

High in the Clouds

Standard II

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

Objective 3

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

Intended Learning Outcomes

Generating evidence: Using the processes of scientific investigation (i.e. framing questions, designing investigations, conducting investigations, collecting data, drawing conclusions)

Communicating Science: Communicating effectively using science language and reasoning.

Knowing in Science: Understanding the nature of science.

Content Connections: Math, Language Arts

Background Information

Students should know that rain and snow come from the sky and/or clouds. Teachers should know the different types of clouds: fair weather clouds (cumulus), rain clouds (cirrus and stratus), and storm (cumulonimbus) and what weather comes from each cloud. Cumulus means "heap" in Latin; they are dark gray, low-level clouds forming at 2,000-4,000 feet and are mostly made of water droplets. Stratus means "layer" in Latin; they are also low-level clouds forming up to 6,500 feet and are a low, lumpy layer that can produce weak precipitation. Cirrus means "curl" in Latin; they are high-level clouds forming above 20,000 feet and are primarily formed of ice crystals. Cumulonimbus means "curl" in Latin; they are mid-level clouds forming at 1,600-39,000 feet, and are large, vertical storm clouds. The tops of the cumulonimbus clouds can reach 39,000 feet. They can develop into large, powerful thunderstorms.

Research Basis

Margulies, N., (2001). Visual Thinking: Symbolic Ways Of Representing Ideas: A Need For More Symbols. *New Horizons for Learning*, Sept/Oct/Nov/Dec 2001, Vol. VII, No 4

As Aristotle said, "The soul never thinks without a mental image." Our culture is one that communicates with icons and symbols. Symbols and icons allow you to see parts of the whole. Making ideas visible with both images and words is our process of thinking.

Margulies, N., (2001). *Mindscaping: A Learning and Thinking Skill for All Students*. *New Horizons for Learning*, Sept/Oct/Nov/Dec 2001, Vol. VII, No 4

Mindscaping is a way to make visual maps. It is a tool used to record ideas and understand what you hear. Mindscaping is a form

of note taking that engages the student to make sense of what is being taught without writing long sentences and having a wandering mind.

Invitation to Learn

Have pictures of the different type of clouds—fair weather, rain and storm (cumulus, cirrus, stratus, and cumulonimbus)—hanging randomly around the room. Ask students to sit under the cloud that matches their mood right then. Ask how students decided where to sit. This is a good pre-assessment to see how much the students know about the different cloud types.

Instructional Procedures for Clouds

Materials

- The Man Who Named the Clouds*
- Cloud Key Wheel*
- Cloud Finder*
- Paper plates
- Metal fasteners
- Cloud Droplet Estimation*
- Large Cotton Balls
- Blue construction paper
- Glue
- Pictures of clouds
- It Looked Like Spilt Milk*



1. Pull out the pictures of storm clouds, rain clouds, and fair weather clouds. Ask students to share what they know about one or all clouds. Read parts of the book *The Man Who Named the Clouds*, by Julie Hannah and John Holub, to your students.
2. Ask students to write down the names of the different cloud types in their science journals. Have them take notes as you discuss the characteristics of each cloud type. A good way to organize the cloud notes in their science journals is to have your students make a T-chart. Students can write information about the clouds on one side of the T-chart and on the other side students can draw a picture of the clouds next to the written information. Fair weather clouds (Cumulus) are made of tiny water droplets, tall, puffy, and bright white in color with sun shining on it. Rain clouds (Cirrus)—water collects to form the curves, no clear shape, looks like curls of hair or string, high in the sky, most water droplets turn to tiny ice drops. Weak rain clouds (Stratus)—Lumpy layered clouds, holds little water moisture, and produces weak rain storms. Thunder storm clouds (Cumulonimbus)—can't hold all water droplets, tall, puffy and gray. Rain, hail, and snow fall when heavy in the cloud. (Use the background information to describe each cloud type.)
3. Cloud in a Bottle—Fill a two-liter bottle one-third full of warm water and put on the cap. As the water evaporates, it adds water vapor to the bottle. Shake the bottle to get rid of the condensation on the sides. Remove the cap, light a match and drop it in the bottle and quickly put the cap back on. Slowly squeeze the bottle, then release. (The squeezing represents the warming in the atmosphere and the releasing represents the

cooling.) A cloud will appear as you release, and disappear as you squeeze. Explanation: Water vapor can be made to condense into the form of small cloud droplets. By adding particles such as smoke, it enhances the process of water condensation; by squeezing the bottle, it causes the air pressure to drop.

4. Ask your students if they have ever seen their breath when they are outside. Tell them that when they blow out the warm air from their mouth they make a cloud. A cloud is when warm air hits cold air and forms water droplets.
5. Make a cloud wheel for students to identify the different clouds in the sky. Each student will receive the *Cloud Key Wheel* and *Cloud Finder* handouts. Have students cut out the *Cloud Key Wheel* and two window parts of the wheel. Next, have the students cut out the *Cloud Finder* circle. Have students glue the *Cloud Finder* circle to a paper plate for stability. Use a fastener to fasten the two circles together with the *Cloud Finder* on the bottom and the *Cloud Key Wheel* on the top with a fastener. Invite students to go outside and search for different cloud types. Ask them to identify a cloud type in the sky and find it on their Cloud Wheel. Come back into the classroom and have students share what cloud types they found. Are they all the same? This is a great way to enhance discussion on clouds and check for understanding.
6. Pass out one piece of blue construction paper and one large cotton ball to each student. Students are to make the different cloud types on their blue paper using *only* one cotton ball and glue. Have students place the clouds in order from high-level clouds to surface clouds. Students may use their science journals to help them with this task.
7. After reading *It Looked Like Spilt Milk*, by Charles G. Shaw, students will create a page in a class book. Materials: blue construction paper, white paint and white crayons. Have students fold their paper horizontally, (hamburger), then open their papers to lay flat. The teacher will put some paint in the middle of the students' paper. The student will fold their paper and smooth out the paint. The student will open their paper and describe what they see. Have your students get out their science journals and write down what they see. Let the paint dry over night. The next day, students will write 'It looks like...' on their paper. The teacher will bind the book and display it in class.

- After each student has made a cloud for the class book, have your students make a cloud poem about their cloud they made. Cloud Poems: title-name of cloud, first line—three adjectives that describe the cloud, second line—three verbs related to the cloud, third line—a phrase that tells about the cloud, fourth line—name of the cloud or synonym.

Instructional Procedures

Materials

- Now I Know What Makes the Weather*
- A Drop Around the World*
- White packing peanuts
- Clear boondoggle
- Beads
- Clear glass jar
- Hot plate
- Pie tin
- Ice cubes
- Science journal
- Water
- Thunder Cake*
- Cloud Droplet Estimation Page*



- Read *Now I Know What Makes the Weather*, by Janet Palazzo, to your class.
- Ask where weather comes from. List the weather words and pictures on the board. This will create a discussion about clouds and the weather that comes from clouds.
- Before starting the Weather Demonstration, talk about how weather is always changing, and by doing the weather demonstration you will show students how clouds pick up and drop moisture (water). For the Weather Demonstration; ask for two volunteers. Student One will act as the cloud and Student Two will be the rain. Lay packing peanuts on the ground and tell Student Two to pick up the peanuts and start to fill Student One's cupped hands with them. Student One waits until his/her hands are over flowing with packing peanuts before he/she separates his/her hands and lets the packing peanuts fall to the ground. Student Two starts all over by picking up the packing peanuts and placing them in Student One's hands again.
- A Recipe for Weather Activity: Have your students pull out their science journals. Tell your students that they will be making a recipe of weather for a nice day, rainy day, or stormy day. Brainstorm some possible ingredients on the board to get students thinking. Some possible ingredients for fair day weather are: blue skies, puffy white clouds, song birds, people outside, sunshine, light breeze and warmer air. Stormy days: dark skies, colder air, dark clouds, heavy wind (2 cups wind), little to no people outside, sound of distant thunder. Rainy days: dark skies, gray clouds, little wind (1 cup wind), cool air, fewer people outside, sound of distant thunder. Go over the format of a recipe. All ingredients are at the top with the desired amounts. Instructions/directions are down below, written in complete sentences.
- Make weather bracelets. Start with white for clouds, blue for rain, clear for wind, yellow for sun, red for temperature, gold for thunder/lightning. Each bead represents a type of weather.

6. Read the book, *A Drop Around the World*, by Barbara Shaw McKinney, to your class.
7. Make rain in a jar. Heat up water to a boil using a hot plate (check with building coordinator to okay the use of a hot plate in classroom). Place boiling water in a clear glass jar. Take a metal pie tin and place on top of the opening of the jar. Fill the pie tin with ice cubes. Watch what happens as the ice cubes begin to melt and cool down the jar of hot water. Explain that rain is formed when warm air from Earth (our jar) meets cold air from the sky (our ice cube in the pie tin).
8. What makes a drop of rain? Have students tell you what a raindrop is made of. Lead them into a discussion that tells them that every raindrop is made of water droplets. Ask your students to estimate how many water droplets are in one drop of rain. Hand out the *Cloud Droplet Estimation Page* to your students. Have your students estimate how many droplets are in the drop of rain on their page. Next, have your students circle groups of 5 or 10 droplets in the clouds. How many were really there? Did your students make a good estimation? Tell students that a drop of rain has as many as one million droplets in it!
9. Read *Thunder Cake*, by Patricia Palocco to your class. Talk about the different sounds you hear when it starts to storm.
10. Make the rain song by making the sounds of rain, thunder and lightening. Divide your class into five groups. Group one starts by rubbing their hands together—the sound of thunder rolling in. Group two gently blows air out of their mouth—the sound of wind. Group three snaps their fingers—the sound of rain falling to the ground. Group four stomps their feet—the sound of thunder. Lastly, group five claps their hands loudly—the sound of lightning.

Assessment Suggestions

- Ask students to share what type of weather words are represented by each color bead on their weather bracelet.
- Was each cloud represented in the cotton ball picture? Were they in the correct height order?
- Read through the students “Life as a Raindrop” stories.
- Have a big “Cooking Pot” for weather in your classroom. In the pot, place ingredients that are and are not for a good day or

rainy day. Ask students to sort out the “real” ingredients from the “fake” ingredients.

Curriculum Extensions/Adaptations/ Integration

- Students can write a life story of a raindrop or snowflake as it goes through its life.
- Make rain in class to show students how rain forms. See instructions above.
- Make a class graph of each student’s favorite cloud. Have each student draw his or her favorite cloud on a 3 x 3 inch square. Graph the class results.
- Are all raindrops the same? Wait for a rainy day to try this observation. Go outside when it is raining. Hold a piece of black construction paper out in the rain to gather raindrops. Bring the paper inside and look at the spots made by the rain. What do you see?
- Make water cycle bracelets. Start with a light blue bead for rain, add a green bead for grass (accumulation on the ground), add a yellow bead for the sun to start the process for evaporation, add a clear bead to finish evaporation, and finally add a white bead for clouds (accumulation of water vapors). Provide instructions in a step-by-step process to clarify order and delivery of content.
- Read *The Snowflake: A Water Cycle Story*, by Neil Waldman, or *A Drop Around the World*, by Barbara Shaw McKinney, to your class. Explain to students that the water cycle is a never-ending cycle. Teach them the simple water cycle song and hand movements to remember all stages in the water cycle: Evaporation (hands go up), accumulation (fingers form a cloud above their head), precipitation (fingers ‘rain’ down)—when it rains, sung to La Cucaracha. Have some students shake the hand maracas as the song is sung.
- Make a class recipe book out of the recipes your students made for weather.

Family Connections

- Encourage your student to watch the weather forecast on television with you at night.

- Listen to the weather in the morning together and let your student choose appropriate clothes to wear to school.

Additional Resources

Books

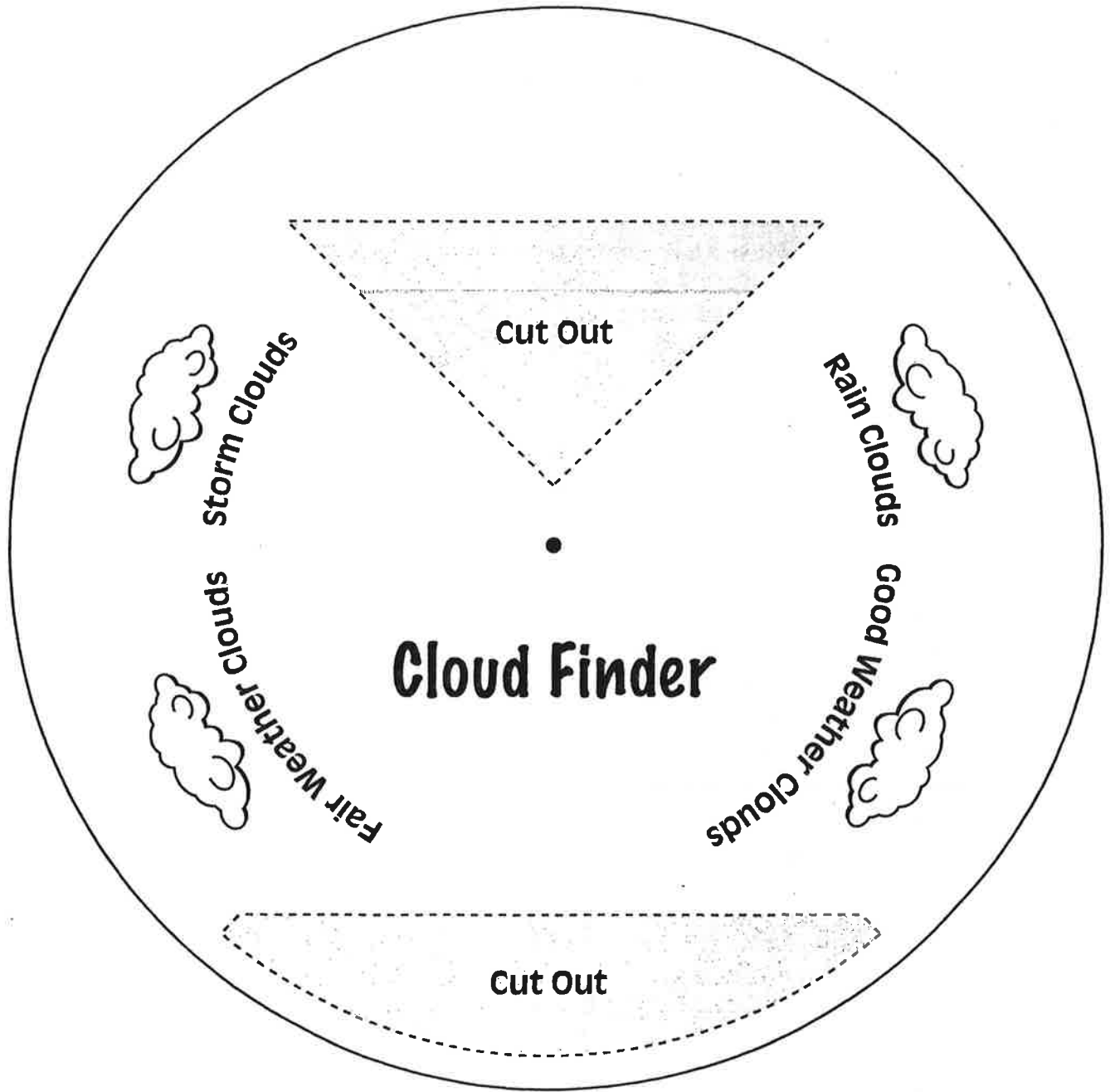
Now I Know What Makes the Weather, by Janet Palazzo; ISBN 0-89375-655-5
The Kids' Book of Clouds and Sky, by Frank Staub; ISBN 1-4027-2806-9
The Man Who Named the Clouds, by Julie Hannah and John Holub; ISBN-13: 978-0-8075-4974-2
A Drop Around the World, by Barbara Shaw McKinney; ISBN 1-883220-72-6
The Snowflake: A Water Cycle Story, by Neil Waldman; ISBN 0-7613-2347-3
Clouds, by Marion Dane Bauer; ISBN 0-689-85441-2
Rain, by Marion Dane Bauer; ISBN 0-689-85439-0
The Cloud Book, by Tomie dePaola; ISBN-10: 0823405311
The Rain Came Down, by David Shannon; ISBN 13: 9780439050210
It Looked Like Spilt Milk, by Charles G. Shaw; ISBN 0-06-443159-2
Wacky Weather, by John Malam and Steve Fricker; ISBN 0689811896
Puddles, by Jonathan London; ISBN 9780140561753
The Water Cycle, by Helen Frost; ISBN 0-7368-0409-9
Clouds, by, Ted O'Hare; ISBN 1-58952-570-1
Down Comes the Rain, by Franklyn M. Branley; ISBN 0-613-04877-6
Cloudy With a Chance of Meatball, by Judi Barrett; ISBN 0-590-30384-8
Thunder Cake, by Patricia Palocco; ISBN 0-698-11581-3

Web sites

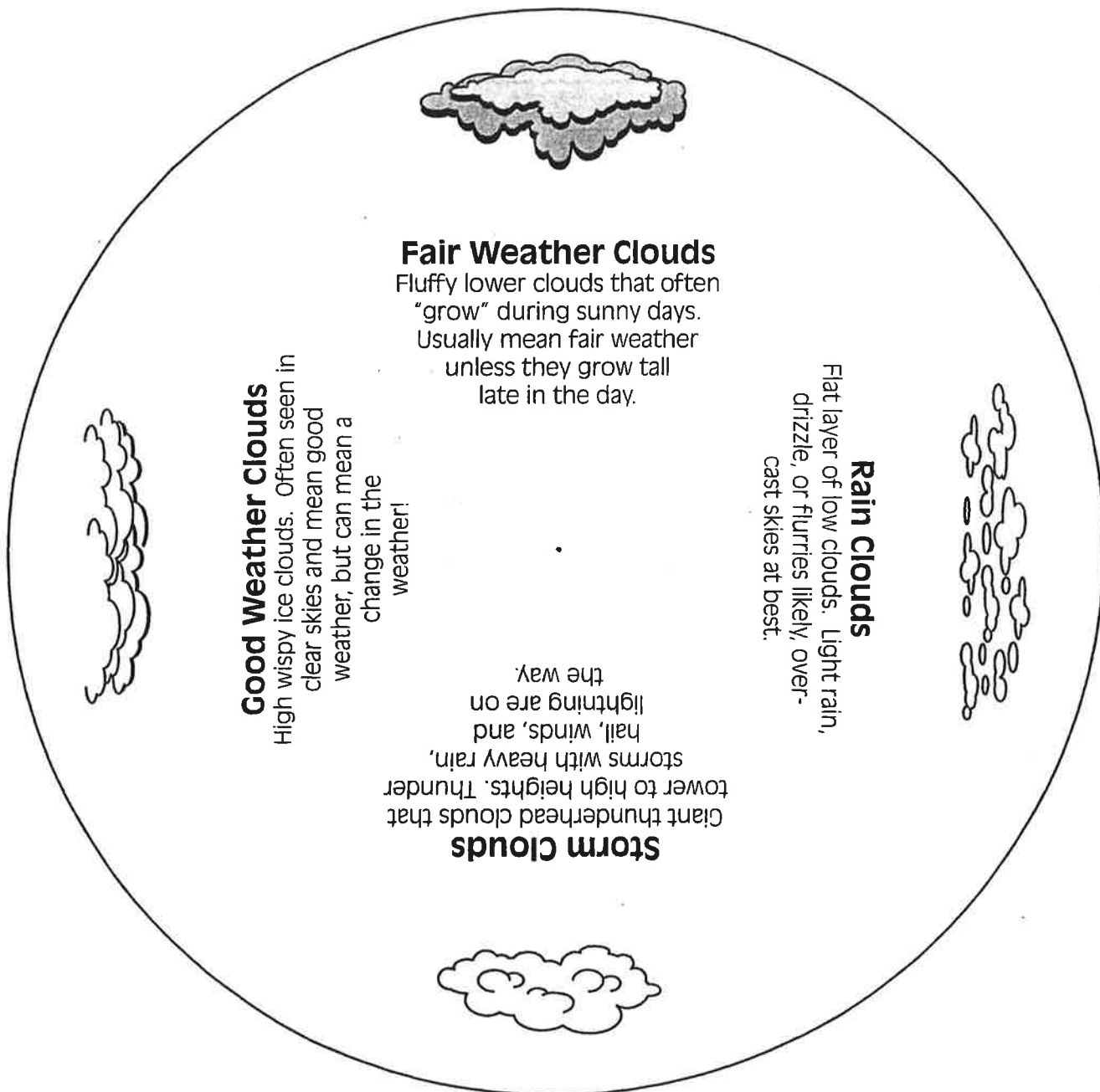
www.scholastic.com/weather
<http://teacher.scholastic.com/activities/wwatch/>
[http://ww2010.atams.uiuc.edu/\(Gh\)/guides/mtr/cld/cldtyp/home.rxml](http://ww2010.atams.uiuc.edu/(Gh)/guides/mtr/cld/cldtyp/home.rxml)
<http://www.weatherwizkids.com/cloud.htm>
<http://vortex.plymouth.edu/clouds.html/>
<http://www.wildwildweather.com/clouds.htm>
<http://www.teachingheart.net/weather.htm>
<http://www.geocities.com/jbaker2404/weather.html>
<http://sln.fi.edu/tfi/units/energy/dixie.html>
www.energyquest.ca.gov/projects/thermometer.html

Cloud Key

Cut out the wheel. Cut out the two shaded areas inside the wheel. This is the top wheel of your Cloud Key.



Cloud Key



2nd 2-3 2.9

Name _____

Drop Estimation Page

1. How many droplets are inside this rain drop?

My estimate _____

2. Circle groups of 10 droplets. Count by tens.

There are _____ groups of 10 in this rain drop.

3. How many droplets are inside this rain drop?

My count _____

