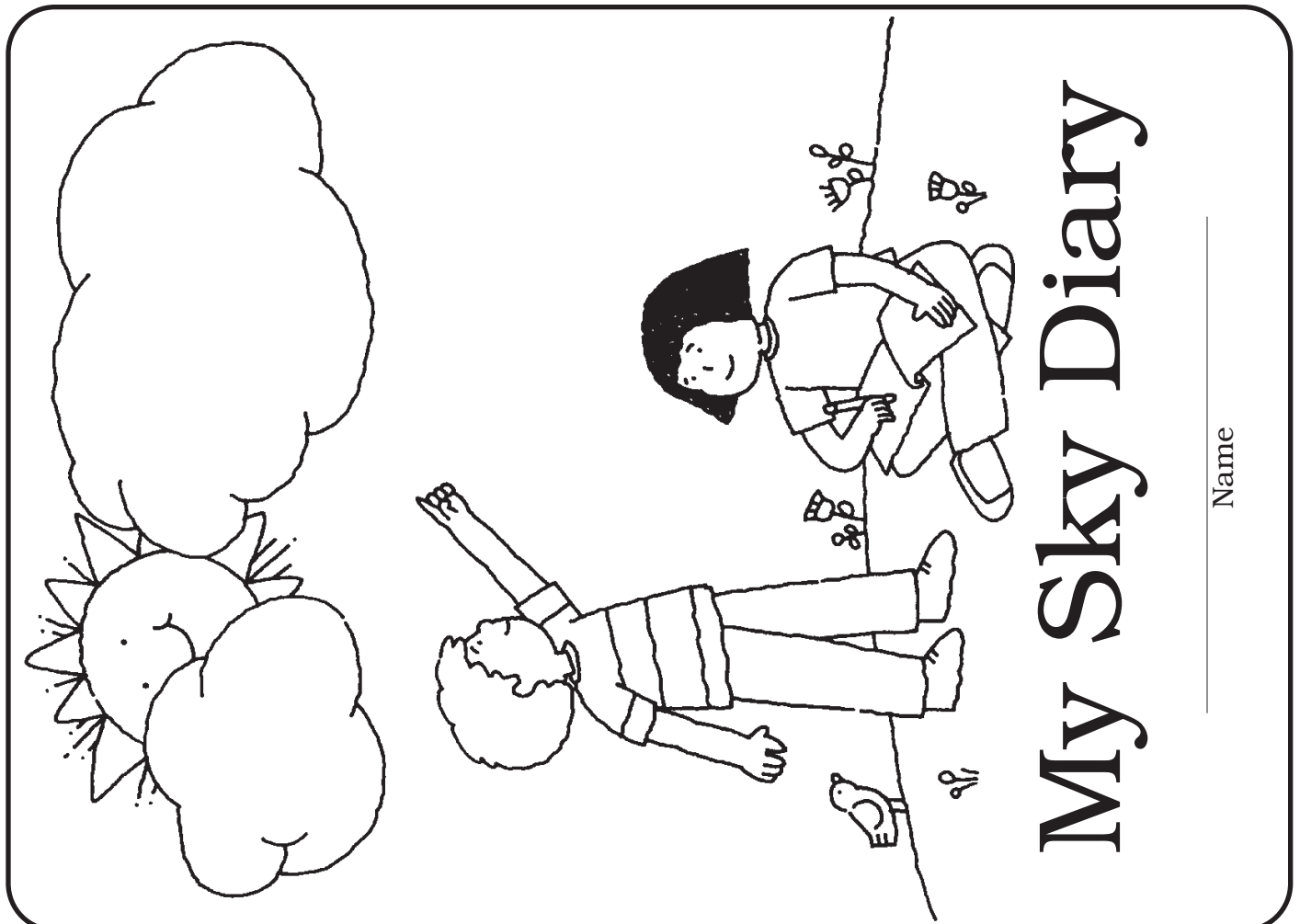
Where's the best place to observe the sky? From an airplane! Invite kids to put on their flight caps and take everyone on an imaginary sky adventure....

Ready, everybody? Let's go!

Be sure to grab a seat next to a window on the shady side of the plane—the right side when flying west and the left side when flying east. Fasten your seat belt and get ready for take-off. Keep your eyes peeled because a plane is a wonderful place to observe clouds. Here we go! We're going to fly right through those clouds. You're right, it does look like fog. After all, a cloud is just mist. Make sure that seat belt is tight because we could have a bumpy ride. You see, the plane is exposed to updrafts and down drafts which tug and pull on the clouds. The pilot likes to avoid flying through cumulus clouds because the unpredictability of the drafts toss the plane around. You'll notice that the plane keeps flying higher and higher until we end up flying *above* the clouds. Cruising altitude for a plane is usually about 5 miles high, where the air is still and clear and the ride is smooth.

Notice the deep blue color of the sky. This is because the thinner air scatters less of the sunlight up here. Look at the clouds. They look different, too. Remember, instead of looking up at the clouds, you are now looking down on them. The clouds look bright and white and fully lit up by the Sun. Some jet planes even create a trail of clouds in the sky. These are called contrails. Is this plane making a contrail? This happens because as the jet engine takes in cold, dry air at a high altitude, it also gives off warm, wet air. This water vapor freezes almost instantly and makes an ice-crystal cloud stream. It's like a man-made cirrus cloud. Contrails usually disappear quickly unless the air is dry and the weather is fair. Wow! Our flight is nearly over. Time to descend through the clouds again. Check that seat belt as we head for home. Did you have fun? What did you observe, sky watchers?

Color and cut out label below. Glue to construction paper to make a Sky Diary cover.



Sky Diary Worksheet

MORNING

Date: _____

Time: _____

Describe the sky:

Draw a picture of the sky.

AFTERNOON

Date: _____

Time: _____

Describe the sky:

Draw a picture of the sky.

My Cloud Chart

All clouds are variations of three basic cloud forms:

1. Cirrus

2. Cumulus

3. Stratus

They change from one type to another when moisture or temperature changes.

Make clouds with cotton balls:

1. Cirrus—Pull cotton apart for wispy clouds. Glue to chart.

2. Cumulus—Fluff cotton for puffy clouds. Glue to chart.

3. Stratus—Stretch cotton for flat clouds. Color with side of pencil. Glue to chart.

Cirrus Clouds

Cirrus means “curl.” These wispy clouds are made of ice crystals because they form so high in the sky. Strong winds blow them into feathery “mares’ tails.”

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Stratus Clouds

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