

Instructor's Notes

Lesson: Wise About Weather

Subjects: Reading, writing, science, math, social studies, and critical thinking

Activities:

GENERAL—ALL TYPES OF WEATHER

1. Obtain "*A Guide to the Sky*" poster for your classroom. This 25" x 38" poster is \$8.95 plus \$4.00 for "postage and handling". Thus, the total for one poster is \$12.95, two posters, \$21.90, etc (increments of \$8.95). The posters are mailed via USPS Priority Mail. They don't have the ability to service credit cards so send a check made out to Sky Guide to:

Sky Guide
P O Box 30027
Greenwood Station
Seattle, Washington 98103-0027

2. Using a current copy of "USA Today", have students look at the weather page and answer the questions on the worksheet titled "Weather Map Questions". Discuss their answers especially focusing on the different parts of the world they examined. Have students point out these spots to each other on a world map in the classroom. Ask if anyone has any information or remembers anything from history about some of the cities mentioned. Discuss why knowing the weather is helpful. Why do we care what is happening in other locations other than our own backyard?
3. Use the instructions for "A Cut up Poem" to write about weather that you have discussed in class. Use your old copies of *USA Today* to cut up.

WIND

4. Use the "Mighty Puff Mobile" experiment to demonstrate the power of wind. Encourage students to have fun with this one! This activity also develops the workplace skills of teamwork and cooperation.

5. Another activity using wind is the Bernoulli Cans activity.

RAIN

6. Complete the "Cloudy With a Chance of Meatballs" activity. *This activity is also included in the Home Visits Ideas.*
7. After reading the rainforest handout make a Rainstick. Rainsticks are ceremonial musical instruments used to invoke the rain spirits. They are made by people who live in the deserts of northern Chile. In Chile, rainsticks are traditionally made from dead cactus tubes with hundreds of cactus spines hammered into the tube. Tiny lava pebbles cascade gently through the tube, sounding much like rain. The rainstick in this activity is definitely not traditional. It is made from a cardboard tube (instead of the dried cactus) and nails (in place of cactus spines). *This activity (in a simpler version) is also listed in the Home Visits packet.*
8. Make a Rainforest Liana Vine Decorative String.
9. Demonstrate "Rain in the Classroom" using the experiment with the same name. Follow this exercise with the hand out on "Understanding Clouds and Fog". Use the questions at the end of this handout to test their knowledge and to spark discussion.

STORMS

10. Read the "Storms" handout. Discuss the different types of storms. Discuss what a tornado is and how it is formed. Complete the tornado worksheet. There are also extension ideas that go across the curriculum.
11. Distribute materials for "Twister in a Bottle" (handout) and make a tornado in your classroom. Follow the instructions on the handout and use the materials in the kit. The questions in the pages that follow will provide a starting point for discussion.
12. Read and discuss the storm safety rules (handout). *This activity is repeated in the home visit ideas.*
13. Read and discuss the handout "What is Thunder?"
14. To demonstrate how thunder works complete the "Poppa's Got a Brand New Bag" Activity.
15. Complete the "Magic Inflating Balloon" Activity.
16. This activity compares Oobleck to the Earth's mantle. Have students make and explore Oobleck.

17. Do the "Mystery Powder" activity.

SUN

Sun exposure safety sheet. (handout) *This activity is repeated in the home visit ideas along with a corresponding activity.* The handout "Facts about UV Rays and Sunburn" can be used for a more in depth discussion about the sun.

Activity #2

Weather Map – USA Today

1. What country does this map show?
2. Find the coldest spot on the map and the warmest spot.
3. What is the difference between the warmest and the coldest spot?
4. Find the average high temperature for the four days listed for the city where the Declaration of Independence was signed?
5. What do the different colors on the large map indicate?
6. Find one interesting weather fact on the sheet that is new to you.
7. Name one city west of where you live.
8. Name one city north of where you live.
9. What is the forecast for tomorrow for the capital of the United States?
10. What place on this map would you like to visit this week if you could go anywhere? Why?
11. Is any part of the country expecting rain in the next 5 days? Name any regions that are expecting rain.
12. What does the “H” and the “L” stand for on the map?
13. Find one city on the continent of Europe and list it and its high and low temperatures for today.

Activity # 4

The Mighty Puff Mobile

Adapted from a lesson by Linda E. Newcome at www.lessonplanspage.com

Objectives: Students will use materials given to design a puff mobile, work in teams, brainstorm, write directions on how to build a puff mobile, test their puff mobile.

Materials: (needed for each group)

- 10 plastic straws
- 1 sheet of copier paper
- 4 wooden beads $1\frac{1}{2}$ inch in diameter or smaller with a hole through the middle
- Unlimited number of straight pins

Procedures:

Part 1—Teacher and students will discuss the land ship that was built years ago to travel across the desert. Teacher and students will brainstorm what would cause the ship to work? What would it need to move it? Group students either in pairs, three, but no more than 4 to a group. Hand each group a baggie containing 10 straws, 1 sheet of paper, the 4 beads, and approximately 30 straight pins. They can have more if needed.

Part 2—Stress to students they have only 20 minutes to build their puff mobile, try it out, readjust it, and fix for the real race. Move around the groups giving moral support but no answers. When the time is up students are taken to a long, clear, hallway. They then talk about the testing arrangements. The group picks their best pair of lungs to get down on hands and knees and blow the puff mobile as fast and as far as they can in 15 seconds. *The teacher times them with a stopwatch.*

The winners are given a certificate or some other fabulous prize!

Evaluation: Discuss how the design of the structure helps wind flow and moves their structure the most effectively. Are there any changes that could be made to help their structure move more quickly? What lessons about wind flow have they learned? Research other phenomena such as the Bernoulli Principle. (*See activity # 5*)

Activity # 5

Bernoulli Cans

In 1738, a Swiss mathematician Daniel Bernoulli studied the relationship between the pressure and velocity of a fluid. The Bernoulli Principle states that the pressure of a liquid decreases as its velocity increases.

Materials:

- 24 drinking straws
- 2 empty soft drink cans
- a flat, smooth table top

Procedure:

1. Place 23 straws on the table parallel to each other, about 1 cm apart.
2. Place the cans upright on the rank of straws approximately 5 cm apart. The cans will be able to roll freely, back and forth.
3. Using the remaining straw, blow between the cans.

Explanation:

The Bernoulli Principle applies to the two cans. As the velocity of the air between the two cans increases (being blown away), the pressure the air it applies to the inner sides of the cans decreases. That allows the air on the opposing sides of the cans to push the cans towards to the area of lower pressure. The air pressure on the outer sides did not increase, rather it was the decrease in pressure between the cans that allowed the cans to roll towards each other. The cans were not “sucked” together. They were pushed together.

Instructor Notes:

Although this activity is fairly simple, it affords several opportunities to model prediction and analytical thinking. First demonstrate how easy it is for the cans to roll back and forth on the straws. Ask your students to predict what is going to happen. Many will suggest that the cans will roll apart due to the additional air you are forcing between the cans. Then ask “Besides the straws, what is touching the cans?” (ANSWER: air) Is blowing between the cans going to increase the air pressure momentarily by adding more local air, or decrease the pressure momentarily by “knocking” some of the local air out of the way?

If students suggest that the cans will roll towards each other, ask them to explain their prediction. What are their prior experiences that would allow them to make such a prediction? (*ANSWER; wind blowing over a sheet of paper and “lifting” it or something getting “pulled” into a current.*)

After completing the activity, have the students draw a top-view drawing of the two cans and use arrows to indicate the forces of air pressure. **Remember:** The cans were pushed together, not “sucked” together.

Activity # 6

Cloudy With a Chance of Meatballs

Use literature to create a class writing sample about weather.

Materials:

- "Cloudy With a Chance of Meatballs" by Judi Barrett
- Paper
- Pencils
- Fabric
- Markers
- Glue
- Scissors
- Misc. art supplies

Activity:

1. Read "Cloudy With a Chance of Meatballs" aloud to the class.
2. Divide the class into groups of two to three students each. Explain that the class is going to create their own version of "Cloudy With a Chance of Meatballs". Before the class can begin, they must decide on a theme for the object(s) that will fall from the sky. Some ideas are: favorite animals, favorite games, patterns, etc. Each group needs to decide on an object that will fall from the sky related to the theme the class chose. For example, if the theme was favorite games, then Legos could fall from the sky.
3. Together each group will write a paragraph and illustrate what is happening in their section of the book. The illustrations can be done in two-dimensions using crayons and paper, or in three-dimensions using objects such as cotton balls, glitter, etc.
4. When each group is finished, let them share their part with the class. After the groups have shared their work, the work can be collected and bound in a class book.

Activity # 9 (Page 1 of 6)

Rain in the Classroom

Purpose: Students will witness three forms of water (liquid, steam, and ice) and gain an understanding of what makes these changes in form to happen. Further students will understand what causes rain and clouds to form.

Materials: skillet or hot plate; pie pan; sponge; water; clock; ice cubes; clear glass large-mouth gallon jar

Safety alert: This experiment is best as a teacher demonstration to avoid students working with hot water.

Procedures: Place a pot of water on a skillet or hot plate to boil. Hold a pie pan that has a wet sponge in it over the boiling water. Students observe the bottom of the pie pan to see when condensation begins to form on the pan. Students time and record how long it takes for the first raindrop to fall from the pan. Repeat the experiment with ice in the pan and record the results. Students compare the lengths of time it took for each activity. Students suggest reasons for the difference in times. Ask students to make a bar graph showing the difference between the pan with water and the pan with ice.

Clouds in the Classroom

Heat a pot of water on a hot plate. Hold a clear glass large-mouth gallon jar upside down over the pot of water to collect the hot air as it rises. Cover several ice cubes with a wet paper towel and place on top of the inverted jar. AS the hot air reaches the top of the jar, clouds begin to form. The clouds may become cold enough to condense and “cause rain”. Discuss the water cycle the students observed.

Discussion:

1. Let's talk about the forms of water we saw in this experiment. (liquid, steam, ice)
2. How did these changes happen? (we heat water; when the steam hit the jar it condensed back into water)
3. Can you state a rule about this? (water has different forms)
4. What was the same about the pans? What was different? Why did the pan with ice make the steam condense faster?
5. What causes rain and clouds to form?

This information from www.theeducatorsnetwork.com

STORMS

Thunderstorms

At any given moment there are about two thousand thunderstorms rumbling across the surface of the earth. Rising air cools to form water droplets on tiny particles. Clouds form in a region of rising air. The first step in the development of a thunderstorm is a harmless cumulus cloud. If air continues to rise, the cumulus cloud continues to grow. As a major weather system approaches, it may force the air to rise even more, and the cumulus cloud grows even larger, becoming a thunderstorm with heavy rain, lightning and thunder.

Ice crystals that split apart produce a charge in the cloud. Charges are either negative or positive, and opposites attract. If a cloud has negative charges and the earth's surface has positive charges, an attraction occurs between the cloud and the tallest object on the earth's surface. The build-up of charges eventually triggers **lightning**, a discharge of electricity built-up within a storm. Sometimes though, lightning strikes from cloud to cloud. **Thunder** is created when particles in the air expand and contract violently. This occurs when lightning passes through the air, heating the air in a split second. This causes the air particles to expand. Then, as the air cools again, those particles rapidly contract, producing thunder.

Whenever there is lightning, there is also thunder. The light and the noise are made at the same time, but you do not always see and hear them at the same time. Light travels faster through the air than sound does. When a storm is close, the lightning and thunder may seem to take place at the same time, but when the storm is far away, the flash of the lightning is seen first and then the thunder is heard. You can estimate how many kilometers away a storm is by counting the number of seconds between the flash and the sound, and multiplying the number of seconds by 330 meters.

In the United States, lightning kills about 100 people every year and injures hundreds more. Most lightning victims are outdoors on golf courses, under tall trees, or on metal machinery.



The Most Ferocious Storm

To this day scientists try to make sense of the phenomenon we call a tornado.

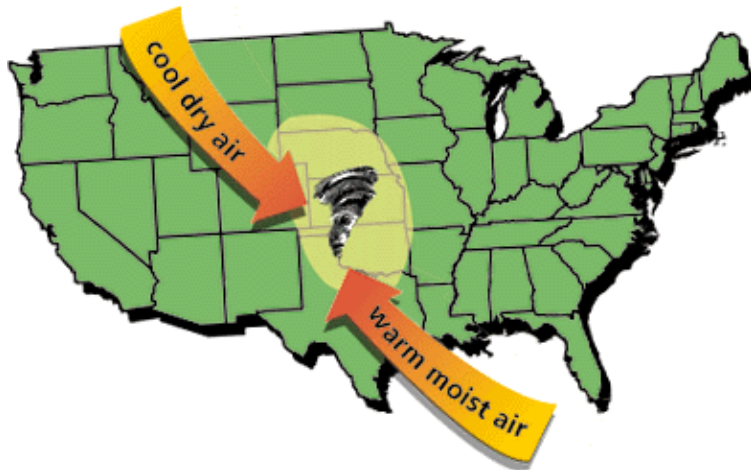
Activity # 10 (Page 2 of 7)

Where do these spinning winds originate? What powers them? And how can we protect ourselves?

Tornadoes are produced inside severe thunderstorms. Several intense thunderstorms begin to rotate and produce a spiraling funnel. The cool dry air and the warm moist air of the thunderstorm meet and the two air masses push against one another to start the air under the thunderstorm twisting. That gives us a clue to the major source of their energy: the latent heat contained in the warm, moist air mass.

A **tornado** is a rapidly rotating column of air in touch with the ground. Wind speeds in a tornado can range from 160-180 km per hour (100-300 mph). Tornadoes last as little as 10 minutes or may endure for several hours. Texas, Oklahoma, Kansas, Nebraska, Arkansas, and Missouri are collectively known as "Tornado Alley". More tornadoes occur in these states than anywhere else in the world, particularly during the spring months. Tornadoes are also relatively common in Alabama, Florida, Georgia, Illinois, Indiana, Iowa, Louisiana, Mississippi, and South Dakota.

The conditions that produce a "tornadic thunderstorm" (a storm that produces a tornado) exist when moist, warm air gets trapped beneath a stable layer of cold, dry air by an intervening layer of warm, dry air. This stratified sandwich of air is called an inversion.



If the cap is disturbed by a front or disturbances in the upper atmosphere, the warm, moist air can rise and punch through the stable air that was holding it down. The warm air will start to spiral upward, as latent heat is released when the moisture it holds condenses. Aided by different winds at different levels of the atmosphere, the rotating updraft gains velocity. That, much simplified, is the origin of a tornado.

Winds Too Quick to Meter

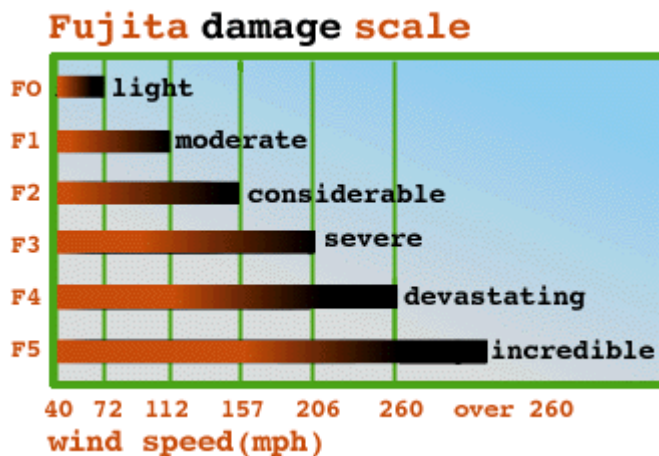
Although tornadoes occur throughout the world, including India and Bangladesh, they are most intense and devastating in the United States. Tornadoes can strike

Activity #10 (Page 3 of 7)

at any time of day, but they are much more frequent in the afternoon and evening, after the heat of the day has produced the hot air that is a requirement of a tornadic thunderstorm.

On average, the United States experiences 100,000 thunderstorms each year, causing about 1,000 tornadoes. The National Weather Service says an average of 42 people are killed by tornadoes annually.

Tornadoes are so common in “Tornado Alley” because of mountains to the west and the Gulf of Mexico to the south. In spring a strong westerly jet stream flows across the Alley, creating instability and a trough of low pressure that draws in warm, moist air from the Gulf. Conditions for the supercells [large, powerful thunderstorms] that spawn tornadoes require strong vertical wind shear [changes in wind speed and direction with height] and lots of instability. That’s what happens in Tornado Alley.



The Fujita scale shows the range of violence of tornadoes. An F-5 tornado produces the most violent winds on earth, approaching speeds of 300 miles per hour. (In the Fujita scale, the wind speed is inferred by analyzing the damage, it's not measured directly.)

Tornadoes range in width (as measured by the damage path) from less than 150 feet to more than a mile. Tornadoes can last from a few minutes to more than an hour. A tornado can travel along the ground between a few hundred feet to more than 100 miles. The land speed (speed the tornado moves along the ground) of tornados ranges from 0 to 60 mph.

Activity #10 (Page 4 of 7)

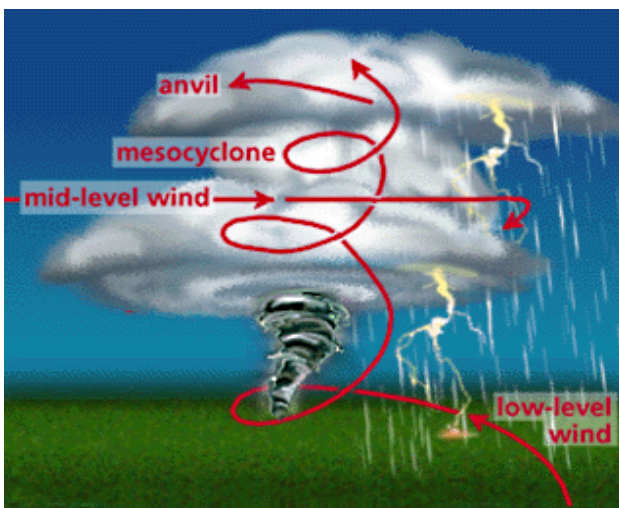
Other Peculiar Winds

Tornadic thunderstorms produce a couple of other bizarre kinds of wind.

- A waterspout is a weak (usually) tornado over water. They are most common along the Gulf Coast and southeastern states. In the western United States, they occur with cold fall or late winter storms, when you would least expect a tornado to develop.
- A downburst is a downward blowing wind that sometimes comes blasting out of a thunderstorm. The damage looks like tornado damage, since the wind can be as strong as an F2 tornado, but debris is blown straight away from a point on the ground. It's not lofted into the air and transported downwind.

The Nuts and Bolts of a Whirlwind

1. A large, thermally stratified situation develops in the atmosphere, with plenty of hot, humid air trapped beneath cold, dry air.
2. For some reason, the "cap," (the stable layer of air between the hot and cold air) is disturbed. The disturbance can be caused by an upper-level air disturbance, or the arrival of a front.
3. As the lower-level air rises, it expands in the reduced air pressure aloft (air pressure drops as altitude increases), and it cools. Eventually, the cooling causes the moisture to condense.
4. Condensation releases latent heat, warming the air, making it bouyant, and causing it to rise quickly (at speeds up to 150 mph). By now, the cloud has formed into a thunderstorm. Upper-level winds tilt the thunderhead to create the anvil at the top.



5. The thunderstorm may die out in intense rain and/or hail. Or it may spawn a tornado.
6. Interactions between air at various altitudes, humidities and temperatures causes rain, lightning, air circulation and an intensification of the rotating updraft, called a "mesocyclone." Low-level wind helps cause this rotation, which is almost always counter-clockwise (seen from above) in the Northern Hemisphere.
7. A tornado may form below the mesocyclone. As the spinning column of air narrows, it rotates faster and extends higher into the storm.

Activity # 10 (Page 5 of 7)

Spinning Like a Dynamo

Energy is the ability to do work. Energy comes in many forms, including chemical, kinetic, potential and thermal. Energy can change forms, and in fact its transformations help drive the furious winds.

Where do tornadoes get all that energy?

- Latent heat of condensation (a form of potential energy) is released when the warm air rises and water vapor condenses into liquid water. This latent heat is the energy that liquid water took in when it evaporated to form the water vapor. Latent heat is the biggest single source of energy in a thunderstorm. When the released latent heat warms the rising air parcel, the resulting difference in density can push the air up at the extreme velocities needed to create the tornado.
- The release of latent heat helps cause differences in pressure, which are another form of potential energy. This potential energy is transformed into kinetic energy as increased wind speed. The ultimate source of this wind (kinetic energy) is the sun. In other words, radiation energy was converted to thermal energy, which evaporated water from the oceans. This water contained latent heat energy, which eventually was converted to kinetic energy in the thunderstorm.
- Thermal energy is transferred between various air bodies within the thunderstorm.
- Finally, electric energy is released by accumulations of positive and negative charges, causing lightning within the clouds, and from the clouds to the ground. Electric energy is not important to the tornado, but it does attract attention!

Tornadoes release lots of energy. A tornado with wind speeds of 200 mph will release kinetic energy at the rate of 1 billion watts -- about equal to the electricity output of a pair of large nuclear reactors. However the large thunderstorms that spawn tornadoes are immensely more powerful, releasing latent heat at the rate of 40 trillion watts -- 40,000 times as powerful as the twister.

Hurricanes

In the fall, meteorologists watch the oceans for larger storm called a **hurricane**. The hurricane is a rotating storm that forms over warm water with wind speeds of 120 km/hr (74 mph) or higher. The average hurricane (550 km or 340 miles in diameter) is much larger than a typical tornado (100-600 meters OR 320-1920 feet). Intense hurricanes resemble the shape of a doughnut, with a nearly calm "eye" in the center of the cyclone. The eye can be 10-20 miles wide. Hurricanes rapidly lose their strength once they move from warm waters onto drier land.

Activity # 10 (Page 6 of 7)

Tornado Worksheet

1. List 2 types of energy. _____

2. When are tornados most common? _____
3. What states comprise “Tornado Alley”? _____

4. Using the Fujita damage scale, how would you classify a tornado with winds of 158 mph? _____
5. What is an inversion? _____
6. Summarize what a tornado is in your own words. What sights and sounds would you encounter if you could get close to a tornado? _____

7. Explain why tornado hunters risk their lives to get close enough to study them? _____

8. In a tornado, what is an anvil? What is another definition for an anvil? _____

9. How many 75 watt lightbulbs would glow with the energy found in a 200 mph tornado? _____

Activity # 10 (Page 7 of 7)

Social Studies Extension:

- Using a U.S. map, color and label the states in “Tornado Alley”. Then label the other states where tornados are common and color them a different color. Add the state capital to each state.
- Create the official flag for each of these states. Use markers, colored pencils, paint, construction paper, etc. Be creative!

Math Extension:

- Have the students do metric conversions. For example: measure the room in feet and inches and convert it to meters and centimeters.
- Calculate the distance between two cities in Tornado Alley. For example, how far is it from Dallas, Texas to Lincoln, Nebraska?

Language Arts Reading Extension:

- Most people have heard the story of Benjamin Franklin’s electricity experiment, which involved flying a kite in a thunderstorm in Philadelphia. Read a story about this legendary American. Explain what you think happened during this experiment and discuss how it helped him understand more about lightning.

Language Arts Writing Extensions:

- You live in “Tornado Alley” and you’re riding in the car for a family trip. Suddenly, to your horror, you see a tornado in the distance. You’re near a highway overpass, a drainage ditch with a large concrete pipe running under the highway, and an abandoned tool shed. Which would you pick for shelter (or would you stay in your car)? Explain your choice.
- Write a poem about tornados. Acrostic (the letters of the word written vertically) is probably the easiest but students can write a Haiku or a diamond poem too.
- Imagine you are making a movie about tornados. Explain how you would show the effects of a tornado without putting anyone in danger. Would you choose to build a model or draw a picture?
- Think about the last time you were in a thunderstorm. What memories do you have of it? Discuss how lightning makes you feel when you see it flash.

Science Extensions: Just a few ideas--

- Meteorology
- Atmosphere (could include ozone and the greenhouse effect)
- Naturally occurring phenomenon such as volcanoes and earthquakes.
- Design a bridge that could withstand an earthquake. Construct it out of craft (Popsicle) sticks. Test the bridge design by adding weights until it breaks. Conclude why the bridge that holds the most weight is the best.

Activity # 11

Twister in a Bottle

A tornado is the most violent type of storm there is. Its winds can whirl at speeds of more than 200 miles (320 kilometers) per hour and tear up trees by their roots, fling cars around like toys, and flatten buildings. Often tornados wind speeds are twice as fast as the winds in a hurricane! You can make a model of a tornado in a bottle to observe how its winds swirl.

What You Need:

1. Two plastic 2 liter soda bottles or two 20 ounce plastic soda bottles
2. Plastic tube connector
3. Food coloring (optional)
4. Water

What You Do:

1. Fill one of the bottles three-quarters full with water. Add a few drops of food coloring. (optional)
2. Screw one end of the plastic tube connector on to the bottle containing the water. Then turn the empty bottle upside down and screw it into the other end of the connector. **NOTE:** *Alternate directions if you do not have a plastic tube connector—Pull off a strip of duct tape about 10 cm (4 inches) long. Make sure the necks of the bottles are very dry. Put the empty bottle on top of the full one, neck-to-neck, and tape them together so that they stay together and they're straight. Now, wrap them with a long length of duct tape. The more neatly you wrap, the better it will work.*
3. Turn your tornado twister upside down, and give it a swirl. Watch the tornado form as the water passes from one bottle to the other.
4. Try it again—this time without giving it a twist.

What's Happening?

Gravity pulls the water down into the empty bottle. However, the empty one is not really empty. It's full of air. When the water swirls through the necks of the bottles, an open space forms in the middle. It's whirlpool. The air in the lower bottle can flow up through the open center of the whirlpool into the upper bottle. The spinning water holds a steady shape. Without the whirlpool to let the air go by, the water burbles its way through. The flow is not smooth and it's often much slower than the whirlpool's flow.

Tornados work the same way. When huge air masses move across the ground, they start to roll like a carpet. If one rolling air mass runs into another rising warm one, the rolling mass gets tipped on end and the rising warm air rushes up through the whirling middle.

Safety Rules

Source: U.S. Dept. of Commerce NOAA Publications

TORNADOES

DON'T TOUCH THE WINDOWS!

Opening a window, once thought to be a way to minimize damage by allowing inside and outside atmospheric pressures to equalize, is NOT recommended. If a tornado gets close enough for a pressure drop to occur, the strong tornado wind probably already will have caused significant damage and opening the wrong window can actually INCREASE damage.

IN A CAR OR MOBILE HOME, GET OUT AND SEEK SHELTER IN A BUILDING OR LIE FLAT IN A NEARBY DITCH OR RAVINE.

While chances of avoiding a tornado by driving away in a vehicle may be better in open country than metropolitan areas, vehicles (and mobile homes) are still dangerous because they can easily be lifted or rolled by high wind.

IN A HOME OR BUILDING, GET TO THE LOWEST LEVEL.

Storm cellars or well constructed basements offer the greatest protection. If neither is available, the lowest floor is the best alternative. In high-rise buildings, occupants should move as far down as possible and take shelter in interior, small rooms or stairwells. Most tornado injuries and deaths result from flying debris. Small rooms, such as closets or bathrooms in the center of a home, offer protection from flying objects. If time permits, seek shelter under a heavy basement bench, table or stairwell to protect yourself from falling debris, rather than being positioned in an exposed corner.

IN SCHOOLS, SEEK SHELTER IN AN INSIDE HALLWAY AWAY FROM CLASSROOM WINDOWS.

THUNDERSTORMS

A severe thunderstorm may contain winds of 92 km/hr (57 mph) or higher and hail about 2 cm (3/4") or more in diameter.

STAY INSIDE A HOME, LARGE BUILDING OR AN ALL METAL (not convertible) AUTOMOBILE.

DON'T USE THE TELEPHONE, EXCEPT FOR EMERGENCIES.

IF OUTSIDE, DON'T STAND UNDERNEATH A TALL, ISOLATED TREE OR TELEPHONE POLE.

Avoid projecting above the surrounding landscape. For example, don't stand on a hilltop. In a forest, seek shelter in a low area under a thick growth of small trees. In open areas, go to a lower place, such as a ravine or valley. Get off or away from open water and metal equipment such as tractors, motorcycles, bicycles

Activity # 12 (Page 2 of 2)

and golf carts. Put down golf clubs and take off golf shoes. Stay away from wire fences, clotheslines, metal pipes and rails.

LIGHTNING MAY STRIKE MILES FROM THE PARENT CLOUD

Precautions should be taken even though the thunderstorm is not directly overhead. If your hair stands on end and/or skin tingles, lightning may be about to strike. Drop to your knees, putting your hands on your knees. Do not run or lie flat on the ground.

PERSONS STRUCK BY LIGHTNING MAY RECEIVE A SEVERE SHOCK OR BURN, BUT THEY CARRY NO ELECTRICAL CHARGE AND CAN BE HANDLED.

The *American Red Cross* says if a victim is not breathing, immediately begin mouth-to-mouth resuscitation, once every 5 seconds to adults and once every 3 seconds to children, until medical help arrives. If both pulse and breathing are absent, cardiopulmonary resuscitation (a combination of mouth to mouth resuscitation and external cardiac compression) should be administered only by persons with proper training. A *Red Cross First Aid Course* provides excellent instruction.

HURRICANES

Hurricanes are tropical cyclones in which winds reach constant speeds of 120 km/hr (74 mph) or more.

BE ALERT to information about hurricanes. A HURRICANE WATCH means “possible” hurricane within 24 to 36 hours. A HURRICANE WARNING means a hurricane *is expected* within 24 hours or less.

What to do if a hurricane is eminent:

MOOR BOATS securely or move them to safe shelter.

SECURE OUTDOOR OBJECTS or bring them indoors.

PROTECT WINDOWS WITH BOARDS, SHUTTERS, OR TAPE.

FUEL YOUR CAR.

DRAW WATER to last several days.

BRING PETS INDOORS.

LEAVE LOW-LYING OR COASTAL AREAS AND OFF-SHORE ISLANDS, AS WELL AS MOBILE HOMES FOR MORE SUBSTANTIAL SHELTER. The “storm surge”, a dome of water that comes across the coast, is the most dangerous part of the storm. Tides can be 5 to 25 feet above normal. Nine out of ten hurricane deaths occur in the storm surge.

LISTEN CAREFULLY TO LOCAL OFFICIALS ON TELEVISION, RADIO OR NOAA WEATHER RADIO AND EVACUATE IF TOLD TO DO SO.

Finally, beware of the deceptively calm eye of the hurricane. These clear skies and light winds are bordered by winds and rain of maximum force that blow from the opposite direction. Don't venture out.

Understanding Clouds and Fog

From USAToday.com

Clouds are usually the most obvious feature of the sky. They both reflect weather patterns and play a role in what the weather does. In addition to their obvious role as sources of precipitation, clouds also can affect the temperatures of the places below them. Clouds not only block incoming sunlight during the day, which cools the air, but they can also block outgoing radiation from the Earth, which can warm temperatures. Many unanswered questions about Earth's climate revolve around the roles of clouds. Clouds also create some patterns of light in the sky such as halos.

Fog forms in the same way as clouds. In fact, fog is a cloud that is on the ground, or with its bottom very near the ground.

Locations of clouds

- Low-level clouds: (generally found below 6,500 feet, or 2,000 meters) Low-level clouds are usually composed of liquid water droplets, but they can have snow and ice crystals in cold weather
- Mid-level clouds: (generally found between 6,500 and 23,000 feet, or 2,000 and 7,000 meters) Most mid-level clouds are composed of liquid water droplets during summer and a liquid droplet-ice crystal mix during winter. Mid-level cloud names are preceded by an "alto" prefix.
- High-level clouds: (generally found above 20,000 feet, or 6,000 meters) High-level clouds are composed of ice crystals and tend to be very thin and wispy. High-level cloud names are preceded by a "cirro" index

Names represent different kinds of clouds

The names of clouds usually indicate both the cloud's location in the sky, as noted above, and its type, as listed below. The listings below give several examples of cloud names.

- Stratus clouds are a uniform gray and usually cover most of the sky.

Activity #9 (Page 3 of 6)

- Cirrus clouds are thin and high in the sky.
- Cumulus clouds are lumpy and can stretch high into the sky.
- Thunderstorms are cumulus clouds, sometimes called "thunderheads."
- Mammatus clouds have pouches that hang down.

Stratus Clouds

Stratus clouds are uniform gray clouds that usually cover the entire sky. They can form when very weak, upward vertical air currents lift a thin layer of air high enough to initiate condensation. Stratus clouds also form when a layer of air is cooled from below to its dewpoint temperature and water vapor condenses into liquid droplets. Stratus clouds look like a layer of fog that never reaches the ground. In fact, fog that "lifts" off the ground forms a layer of low stratus clouds. Precipitation rarely falls from true stratus clouds since the upward vertical motion needed for precipitation is very weak, but light mist and drizzle can sometimes accompany stratus clouds.

Cirrus Clouds

Cirrus clouds are thin, wispy clouds that usually form above 18,000 feet. These clouds are blown by strong westerly winds aloft into streamers known as "mares' tails" Cirrus clouds generally move from west to east across the sky and usually "point" to fair weather. Cirrus clouds form when water vapor undergoes deposition and forms ice crystals. Cirrus clouds are thin because they form in the higher levels of the atmosphere where little water vapor is present.

Cumulus Clouds

Cumulus clouds form as water vapor condenses in strong, upward air currents above the earth's surface. These clouds usually have flat bases and lumpy tops. Cumulus clouds are usually very isolated with large areas of blue sky in between the clouds. Most cumulus clouds form below 6,000 feet and are relatively thin and associated with fair weather. However, when the atmosphere becomes unstable and very strong, upward air currents form,

Activity #9 (Page 4 of 6)

cumulus clouds can grow into cumulus congestus, or towering cumulus. If the atmosphere is unstable enough, cumulonimbus clouds, better known as thunderstorms, form. Cumulus congestus and cumulonimbus clouds can tower from below 6,000 feet to greater than 50,000 feet.

A look inside a thunderstorm

The key ingredient that defines a thunderstorm is lightning. Since lightning creates thunder, a storm with lightning is called a thunderstorm.

Thunderstorms come in all shapes and sizes with some cells only a few miles in diameter and some clusters of storms, known as mesoscale convective complexes, that span hundreds of miles across.

The true meaning of mammatus clouds

Mammatus clouds often form on the underside of cumulonimbus clouds, but are sometimes seen underneath other clouds as well. They can appear threatening, but the sinking air required to make these clouds actually indicates weakening of the storm associated with them. No matter how threatening, these spectacles of nature are actually a blessing in a quite impressive disguise.

Clearly Understanding Clouds

True or False

_____ 1. Clouds not only affect the precipitation, they also affect the temperature.

_____ 2. Fog is basically the same as a cloud.

_____ 3. Thunder can occur without lightning.

_____ 4. Cirro clouds are low level clouds.

_____ 5. Stratus clouds usually bring heavy rain.

_____ 6. Cumulus clouds usually mean good weather.

_____ 7. Mammatus clouds are one of the most threatening.

_____ 8. Thunderstorms can be hundreds of miles wide.

_____ 9. Low level clouds are composed of ice crystals.

10. What kind of clouds do you hope to see in the sky? Give at least two reasons why you picked your choice.

Clearly Understanding Clouds

Answer Sheet

True or False

 T 1. Clouds not only affect the precipitation, they also affect the temperature.

 T 2. Fog is basically the same as a cloud.

 F 3. Thunder can occur without lightning.

 F 4. Cirro clouds are low level clouds.

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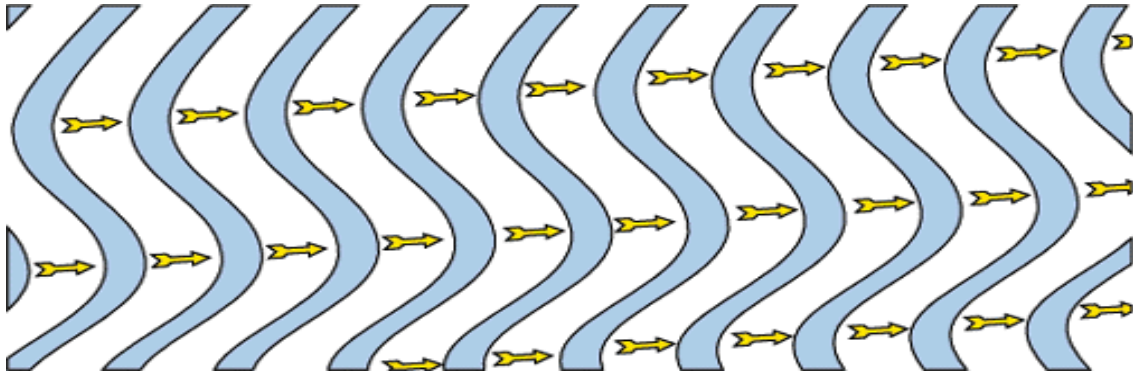
 F 9. Low level clouds are composed of ice crystals.

10. What kind of clouds do you hope to see in the sky? Give at least two reasons why you picked your choice. *Answers will vary but probably will deal with the kind of weather associated with them or with the beauty of the cloud structure.*

Activity #13

What is Thunder?

Question: What is thunder made out of?



Answer:

Thunder is not made out of a thing. Thunder is an event. Thunder is when a certain thing happens. If we could see thunder, it would probably look like the design above—sound waves getting pushed while pushing through the air.

Thunder is a huge, enormous push of sound waves. The push is from the heat of a tremendous electrical spark—the lightning. Thunder is the sound we hear from an explosion.

The air around the lightning gets very, very hot and expands really quickly. That's what an explosion really is - when something gets really big, really quickly.

To demonstrate what happens, do the following activity: Poppa's Got a Brand New Bag". (Activity # 14)

Activity # 14

Poppa's Got a Brand New Bag

Materials:

- Lunch size paper bag
- Air from your lungs

Procedure:

1. Hold the bag to your mouth and blow it up.
2. When the bag is full of air, close the end. (*Can you guess what comes next?*)
3. Pop the bag!

Maybe you've done this before to scare someone. However, you probably never thought about thunder when you were doing it before. So... think about thunder for a minute.

Explanation:

When you popped the bag, you gave the air inside a big squeeze. It rushed out the hole, pushing against the air outside the bag.

It was kind of a shoving match. The air inside the bag pushed against the air outside, which kept pushing air and pushing air—similar to a shock wave.

These shock waves pushed through the air until they got to your eardrum. That's exactly how thunder works, only thunder is a *lot bigger*.

Activity # 15

Magic Inflating Balloon

This activity can be demonstrated in the class and then repeated at home. It will help explain why air expands.

Materials:

- Balloon
- Glass soda bottle or other long neck bottle
- Water
- Saucepan and stove or microwave for heating the water

Procedure:

1. Stretch the mouth of the balloon over the mouth of the bottle. Place the bottle in the saucepan and slowly pour steaming hot water around the bottle - about 2 inches.
2. Sit back and watch what happens to the balloon.

Explanation: The heat energy you put into the air inside the bottle made the molecules of air move more quickly. In order to do that, they needed more room. So the air just expanded and took up more room. Thus the balloon filled up with air. Thunder is air getting real hot from a lightning bolt, and expanding so quickly that it explodes!

What thunder is not:

Thunder is not air collapsing back on a vacuum created by the lightning's spark. A lot of people think that. And they're wrong. Air expanding makes the sound, not air collapsing. And there is no vacuum when lightning strikes.

Activity # 16 (Page 1 of 2)

Oobleck : A MODEL FOR THE EARTH'S MANTLE

Various types of evidence suggest that the earth is not rigid at depths of 64 to 250 km. Large areas of the earth's surface can apparently move slowly up or down as loads are applied to them or are removed. The continents give the appearance of having changed their locations. Such occurrences are not consistent with the idea of a completely rigid material underlying the crust. Secondary waves or shear waves (S waves) pass through this zone as a result of an occurring earthquake. Shear waves twist and shave solid substances as they pass through. This can be illustrated by tying one end of a rope to a fence post and shaking the other end by holding the rope tense. S waves cannot pass through fluids.

Thus, the materials underlying the crust have some properties which are associated with solids and others which are associated with liquids. Materials with these characteristics are not common, but they do exist. In this investigation, you will prepare such a substance.

MATERIALS:

- Cornstarch
- Saucer or shallow dish
- Spoon
- Small pieces of metal, plastic, and wood
- Water
- Food coloring (optional)

PROCEDURE:

1. Place 4 ounces cornstarch in a dish or other container. Add 2 ounces of water a little at a time. Stir thoroughly after each addition of water. Continue adding water and stirring until the desired consistency is obtained. Add a drop of food coloring if desired. You have created Oobleck.
2. Describe the appearance of the Oobleck.
3. List at least three objects that are also similar in form to the Oobleck.

Activity # 16 (Page 2 of 2)

4. Remove a small amount of the Oobleck from the container. Break a small bit off and observe the freshly broken surface.
5. Describe the appearance of the freshly broken surface.
6. Wait 10 seconds and then describe the appearance of the broken surface.
7. In what ways does the paste resemble a liquid?
8. In what ways does the paste resemble a solid?
9. Pour the paste from one container to another in such a way that a long, continuous stream of paste is produced. If necessary add water or powdered cornstarch to your paste to bring it to the proper consistency. While the paste is being poured, tap the bottom of the stream sharply with one finger. Record your observations.
10. Can S waves pass through cornstarch paste? Explain why you think they can or cannot.

Activity # 17 (Page 1 of 3)

Mystery Powder

The following activity uses the book "Bartholomew and the Oobleck" by Dr. Seuss. The King of Didd loved to look into the sky. However, he was increasingly unhappy when he saw only rain, snow, fog, and sunshine. As a powerful king, he decided to change things so he could get more variety. Bizarre events soon unfold when Oobleck is introduced into the story.

Objective: The students will use process skills of investigation to determine which mystery powder forms Oobleck.

Materials:

- "Bartholomew and the Oobleck" by Dr. Suess
- 1 gallon bag (with zipper top) of flour marked as "mystery powder 1"
- 1 gallon bag of baking powder marked as "mystery powder 2"
- 1 gallon bag of powdered sugar marked as "mystery powder 3"
- 1 gallon bag of corn starch marked as "mystery powder 4"
- 1 gallon bag of salt marked as "mystery powder 5"
- 3 oz. plastic cups (5 for each group)
- 12 oz. plastic cups (5 for each group)
- Measuring cups and spoons
- Food coloring (optional)
- Popsicle sticks or plastic spoons for stirring
- Paper towels
- Water—a bucket is plenty if there is not a source in your room
- Sandwich size zipper bags

Before doing the activity:

- In advance prepare a small amount of Oobleck for each group. About 3 oz. of corn starch to 1.5 oz. water should be enough for the demonstration. Add green food coloring for effect.
- Have the five 1 gallon bags on a central table simply marked as mystery powders (1), (2), (3), (4), and (5).
- Have cups, bowls, towels, and measuring devices either at a central station or already at the individual tables. This will depend on your own personal management style and classroom setup.

Activity # 17 (Page 2 of 3)

- Preferably, the students will be grouped in tables of four. Use cooperative role assignments to help with the efficiency of distribution. Possible roles could be:
 - Runner - the person who gathers the materials and brings them back to the group.
 - Recorder - the person who records all experimental steps and measurements.
 - Reporter - the person who shares information and results with the rest of the class.
 - Supervisor - the person who assigns and runs the experimentation as well as keeping everyone in the group involved and interested.
- Read the Dr. Suess book *Bartholomew and the Oobleck* to the point in the book where it is the morning after the magicians have concocted Oobleck and have sent it up to the sky. Bartholomew is concerned as he sees tiny green flecks in the sky.
- Explain to the students that their job for the day is to determine which of the mystery powders the Oobleck powder is.

Procedure:

1. Review science experiment safety rules.
2. Have the groups examine the Oobleck.
3. Then have the groups obtain 3 oz. of each of the mystery powders.
4. Experiment with the mystery powders to decide which one is the "real Oobleck" by adding 1.5 oz. of water to each powder (2:1 powder to water ratio).

(Note: The baking powder will form a harmless chemical reaction "fizz" that produces CO₂ gas when water is added. Students should wear safety goggles and should not consume the "fizzing" mixture.)

5. Once the correct powder has been discovered, give each group a bag or box of corn starch and allow them to make and explore with Oobleck for a while. Food coloring can be added to the mixture if desired. (This would be a good opportunity to talk about mixing colors.)

Activity # 17 (Page 3 of 3)

6. Have the students clean up their work space. Distribute small baggies for students to take home their Oobleck. Explain to them that if it dries out, all they have to do is add water!!
7. Journal assignment—Have the students write about their experience with Oobleck.

All About Rainforests

from Enchantedlearning.com



What is a Rainforest?



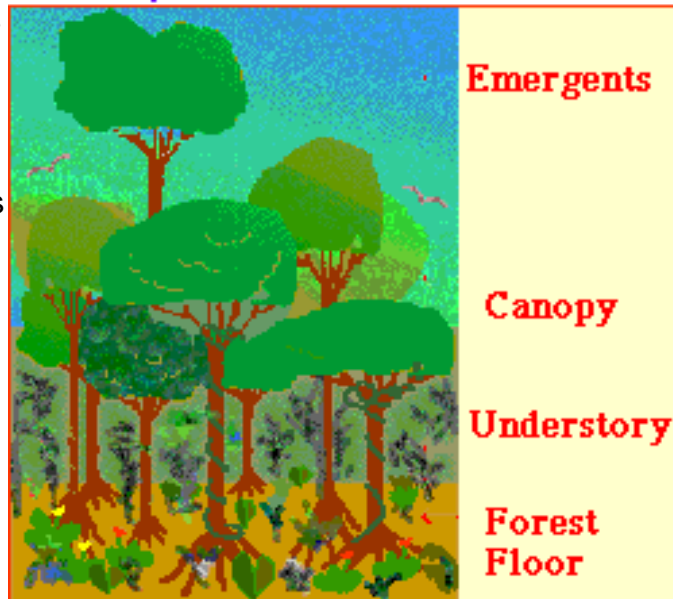
Rainforests are very dense, warm, wet forests. They are havens for millions of plants and animals. Rainforests are extremely important in the ecology of the Earth. The plants of the rainforest generate much of the Earth's oxygen. These plants are also very important to people in other ways; many are used in new drugs that fight disease and illness.

Strata of the Rainforest

Different animals and plants live in different parts of the rainforest. Scientists divide the rainforest into strata (zones) based on the living environment. Starting at the top, the strata are:

Tropical Rainforest Strata

- **EMERGENTS:** Giant trees that are much higher than the average canopy height. It houses many birds and insects.
- **CANOPY:** The upper parts of the trees. This leafy environment is full of life in a tropical rainforest and includes: insects, birds, reptiles, mammals, and more.
- **UNDERSTORY:** A dark, cool environment under the leaves but over the ground.
- **FOREST FLOOR:**



Teeming with animal life, especially insects. The largest animals in the rainforest generally live here.

Animals of the Rainforests

An incredible number of animals live in rainforests.. Millions of insects, reptiles, amphibians, birds, and mammals call them home. Insects are the most numerous animals in rainforests. Tropical rainforests have a greater diversity of plants and animals than temperate rainforests or any other biome.



Activity # 7 (Page 2 of 6)

In temperate rainforests, most of the animals are ground dwellers and there are fewer animals living in the forest canopy.

Where are Rainforests?

Tropical rainforests are found in a belt around the equator of the Earth. There are tropical rainforests across South America, Central America, Africa, Southeast Asia and Australia (and nearby islands).

Temperate rainforests are found along the Pacific coast of the USA and Canada (from northern California to Alaska), in New Zealand, Tasmania, Chile, Ireland, Scotland and Norway. They are less abundant than tropical rainforests.

Rainfall

It is almost always raining in a rainforest. Rainforests get over 80 inches (2 m) of rain each year. This is about 1 1/2 inches (3.8 cm) of rain each week.

The rain is more evenly distributed throughout the year in a tropical rainforest (even though there is a little seasonality). In a temperate rainforest, there are wet and dry seasons. During the "dry" season, coastal fog supplies abundant moisture to the forest.

Temperature

The temperature in a rainforest never freezes and never gets very hot. The range of temperature in a tropical rainforest is usually between 75° F and 80° F (24-27° C). Temperate rainforests rarely freeze or get over 80° F (27° C).

The Soil in a Rainforest

The soil of a tropical rainforest is only about 3-4 inches (7.8-10 cm) thick and is ancient. Thick clay lies underneath the soil. Once damaged, the soil of a tropical rainforest takes many years to recover.

Temperate rainforests have soil that is richer in nutrients, relatively young and less prone to damage.

The Importance of Rainforests

Tropical rainforests cover about 7% of the Earth's surface and are VERY important to the Earth's ecosystem. The rainforests recycle and clean water. Tropical rainforest trees and plants also remove carbon dioxide from the atmosphere and store it in their roots, stems, leaves, and branches. Rainforests affect the greenhouse effect, which traps heat inside the Earth's atmosphere.

Activity # 7 (Page 3 of 6)

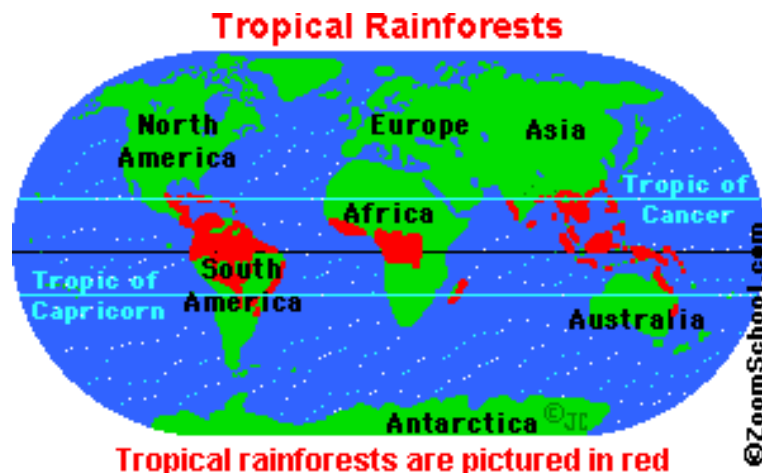
Some of the foods that were originally from rainforests around the world include cashew nuts, Brazil nuts, Macadamia nuts, bananas, plantains, pineapple, cucumber, cocoa (chocolate), coffee, tea, avocados, papaya, guava, mango, cassava (a starchy root), tapioca, yams, sweet potato, okra, cinnamon, vanilla, nutmeg, mace, ginger, cayenne pepper, cloves, oranges, grapefruit, lemons, limes, passion fruit, peanuts, rice, sugar cane, and coconuts (mostly from coastal areas).

People Living in Tropical Rainforests

There are many Indigenous groups of people who have live in the tropical rainforests. Many of these groups, like the Yanomamo tribe of the Amazon rainforests of Brazil and southern Venezuela, have lived in scattered villages in the rainforests for hundreds or thousands of years. These tribes get their food, clothing, and housing mainly from materials they obtain in the forests.

Forest people are mostly hunter-gatherers; they get their food by hunting for meat (and fishing for fish) and gathering edible plants, like starchy roots and fruit. Many also have small gardens in cleared areas of the forest. Since the soil in the rainforest is so poor, the garden areas must be moved after just a few years, and another part of the forest is cleared.

Most indigenous populations are declining. There are many reasons for this. Their primary problems are disease (like smallpox and measles, which were inadvertently introduced by Europeans) and governmental land seizure.



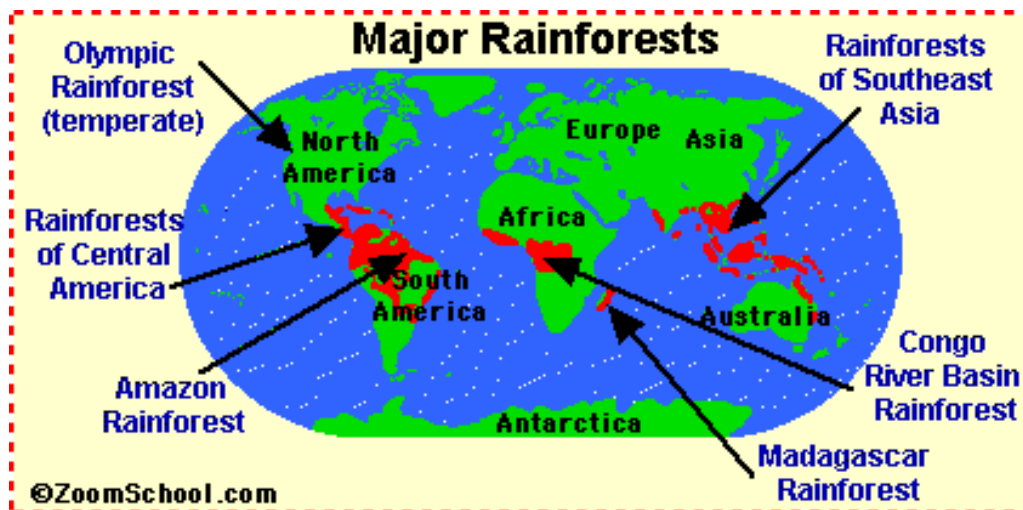
Where are tropical rainforests? Tropical rainforests are located in a band around the equator (Zero degrees latitude), mostly in the area between the

Activity # 7 (Page 4 of 6)

Tropic of Cancer (23.5° N latitude) and the Tropic of Capricorn (23.5° S latitude). This 3,000 mile (4800 km) wide band is called the "tropics."

The equator is an imaginary circle around the earth, halfway between the north and south poles. Temperatures at the equator are high. These high temperatures cause accelerated evaporation of water, which results in frequent rain in forested areas in the tropics.

There are rainforests in South and Central America, Africa, Oceania (the islands around Australia), and Asia. Tropical rainforests cover only about 7% of the Earth's surface.



The largest rainforests are in the Amazon River Basin (South America), the Congo River Basin (western Africa), and throughout much of southeast Asia. Smaller rainforests are located in Central America, Madagascar, Australia and nearby islands, India, and other locations in the tropics.

There are only two seasons in a tropical rainforest, the wet season and the dry season.

Temperate rainforests are found along the Pacific coast of the USA and Canada (from northern California to Alaska), in New Zealand, Tasmania, Chile, Ireland, Scotland and Norway. They cover less area than tropical rainforests.

The Olympic rain forest (located on the Olympic peninsula in the state of Washington, United States of America) is a temperate rain forest near the Pacific ocean.

Rain Forest Discussion Questions

- What makes a rain forest different than any other forest?
- Name several kinds of rain forests.
- What location are most rain forests found?
- What are the three main areas of rain forest?
- Why do you think the rain forest areas are shrinking?

Activity # 7 (Page 6 of 6)

Rainstick

Materials:

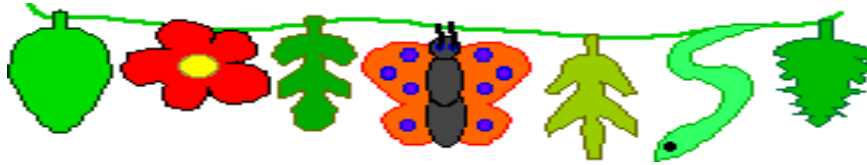
- Cardboard rolls - Wrapping Paper Rolls work best but you can also use paper towel rolls
- 1 $\frac{1}{2}$ inch nails
- Rice, dried Beans, or popcorn
- Clear packing tape
- Stuff for decorating

Procedure:

1. Cover the end of the cardboard roll with wax paper and then put a piece of clear packing tape on top of it. Poke in one and one half inch nails randomly all over the tube so that they go all the way into the tube but not out the other side. You'll need to use quite a few to get a good sound effect.
2. Then you put about a half a cup of rice or dried peas in the tube (you really need to experiment with the number of nails and amount of rice or peas to see what produces a good sound) and put wax paper and tape on the other end.
3. Let the students decorate the outside of the tube however they like. They can use paper, fabric, leaves, acorns, bark, etc. You can have the students decorate the tubes to fit a theme or just let them do their own thing.

Activity # 8

Rainforest Liana Vine



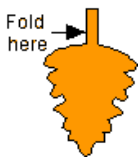
Make a rainforest liana vine to decorate a room. This simple-to-make string makes a great classroom or home decoration. It represents a rainforest vine full of leaves, flowers, butterflies, caterpillars, snakes, lizards, sloths, and other life. You can drape the colorful string around the classroom, from the ceiling, or over the windows.

Liana is a woody, climbing vine that grows on tree trunks in order to reach sunlight in the rainforest. Rattan, used for making wicker furniture, is made from liana vines.

Materials:

- Construction paper in many colors
- Crayons or markers
- Scissors
- Glue, tape, or staples

Procedure:



1. Draw a leaf on a piece of construction paper. Make sure to draw a thick stem on the top (your leaf will hang from this stem, which will be folded over).
2. Cut out the leaf. Draw the leaf veins if you wish. Fold the leaf's stem in half.
3. Attach the leaf to a long string using tape, glue, or staples. Make more leaves and attach them to the string.
4. Make flowers, butterflies, caterpillars, snakes, and other animals for the vine (if you're really adventurous, try iguanas or sloths.)
5. Draw details on your flowers and animals, and attach them to the string (using tape, glue, staples or pipe cleaners).
6. Hang your rainforest vine across the room for a colorful rainforest decoration.

Activity # 3

Cut-Up Poems

You can create brand new poems using a pair of scissors and a glue stick. Find an old magazine or color supplement and cut out several lines of text from different articles. Then stick them on to a clean sheet of paper. The beauty of this is that you have no idea what the poem will turn out like until it's finished. You might end up with something weird or funny. It may even turn out to make sense and sound quite serious. It will certainly be an interesting poem.

This is a good way to make up nonsense poems. This poem was made from USA Today on February 13, 2003.

Weather For the Week

Extremes make historic days
Fur flies
Dumped politicians
Throw a curve
Reveal hats off
Making a Splash
Pack an umbrella
and nice shoes
Set the tone
Talk, dial, listen
Add fuel
Don't hit rock bottom
Stars to play
Area water starved
Tantalizing tension

*Idea from Poetry Zone
Poem by Sarah Goldammer*

Safety in the Sun!

Be sure, if possible, that children avoid sunburn, as most long term sun damage is done before the age of 18 years. One or two bad sunburns before this age can cause skin cancer many years later. The damage may be done early and is cumulative, but may not be evident for 20 years or more. Also, burns that occur once or twice a year while on vacation are much worse than slow tanning. It's best to make the use of a sunscreen a habit at an early age.

No child 6 months old or younger should be exposed to direct sunlight for prolonged periods of time. The baby should have a hooded carriage or stroller, be wearing a hat and clothing. After 6 months of age sunscreen usage may be started, and should be used on a regular basis when the child is to be out of doors.

If possible, the following list should be adhered to:

- Avoid prolonged direct sun exposure during peak hours (10 AM - 3 PM)
- Use a sunscreen of at least an SPF 15 - it is also wise to wear protective clothing and a hat.
- Re-apply sunscreen after swimming.
- Try to make the application of sunscreen (SPF 15 or higher) a matter of the child's' daily routine.
- Set a good example by doing the same thing for you as children are more likely to learn what they see, not just what you tell them.
- Send sunscreen to camp with the child to be applied prior to exposure. If it is day camp, apply sunscreen before leaving for camp each day. Be sure it is re-applied after swimming

Information adapted from www.dermaesthetics.com

Activity # 18 (Page 2 of 3)

Facts about UV Rays and Sunburn

Ever since the Coppertone® girl showed off her tan lines in 1953, having a golden tan has been the "trendy" look for skin. For a number of years now researchers have educated the public and reinforced the statements that tans are unhealthy, and the sun can cause skin damage and even cancer. Still, the local pool is packed and the beaches are more for "catching some rays" than swimming or surfing. As the atmosphere above is damaged, the sun's ultraviolet rays become more dangerous each year.

Sunburns don't show immediately, and they are usually most painful within the first 6-48 hours after exposure. True, a sunburn will turn into a tan, but that is only because the skin has been severely damaged by the initial burn, and is working to protect against another sunburn.

First it's important to understand why it's possible to get a sunburn. When ultraviolet radiation is absorbed by your skin, melanin goes to the surface of your skin and acts as a natural sunscreen to shield your skin from further damage. Melanin gives your skin a "tan" color, and that color deepens with continued exposure. Sunburns occur when the exposure to the ultraviolet light exceeds the ability of the melanin to protect skin. People with pale skin don't consistently produce enough melanin to protect their skin, so they are more prone to sunburns. Each time you tan or burn, you damage your skin. Damage results in wrinkles, sun spots, and in some cases, the skin cancer: melanoma.

Teachers and parents should be familiar with the "It won't happen to me" attitude. Kids don't worry about things like cancer, because they don't believe it will ever affect them. If you can't sell the melanoma statistics, you might have better luck hitting where it hurts. The truth is, 70% of the damage done to one's skin happens before the age of 17, and each severe sunburn **doubles** the chance of skin cancer. Sunburns are painful, damaging, and especially not attractive to those who would have rather had that "bronzed look" anyway.

How do you keep from getting a sunburn? Obviously, the best thing to do is avoid the sun. The sun's rays are strongest between 10am and 3pm, so this is

Activity # 18 (Page 3 of 3)

the easiest time to get a sunburn. Plan outdoor activities for early morning or late afternoon, and always wear sunscreen with an SPF (sun protection factor) of at least 15. Coppertone developed the SPF system, and the government is expected to propose new labeling for sunscreens that will clarify what those SPF numbers really mean. Sunscreens with an SPF lower than 15 don't provide sufficient UV protection, because they don't block a high enough percentage of UV rays. Using an SPF of at least 25 is really your best bet, and will help ensure you don't burn.

A few healthy reminders:

- **Pale really is "in."** Really healthy skin is pale-with fewer wrinkles and a lower chance of skin cancer. While the models on the covers of the latest fashion magazines may *look* like they've been on the beach for days, a quick look at the inside cover will reveal the name of the sunless tanner they used to achieve the bronze glow. You'd be hard pressed to find a model that actually tans under UV rays.
- **Steven Spielberg is hip.** Sport a baseball cap with a big brim, sunglasses, a beard and big, baggy clothes. Spielberg is a great sun protection role model. There are many clothing brands emerging that offer clothing with an SPF to help protect skin just like sunscreen does.
- **Watch the UV index.** The ultraviolet index is printed in most major newspapers. Take heed and stay inside when the UV index is high. Anything over 7 on the index is serious; 10 means big-time sun burns.
- **Make 15 your lucky number.** Skip the lotions that only provide partial sun protection. SPF 15 is the first stop for real skin protection. Waterproof sun screen will wear off and wipe off on a towel. Reapply protection frequently, especially when at the beach. Lips are skin too. Use a lip balm with an SPF of 15 or greater every day.
- **Remember snow and sandburn.** Reflected sunlight bounces ultraviolet rays right back at you, creating dangerous "sun surround." Snow reflects 80-90 percent of the sun's harmful rays; sand reflects between 15 and 20 percent.

Adapted from teachnet.com