

Come Rain or Shine



An Earth and Space Science Unit

Based on the NAD SMART Curriculum

By: Sherina Phillips



Introduction

The study of weather encompasses a branch of science called Meteorology.

This unit is planned with the students in grades K to Grade 4 in mind. It is levelled as Easy, Medium, and Advanced in order to meet the different learning needs of all your students across the different grades. Additionally, there are different techniques built in to meet the needs of students with differing learning styles.

We are going to float through the clouds to uncover the hidden beauties that many people, especially those living in the city, do not get to witness on a daily basis.

Welcome to a study on the weather. I hope you will use it to help your students see the presence and beauty of God in and around them.

Come fly away with us as we soar through the clouds!

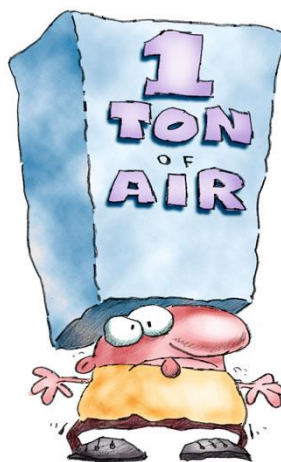
Sherina Phillips





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NAD SMART Correlation

Grades 1 to 4

S.M.A.R.T. Cycle Chart

L – Lower Grade Cycle

U – Upper Grade Cycle

One grade classroom – Teach same cycle yearly	Grade 1 – Cycle 1L Grade 2 – Cycle 2L Grade 3 – Cycle 3L Grade 4 – Cycle 4L		Grade 5 – Cycle 1U Grade 6 – Cycle 2U Grade 7 – Cycle 3U Grade 8 – Cycle 4U	
Two grade classroom – Rotate cycle for two years	Grades 1 & 2 Cycles 1L & 2L	Grades 3 & 4 Cycles 3L & 4L	Grades 5 & 6 Cycles 1U & 2U	Grades 7 & 8 Cycles 3U & 4U
Four grade classrooms – Rotate cycles for four years	Grades 1 – 4 Cycles 1L – 4L		Grades 5 – 8 Cycles 1U – 4U	

Yearly Scheduling Chart

Grade	One Grade	2009 – 2016	Two Grades	2009	2010	2011	2012	Four Grades	2009	2010	2011	2012
				2013	2014	2015	2016		2013	2014	2015	2016
1		1L		1L	2L	1L	2L		3L	4L	1L	2L
2		2L		1L	2L	1L	2L		3L	4L	1L	2L
3		3L		3L	4L	3L	4L		3L	4L	1L	2L
4		4L		3L	4L	3L	4L		3L	4L	1L	2L
5		1U		1U	2U	1U	2U		3U	4U	1U	2U
6		2U		1U	2U	1U	2U		3U	4U	1U	2U
7		3U		3U	4U	3U	4U		3U	4U	1U	2U
8		4U		3U	4U	3U	4U		3U	4U	1U	2U

Years listed above indicate the ending year of each school year, e.g., the 2008-2009 school year is listed as 2009. For your convenience, the S.M.A.R.T. 4-year rotation is the same as Bible 1-4.



SCIENCE CURRICULUM MAP: GRADES 1 – 4

	Grade 1 Lower	Grade 2 Lower	Grade 3 Lower	Grade 4 Lower
1 st Qtr.	<i>Living Things</i> • Characteristics • Classification <i>Animals</i> • Fish • Birds • Reptiles/Amphibians • Mammals <i>Ecology</i> • Environmental Issues • Natural Resources • Careers and Service	<i>Human Body</i> • Organization • Sense Organs • Teeth • Skeletal/Muscular System • Respiratory/Circulatory • Immune System • Digestive/Excretory System <i>Careers and Service</i>	<i>Cells</i> <i>Animals</i> • Growth/Development/Behavior • Organisms • Invertebrates/Worms • Insects/Arthropods • Arachnids <i>Careers and Service</i>	<i>Plants</i> • Classification • Structure/Function/Importance • Growth/Life Cycle • Photosynthesis • Reproduction <i>Ecology</i> • General Information/Food Chain • Communities/Population <i>Careers and Service</i>
2 nd Qtr.	<i>Mental/Emotional Health</i> • Decision Making • Self-Concept • Emotions • Stress <i>Family/Social Health</i> • Family Structure • Communication <i>Careers and Service</i>	<i>Nutrition</i> • Nutrients • Food Pyramids • Dietary Guidelines <i>Education</i> <i>Safety/First Aid</i> <i>Public Safety</i> <i>Recreational Safety</i> <i>Careers and Service</i>	<i>Drugs</i> • Decision Making • Effects • Medicines <i>Health Principles</i> <i>Biblical Principles</i> <i>Natural Laws</i> <i>Careers and Service</i>	<i>Consumer Health</i> • Health Care • Preventative/Curative <i>Community Health</i> • Educational Resources <i>Communicable Diseases/Immune System</i> <i>Disease Transmission</i> <i>Careers and Service</i>
3 rd Qtr.	<i>Heat</i> <i>Energy/Waves</i> <i>Sound</i> <i>Light</i> <i>Career and Service</i>	<i>Magnetism</i> <i>Electricity</i> • General Information • Static Electricity • Current Energy <i>Career and Service</i>	<i>Force</i> <i>Friction/Gravity/Mass/Weight</i> <i>Motion</i> <i>Career and Service</i>	<i>Chemistry</i> • Matter • Atomic Structure • Mixtures/Compounds <i>Basic Energy</i> <i>Simple & Compound Machines</i> <i>Careers and Service</i>
4 th Qtr.	<i>Meteorology</i> • General Information • Weather Elements • Seasons • Climate • Atmosphere • Water Cycle <i>Career and Service</i>	<i>Geology</i> • Earth's Features • Genesis Flood • Earthquakes/Volcanoes • Minerals/Rocks • Erosion • Soil Pollution <i>Career and Service</i>	<i>Origin of the Universe</i> <i>Astronomy</i> • History • Space Exploration <i>Solar System</i> • General Information • Sun/Stars • Moon • Asteroids, Meteorites, & Comets <i>The Universe</i> • Constellations <i>Careers and Service</i>	<i>Creation & Evolution</i> <i>Geology</i> • Fossils • Dinosaurs <i>Ecology</i> • Natural Resources • Environmental Issues <i>Careers and Service</i>



STRAND 4: EARTH AND SPACE SCIENCE

SCOPE AND SEQUENCE K-8

4B Changes in Earth and Sky	K	1	2	3	4	5	6	7	8
Changing Surface									
• Earthquakes and Volcanoes			*		*		*		
• Plate Tectonics			*		*		*		
• Weathering and Erosion			*		*		*		
Earth's Air and Water									
• Atmosphere	*	*	*	*		*			
✚ Structure	*	*	*	*		*			
✚ Water Cycle	*	*	*	*		*			
• Climate	*	*	*	*		*			*
• Oceanography	*	*	*			*			
✚ Currents, Tides, and Waves						*			
✚ Marine Environments				*	*	*			
✚ Resources				*	*	*			
• Seasons	*	*	*	*	*	*			
• Weather	*	*	*	*	*	*			
Geologic Time									
• Creation							*		*
• Flood/Ice Age							*		*
• Fossils	*	*	*	*	*		*		*
✚ Dinosaurs	*	*	*	*	*		*		*
• Geologic Column									*



Come Rain or Shine: *General Meteorology*

NAD Strand 4: Earth and Space Science

Essential Learning Elements

1. Define meteorology, and describe the instruments used to study weather.

Learning Points

- Explain the basic weather symbols.
- Explain how satellite images (radar maps) are used in weather prediction.
- Understand how each instrument functions and assists in weather prediction: thermometer, barometer, wind vane, and anemometer.





Come Rain or Shine: *Weather Elements*

NAD Strand 4: Earth and Space Science

Essential Learning Elements

1. Identify elements of weather.

Learning Points

- Describe air pressure.
- Explain the effect of air pressure on weather.
- Explain changes in air temperatures.
- Explain the cause of wind.





Come Rain or Shine: *Climate*

NAD Strand 4: Earth and Space Science

Essential Learning Elements

1. Explain factors that affect climate.
2. Identify factors that affect climate.
3. Distinguish between weather and climate.

Learning Points

- Explain how mountains affect climate.
- Explain how oceans and large bodies of water affect climate.
- Explain how plains affect climate.
- Explain the difference between short-range and long-range weather report.





Come Rain or Shine: *Atmosphere*

NAD Strand 4: Earth and Space Science

Essential Learning Elements

1. Describe Earth's atmosphere.

Learning Points

- Explain what causes precipitation.
- Understand that clouds are composed of water droplets.
- Identify different types of clouds.
- Recognize the importance of clouds in weather.
- Identify evidence and show examples of changes in the earth's atmosphere.





Come Rain or Shine: *Water Cycle*

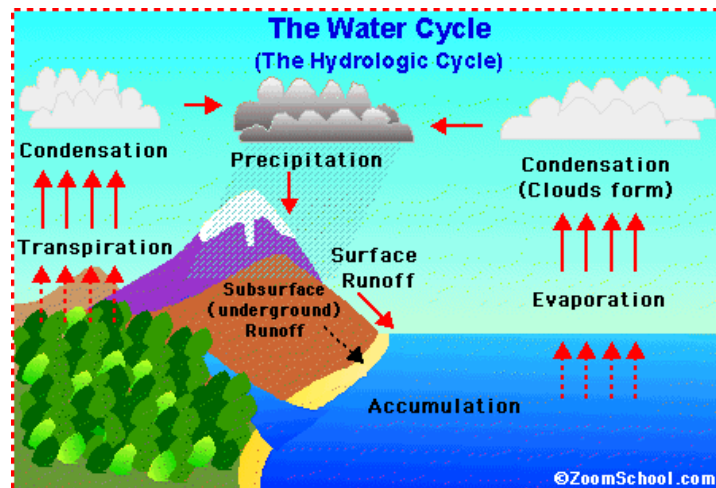
NAD Strand 4: Earth and Space Science

Essential Learning Elements

1. Describe the water cycle.
2. Describe how clouds form.

Learning Points

- Describe “water cycle.”
- Describe “cloud formation.”
- Explain the importance of the water cycle in the environment.

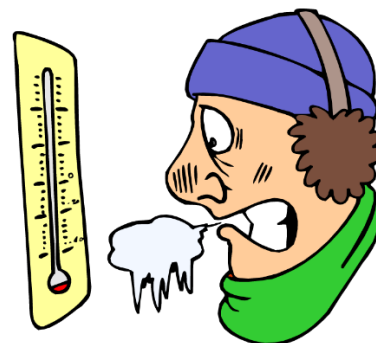




Lesson 1: Weather Symbols

Key Learning Elements Covered

- *Easy:*
 - Students will explain the basic weather symbols.
- *Medium/Advanced:*
 - Students will recognize and use weather map symbols to predict weather.



Materials Needed

All Worksheets listed under this section can be found at the end of the lesson.

- *Weather Systems Sheet*
- *Warm and Cold Fronts Sheet*
- *Chilly Weather Sheet*
- *Warm Weather Sheet*
- *Weather Symbols #1 Sheet*
- *Weather Symbols #2 Sheet*
- *Weather Worksheets*
- *Weather PowerPoint*
- *Projector*

Introduction

Ecclesiastes 11:4, Amplified Bible, says, “He who observes the wind [and waits for all conditions to be favorable] will not sow, and he who regards the clouds will not reap.” Clearly the concept of people monitoring the weather dates back to Bible times. Men and women looked to the skies so that they would know when it was a good time to plant their crops. Today, we have become sophisticated in our weather watching but the fact still remains that we plan our day-to-day activities around the weather. Like the Bible characters of old, we have found ways to relate to the weather as well. We are focusing today on the different symbols that weather reporters use to relay the different types of weather to us.

Procedure

- Begin by going through the *Weather PowerPoint* with the students.
- Easy:
 - Discuss the different types of weather.
 - Have students explain how they feel during the different seasons.
 - Introduce the concept of a weather front.



- Cold fronts happen when there is a temperature drop.
- Warm fronts happen when it gets hot.
- Have students share the type of clothes they wear and the activities they participate in during both a cold and a warm front.

- Medium/Advanced:

Pressure

- Point out the symbols for high and low pressure that would be found on weather maps.
- Explain that high and low pressure refers to the pressure of the air. Make reference to how students can feel their ears pop when they go in an airplane, up a mountain, or in a swimming pool.
- Divide the class into groups of 4.
- Give each student the *Weather System* sheet.
- Have students observe the different pressure systems.
- Ask students to observe the maps and state what type of weather is associated with high and low pressure.
 - Maps with low pressure systems have rainy and cloudy weather.
 - Maps with high pressure systems have sunny and clear weather.

Fronts

- Give students the *Warm and Cold Fronts* sheet and have them identify the different symbols for each.
- Discuss ways you can easily remember the weather associated with the different types of weather fronts (for example, a cold front looks like icicles and a warm front looks like melting icicles).
- Ask students to observe the map and explain the type of weather associated with both a cold and a warm front.
 - Cold front maps have colder temperatures to the left of the front.
 - Warm front maps have warmer temperatures to the left of the front.
- Have students draw the symbol representing “Cold Front” and “Warm Front.”

Evaluation

Easy

Have students complete the “*Chilly Weather Worksheet*”.

Medium/Advanced:

Have students use the Internet to find a weather map showing a cold front and one showing a warm front.



Homework

Easy

Have students complete the “Warm Weather Worksheet”

Medium:

Use the *Weather Map Symbols #1* sheet to record the weather in your community for the next week. Draw a smiley face to show how you feel each day with the different type of weather.



Advanced:

Use the *Weather Map Symbols #2* sheet to record the weather in your community for the next two weeks. Turn it into a small booklet and write a sentence or two explaining how the weather made you feel each day.

Cross-Curriculum Links

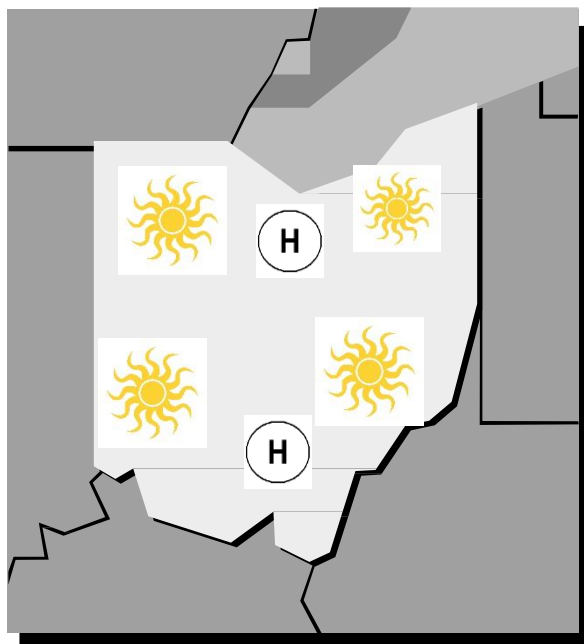
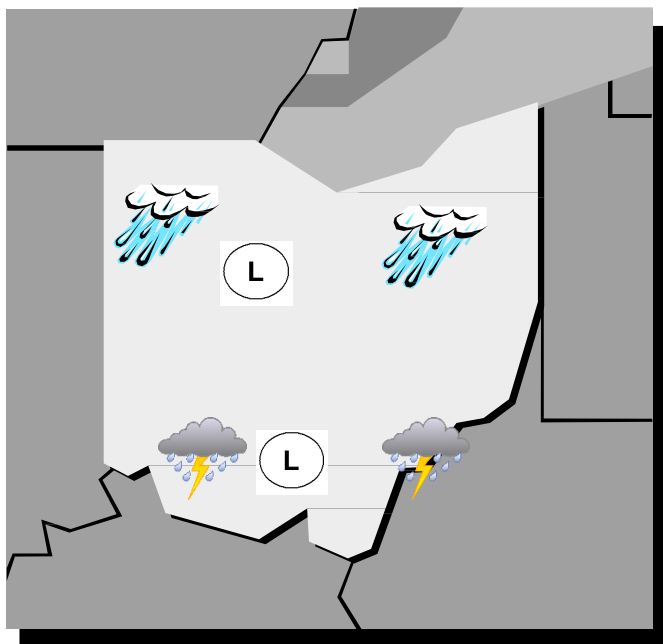
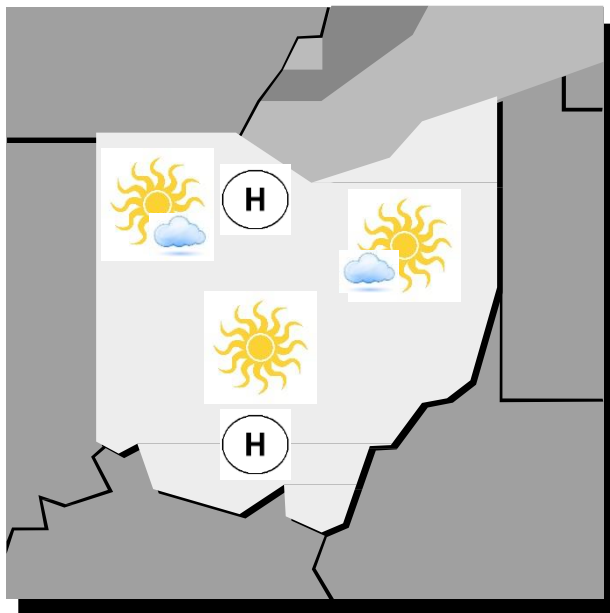
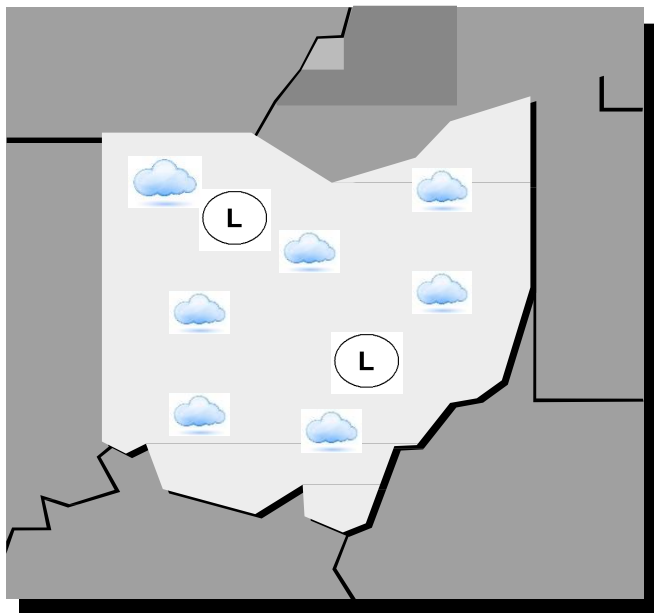
Art

Students will create drawings explaining to a friend what a cold front looks like and what a warm front looks like. They will need to use pictures of people and items to describe the different types of weather.



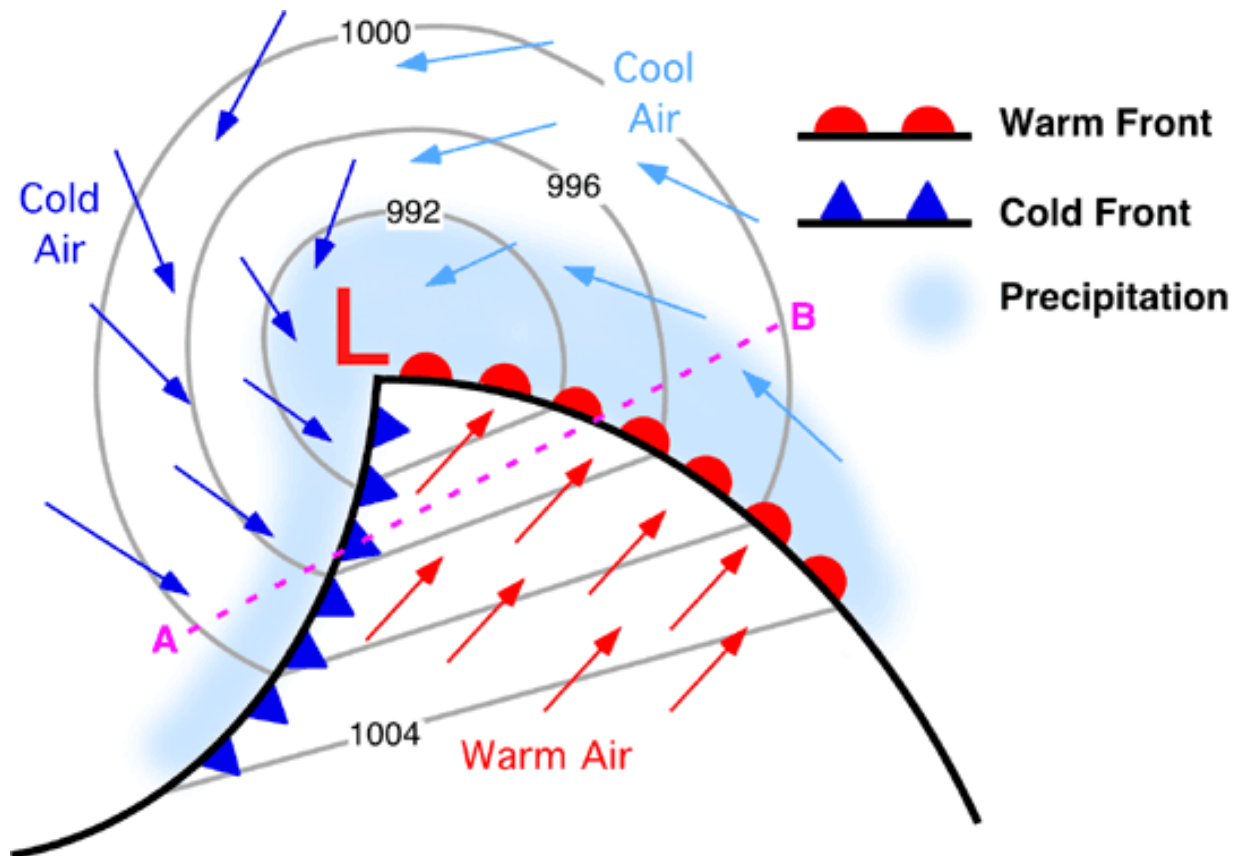


Weather Systems





Warm and Cold Fronts

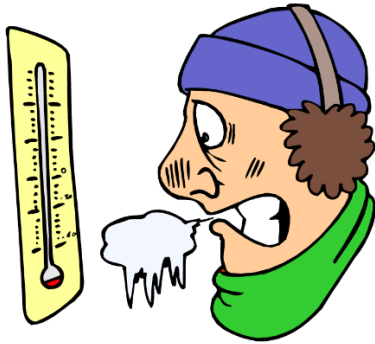


<http://www.ecn.ac.uk/images/OCCLUSION11.GIF>



Chilly Weather Worksheet

Circle all the pictures that are part of a Cold Front (cold weather).





Warm Weather Worksheet

Circle all the pictures that are part of a Warm Front (warm/hot weather).





Weather Map Symbols #1



Sunny



Rainy



Snowy

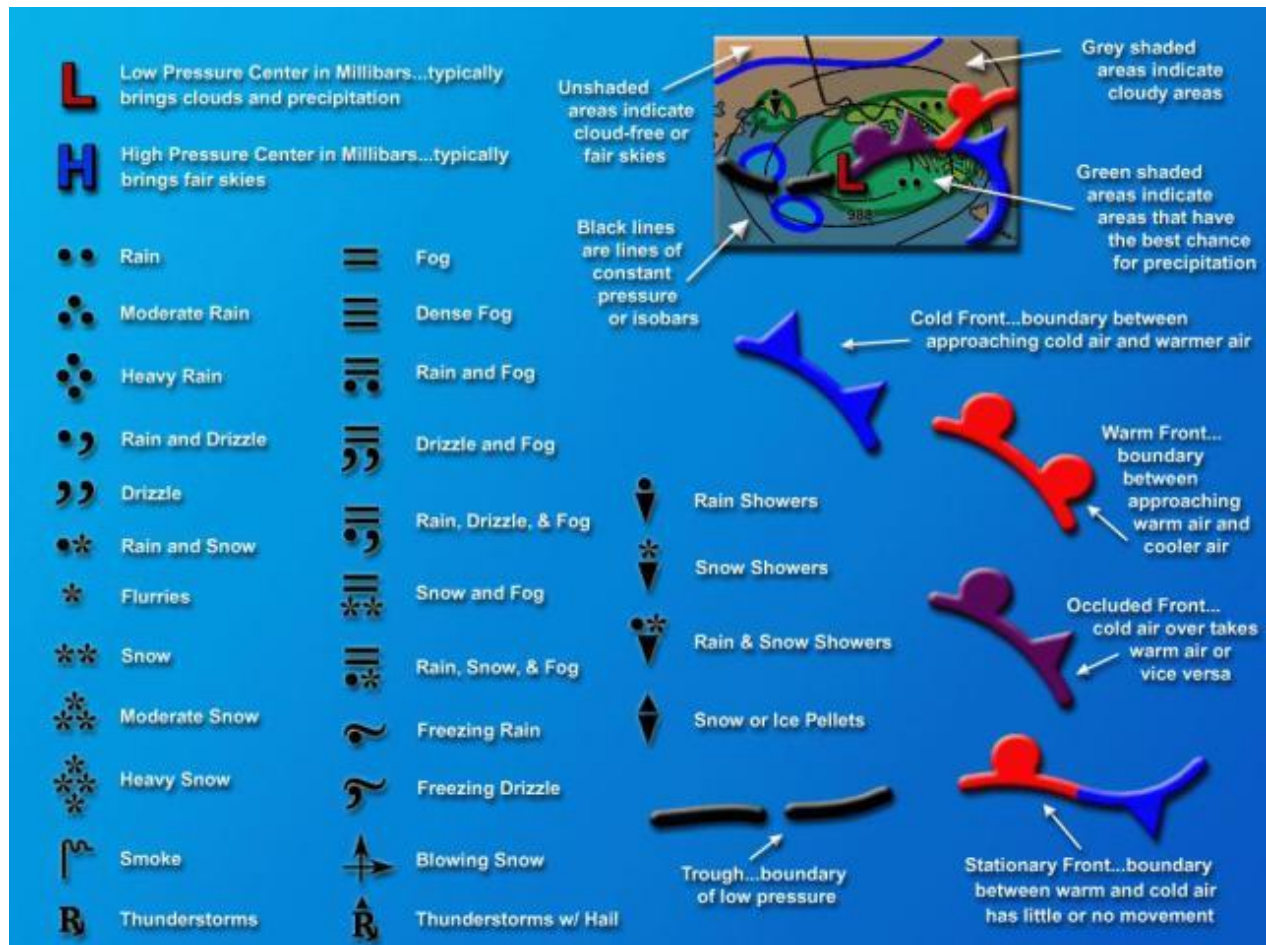


Cloudy



Weather Map Symbols #2

Summary of the different weather symbols.





Lesson 2: Air Pressure

Key Learning Elements Covered

- *Easy*
 - Students will describe air pressure.
- *Medium/Advanced:*
 - Students will explain the effect of air pressure on weather.
 - Students will explain changes in air temperature.
- *Advanced*
 - Students will describe the different arrangement of air molecules in high and low air pressure masses.

Materials Needed

All Worksheets listed under this section can be found at the end of the lesson.

- *Pressure Dot Sheet*
- *Build a Weather Frog Sheet*
- *Build A Barometer Sheet*
- *My Barometer Readings Sheet*
- *Creating a Podcast* audio file (available on Teacher Bulletin website)
- 4 paper grocery bags or shoe boxes
- Styrofoam packing peanuts
- Balloons
- Wooden blocks
- Sand or gravel
- Multi-colored stick-on dots
- White paper
- Markers
- Aneroid barometer
- 1 soup can per student
- Non bending straws
- Rubber bands
- Silicon glue/adhesive



Introduction

When we speak of air pressure, we are referring to the weight of air. Cold, dry air weighs the most. You can know what the current air pressure is by using a barometer; it tells meteorologists about the type of



weather that is coming. Unlike cold and dry air, air that is warm and damp weighs much less. When air pressure drops, it usually indicates to meteorologists that bad weather is coming soon. Meteorologists use many different instruments when predicting weather, many of which are made to measure barometric pressure. Barometers are important for forecasting weather. In the Amplified Bible, Job 28:25 mentions the pressure that God put in the air, “When He gave to the wind weight *or* pressure and allotted the waters by measure.”

Procedure

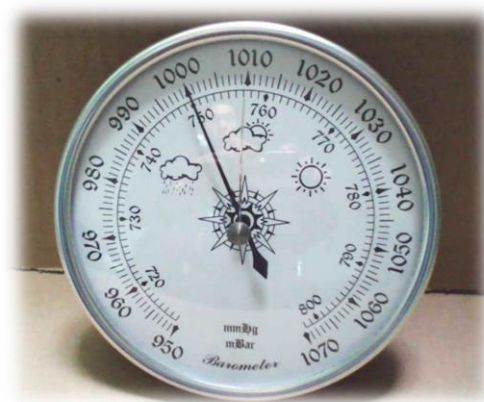
- Discuss what the term air pressure means.
- Discuss and explain how a barometer works.

Part I

- Fill and label four separate shoe boxes as follows:
 - A. several inches of Styrofoam packing material
 - B. several inches of sand/gravel
 - C. 8-10 partially blown up balloons
 - D. 8-10 wooden blocks-stacked neatly
- Seal the tops shut.
- Try to make boxes A and B appear to be the same and C and D appear to be the same.
- Label them with the correct letter and set them on a table/floor in front of the children.
- Ask the students to figure out how they are different without picking up or touching the boxes.
- After several suggestions, let the children pick up the boxes and discover that two are heavy and two are light. Discuss what could make the boxes heavy and light.
- Have students open the boxes and look at the contents. Try to discover why the heavy objects are heavier than the light ones. Size of the object should not be a factor because the bigger objects are actually lighter than the heavier ones--the balloons and the peanuts are larger in size but lighter in weight than the sand and the blocks.
- Students should see that the light weight objects have larger spaces between themselves and that the heavy items have smaller spaces between themselves. The lighter items do not fit as well together as well as the heavy items.

Part II

- Relate these findings to air masses. Heavy air masses have pieces that are close together with more pieces in the mass. Light air masses have pieces that are farther apart and fewer in number.
- Have the students practice this information by pretending to be air masses. A heavy air mass would have many children close together, while a light air mass would have fewer children spread further apart.
- Put the children into an enclosed circle on the floor and tell them they are a heavy mass of air. Have them close their eyes while imagining the following scenario: “*The sun comes out and*





warms them up. They start to feel _____ (hot, sticky). Do they want to stick close to each other? (NO!) They should start to move apart. They should spread out all around the room. Now they are no longer a heavy air mass, they are a _____ (light) air mass because they are all spread out and have lots of space between them. Now the sun goes away and they begin to get _____ (cooler). Do they want to stay spread out and freeze? (NO!) They want to move close together to warm each other up. They should move back to the circle. Now they are no longer a light mass but a _____ (heavy) mass.”

- After this exercise, the students should figure out that heavy air masses have cooler temperatures and that light air masses have warmer temperatures and that lots of sun can change a heavy mass into a light mass and vice versa.

Part III

- Refer students back to the shoe boxes.
- Point out that the boxes were hard to tell apart until they picked them up and felt the difference. Make the point that scientists cannot tell the pressure of air without measuring it with a barometer.
- Have a classroom barometer in class and explain to students how it works. Keep track of the air pressure for 2 weeks.
- Compare the weather that occurs 12-24 hours after the barometer readings are done. You should see a pattern of lower barometer readings equaling stormy or wet weather and higher barometer readings equaling sunny, nicer weather. If the barometer does not change, the weather should not change much either. Therefore, the barometer can really tell you what the weather is going to do the next day.

Evaluation

Easy/Medium

Students will complete the activity on the *Pressure Dot* sheet in class.

Advanced

Students will work in pairs using the *Build a Weather Frog* sheet to build a barometer in class.

Homework

Medium/Advanced

Students will use the *Build Your Own Barometer* sheet to construct their own personal barometer and record the air pressure at their house for a week.





Cross-Curriculum Links

Language Arts

Write a letter to your friend telling them about the barometer you made. Describe to him or her how it works and why a barometer is useful in predicting the weather.

Computer

Listen to the Podcast called *Creating a Podcast*. Document your Barometer building and the results via a podcast and share it with the class.





Pressure Dot

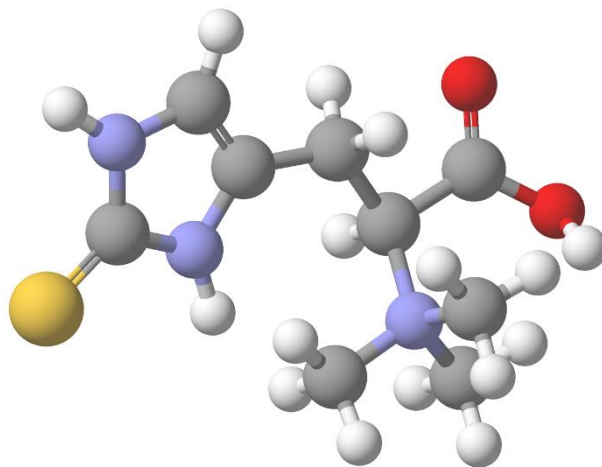
Students will make a model to show the differences between air particles in high and low air pressure masses.

Materials

- multi-colored stick on dots
- white paper
- markers

Instructions:

1. Give each student one paper labeled “High pressure/Heavy air,” one paper labeled “Low Pressure/Light Air,” and a variety of stick on dots.
2. Review:
 - a. Heavy air has many particles and they are close together.
 - b. Light air has fewer particles and they are farther apart.
3. Have students complete their models by sticking dots on their pieces of paper.





Build a Weather Frog

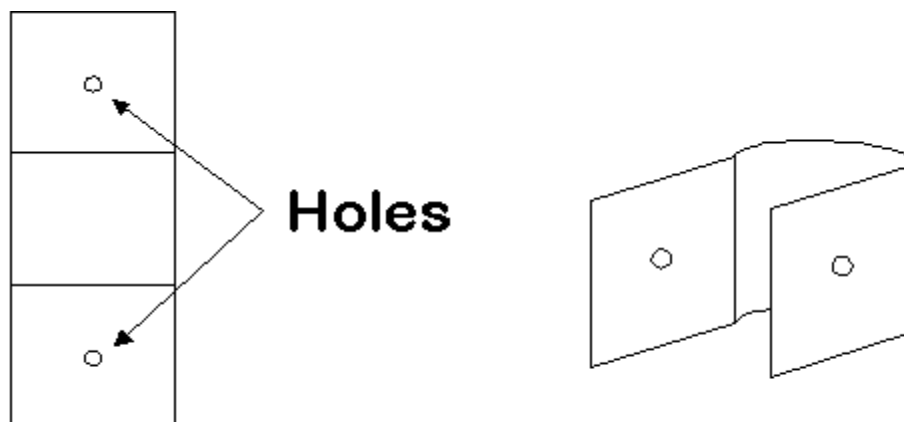
This little frog will “hop” up and down the ladder to tell the weather just like tree frogs in the jungle! It works on the same principle that a barometer does.

Materials:

- 2 1/2 inch long strip of thin copper metal, 1/2 inch wide
- 2 inch sewing needle
- thread
- cardboard disc, 1 1/4 inch diameter
- 1/4 inch glass bead
- fine wire that will support the weight of the paper frog
- cardboard ladder
- 4 inch tall glass jar with straight sides (no slants)
- Mylar foil circle, large enough to cover the top of the jar and overlap to be secured with a rubber band and glue
- silicon glue

Instructions:

1. Bore holes in the copper strip and bend it into a u-shape:



a) Thin Metal strip b) After bending

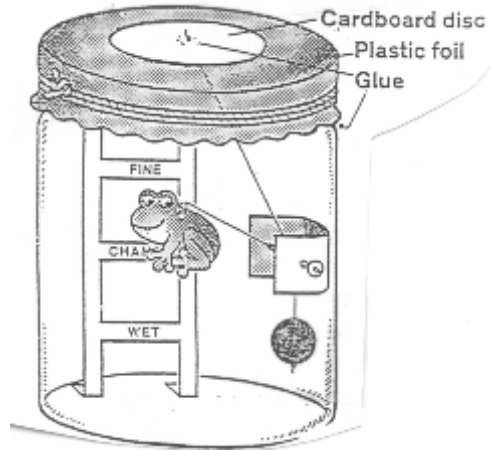
2. Make the frog from green paper and the ladder from cardboard.
3. Insert the needle into the holes of the copper strip. It should turn freely. Put tiny dots of silicon glue on the ends of the needle so it cannot slip out of the holes.
4. Attach the frog to one end of the fine wire and wrap the other end around the needle several times.





5. Glue the copper strip to the middle of the side of the jar. Glue the ladder to the bottom and the top side of the jar so it looks like the frog is sitting on the ladder.

6. Attach the bead to one end of the thread and wind the thread around the needle several times. Push the thread through the center of the Mylar circle and the cardboard circle.



7. Secure the Mylar to the top of the jar with glue and rubber bands to make an air tight seal. Pull the thread tight to make the frog sit closest to what the weather is for the day. Knot the thread and seal the thread hole in the Mylar and cardboard with a tiny amount of glue.

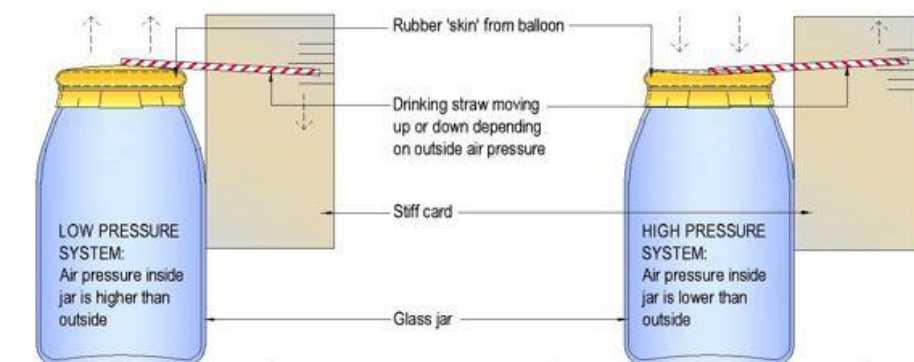
8. When the air pressure is greater, it will push down on the cardboard/foil and the frog will “climb up” the ladder. When the air pressure is less, it will release the foil and the frog will “climb down” the ladder.



Build a Barometer

Materials:

- Non-bending straw
- Large balloon
- Soup can, label Removed
- Rubber bands
- Cardboard strip
- Silicon glue
- Markers
- Scissors



What to do:

1. Cut a circle from the balloon that is large enough to stretch over the top of the soup can.
2. Stretch the balloon over the can and secure it with rubber bands.
3. Glue one end of the straw to the center of the top of the balloon.
4. Set the jar next to the wall where the temperature does not change a lot. Hang the cardboard on the wall so the straw almost touches the center of the cardboard.
5. Draw a line with the marker where the straw is.
6. Make a mark about 1 inch above the straw and label it “HIGH”. Make a mark about 1 inch below the straw and label it “LOW”.
7. Watch the straw for the next few days. The balloon will move it up or down as the air pressure changes. When the pressure goes up, the straw will go higher; when the pressure gets lower, the straw will dip lower.
8. Higher air pressure indicates fair weather and low air pressure indicates cloudy, wet weather.



My Barometer Readings

Record your barometer readings in the table below. Place an X in the box to show if the pressure was high or low on each day. You need to start on Sunday.

	Date	High Pressure	Low Pressure
Sunday			
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			





Lesson 3: Atmosphere

This lesson is completed entirely via WebQuest. Access the WebQuest file associated with this lesson entitled *The Atmosphere* and follow the instructions on screen.

This topic is covered at the Advanced level. Students will work in pairs for this assignment and by the end of the WebQuest, the students will have covered the information listed in the objectives below.

Key Learning Elements Covered

- *Easy:*
 - Students will observe how clouds form.
- *Medium/Advanced:*
 - Students will explain what causes precipitation.
 - Students will understand that clouds are composed of water droplets.
 - Students will identify different types of clouds.
 - Students will recognize the importance of clouds in weather.
 - Students will identify evidence and show examples of changes in the earth's atmosphere.



Materials Needed

- Computer with internet access
- *The Atmosphere* WebQuest
- *Garden of Eden* Coloring Sheet
- *WebQuesting in Lesson 2 (Teacher Video)*
- *WebQuesting in Lesson 2 (Student Video)*
- Cotton Balls

Introduction

Genesis 1:1 says “In the beginning God created the Heavens and the Earth.” Furthering this thought, we are also taught that when God returns he will be coming through Orion’s belt. Heaven is not a place on Earth as many songs are written to say. We are not making Heaven on Earth as songwriters say. Heaven is a place located far away above the clouds – in the atmosphere we could say. The atmosphere has always been important. From the beginning of time, God separated the sky from the waters beneath. The fact that we will one day go to live with God in Heaven and He will return to us through a specific constellation is cause enough for us to want to study the atmosphere and the sky.



Procedure

- Watch the *WebQuesting in Lesson 2 (Teacher Video)* to familiarize yourself with this WebQuest.
- Have students watch *WebQuesting in Lesson 2 (Student Video)* to familiarize themselves with this WebQuest.

Easy/Medium:

- Read the creation story from a Children's Bible.
- Discuss the placement of Heaven and make note that it is in the atmosphere above the clouds.
- Distribute cotton balls and *Garden of Eden Coloring Sheet*. Have students color the picture of Adam and Even in the Garden of Eden and then add fluffy cotton balls to make clouds.

Advanced

- Take students to the computer lab or cluster them around classroom computers. If there are not enough computers in the room, project images onto a screen so that everyone can view it.
- Have students load the WebQuest on to the computer and guide them through the different sections of the site.
- Ensure that students understand what is being required of them in the WebQuest.

Evaluation

Students will present their findings from the WebQuest via a research paper and oral presentation. All the instructions and rubrics for scoring are outlined online for clarity.

Homework

Homework for this lesson is ongoing during the time the WebQuest is being done, as the project will take more than one day for research and presentation.

Cross-Curriculum Links

Language Arts

Students will read, analyze, and synthesize data online in order to put together a comprehensive report on information found.

Art

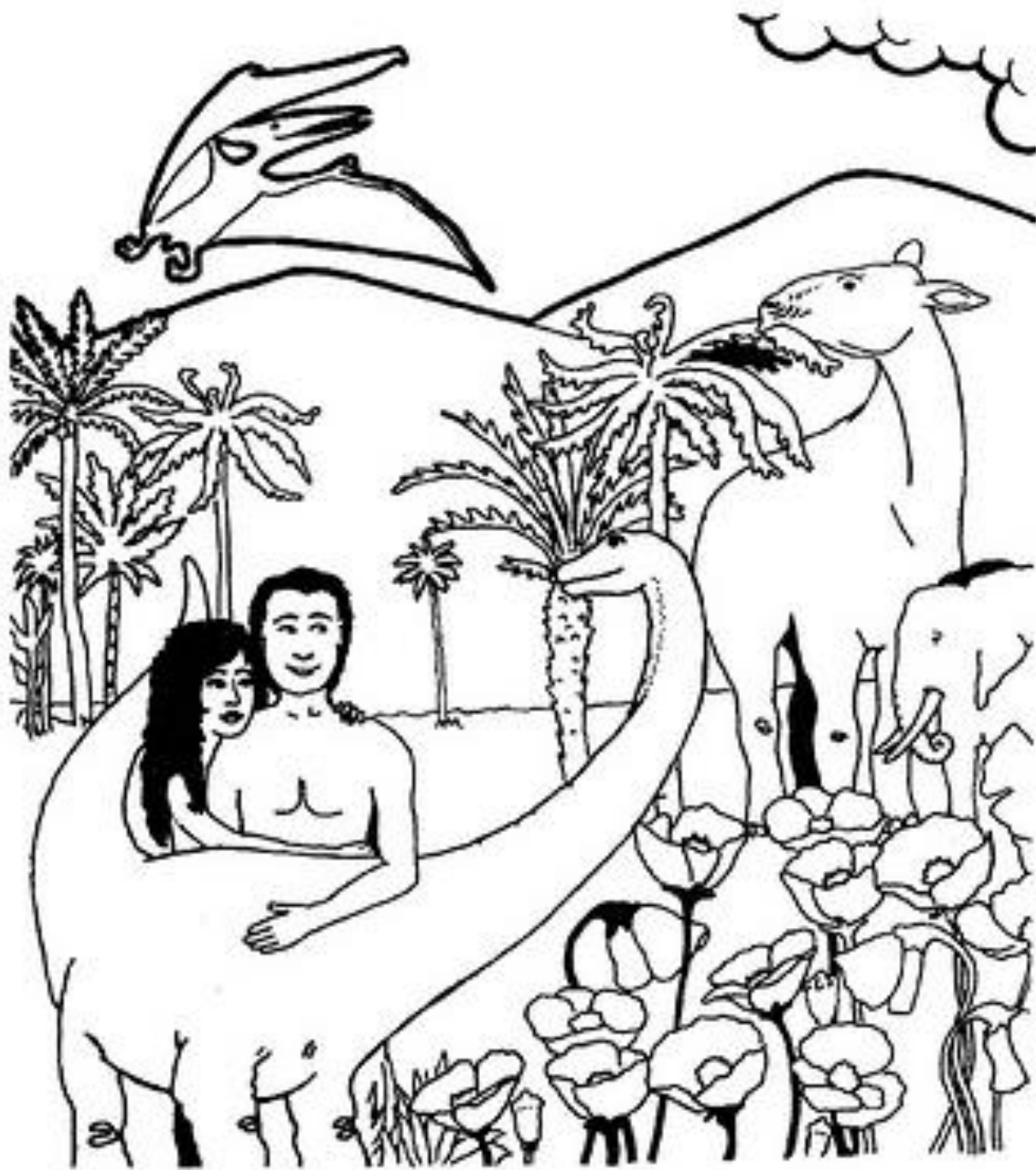
Students will develop their fine motor skills by reinforcing and practicing coloring within the lines.





Garden of Eden Coloring Sheet

Color the picture of Adam and Eve in the Garden of Eden and add cotton balls to make clouds.





Lesson 4: Precipitation

Key Learning Elements Covered

- *Easy*
 - Students will describe the water cycle.
 - Students will identify the different states of water.
- *Medium*
 - Students will describe cloud formation.
 - Students will identify the different states of water within the Water Cycle.
- *Advanced*
 - Students will explain the importance of the water cycle in the environment.

Materials Needed

- Water cycle cards
- Water cycle image
- Glass of water
- Water Cycle PowerPoint
- *Where Does The Water Go?* Narrative Sheet
- Water Cycle cards
- Water Cycle Sheet – Student’s copy
- Water Cycle Sheet – Teacher’s copy



Introduction

Water has always played an important part in Bible times. Some of Jesus’ disciples were fishermen and they all spent lots of time on the water. Jesus made Peter walk on water and He also calmed the storm while He slept in the bottom of the boat. Additionally, His first miracle was turning water into wine. The Water Cycle focuses on the cycle of water from the ground to the oceans to the sky and back. In the Garden of Eden, there was no rain but rather the plants were watered from dew that came from the Earth. When God sent the Flood of Noah’s time, we see the Water Cycle in full force – water came from below the Earth and it rained for the first time; since then, we have had a constant cycle of rain and evaporation. However, God has kept it all in balance and He will continue to keep things in order until He returns.

Procedure

- Show students a glass of water. Ask them to think about the many uses of water. How do they use water in their lives?
- Encourage students to think about water in nature. Where does the water come from?
- Record responses in two columns on the board: “Water Uses” and “Water Sources.”
- Explain that the water is in a constant cycle. The class will act out the cycle that water goes through.
- Using the narrative “*Where Does the Water Go?*” Students enact the water cycle.
- Assign two people for each category with the remainder of the class as raindrops. Categories are:



- Clouds
- Trees
- Ground
- Streams
- Lakes
- Oceans
- Distribute *Water Cycle Cards*.
- Students labelled as Clouds, Trees, Ground, Streams, Lakes, and Oceans are to form a circle, in said order, around the classroom. Water drops begin in the center of the circle.
- Begin to read the narrative to the students, having the water drops move to the appropriate section of the circle.
- Question for the students to think about and discuss:
 - When it rains, does all the water go to the same place?
- Provide a picture of the water cycle for the students to draw and label with appropriate vocabulary words. In order to help them think about their connections to the water cycle, have students draw themselves within the water cycle.
- Make the point that we get water from our taps and it comes from either surface water (lakes or rivers) or ground water (water that sinks deep into the soil).
- Have students watch the *Water Cycle PowerPoint*.

Evaluation

- Provide a picture of the water cycle for the students to draw and label with appropriate vocabulary words. In order to help them think about their connections to the water cycle, have students draw themselves within the water cycle.
- Have students label the places that drinking water comes from.

Homework/Cross-Curriculum Links

Math

What is water used for? How many gallons of water are needed for each task?

- Divide the students into four groups.
- Hold up a gallon container and ask students to predict how many gallons of water it takes to wash their hands.
- Record predictions.
- Have one member of each group to wash their hands over a bucket and measure the amount of water used to wash their hands by pouring it into gallon containers.
- Based on these numbers, have students then estimate water usage for other daily activities.



Service Learning

- Have the class write a play for younger students in the school. They are to then perform the play and include the younger students as raindrops. Have them write a song and turn the play into a musical.



Where Does The Water Go?

When you hear Where does the water go? The Water Drops will move as they move in nature.

Clouds gather, their arms puffing up as Water Drops gather in the clouds. Where does the water go? Water gathers in the clouds and the clouds get bigger. They fill up with water until they are full, full, full.

There, clouds get so full that the water must be released. Rain falls. Scientists call this rain **precipitation**. Where does the water go? Rain comes down over the houses and fields and the forests and the oceans. The water falls onto the ground; water falls into streams and lakes and oceans, and onto the leaves of the trees and plants. This precipitation, this water, keeps falling from the clouds.

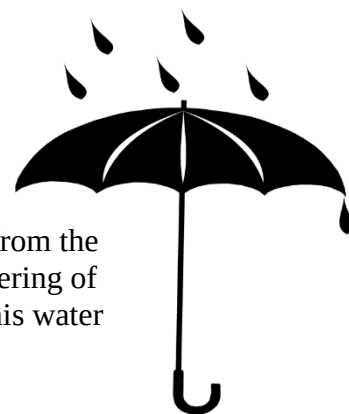
Now the water moves from the ground where it fell. It can't just stay on top; it filters into the soil. Where does the water go? It goes beneath the soil, to underground aquifers, pools, and streams under the earth where it can be used for wells. Where does the water go? Some water sinks through the soil and becomes groundwater. Not all water sinks into the soil; some of it runs along the soil and is called runoff. It runs along the soil, running, running. Where does the water go? It runs with other runoff to form streams, and then the water flows. Where does the water go? Some of the water from the rain, from the clouds, runs along the ground and forms streams.

Thirsty roots of plants and trees absorb water that sank into the soil but stayed near the top. Where does the water go? The trees and plants drink it through their roots.

The trees and plants can't hold all the water. Some of it is released through their leaves to the air. Where does the water go? It is released into the air as water vapor, which scientists call **transpiration**. The water vapor leaves the trees and plants and floats through the air. Where does the water go? Now the water moves up toward the clouds and gathers there. The clouds are full.

Back to the streams, where water flows and flows. The streams rush along, and other streams join those streams and more runoff joins all the streams and they form rivers that flow into bigger bodies of water. Where does the water go? The streams and the rivers flow into lakes and some of them flow into the oceans, just like the Mississippi River flows into the Atlantic Ocean. Where does the water go? It flows into the lakes and the oceans. When water gathers together, scientists call the process **accumulation**.

Lakes and oceans release water vapor too. Water vapor and fog rise up into the open sky. Scientists call this **evaporation** when water leaves the lakes and the oceans and rises in the form of water vapor. Where does the water go? It rises up from the lakes and the oceans to the clouds. It gathers in the clouds. Scientists call this gathering of water vapor **condensation**. The water gathers until the clouds burst, and what is this water called? Rain!





Water Cycle Cards

Print these cards out on cardstock or stick them to cardboard so that they are large and firm.

Quantities needed will vary depending on class size but you will need:

- 2 Clouds
- 2 Trees
- 2 Grounds
- 2 Streams
- 2 Lakes
- 2 Oceans

Raindrops will be based on the number of students you have remaining.

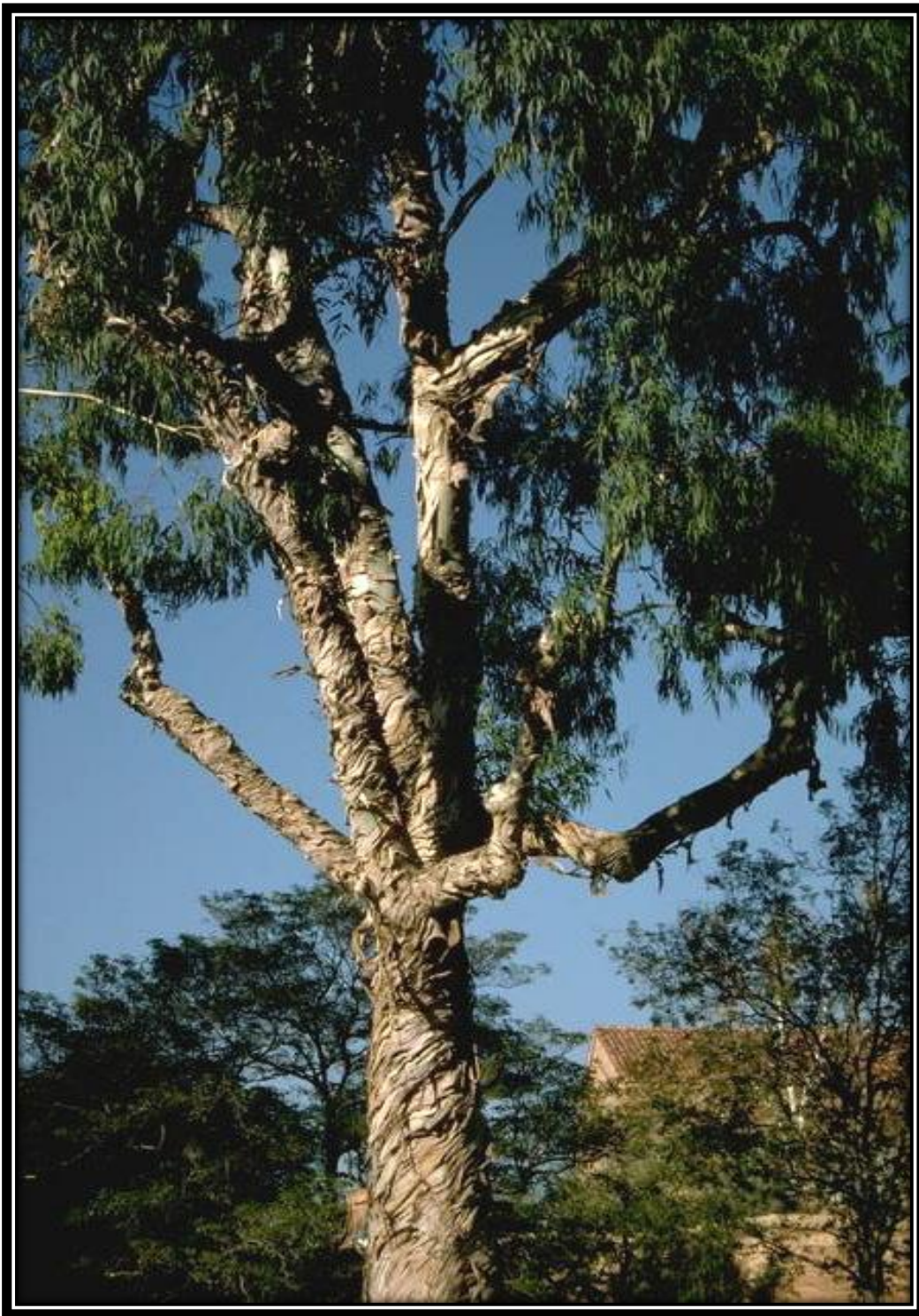
You can attach string to the card so it hangs around each student's neck.





<http://techtikus.com/wp-content/uploads/2012/02/Cloud.jpg>

CLOUDS



[Http://schools.clipart.com](http://schools.clipart.com)

TREES



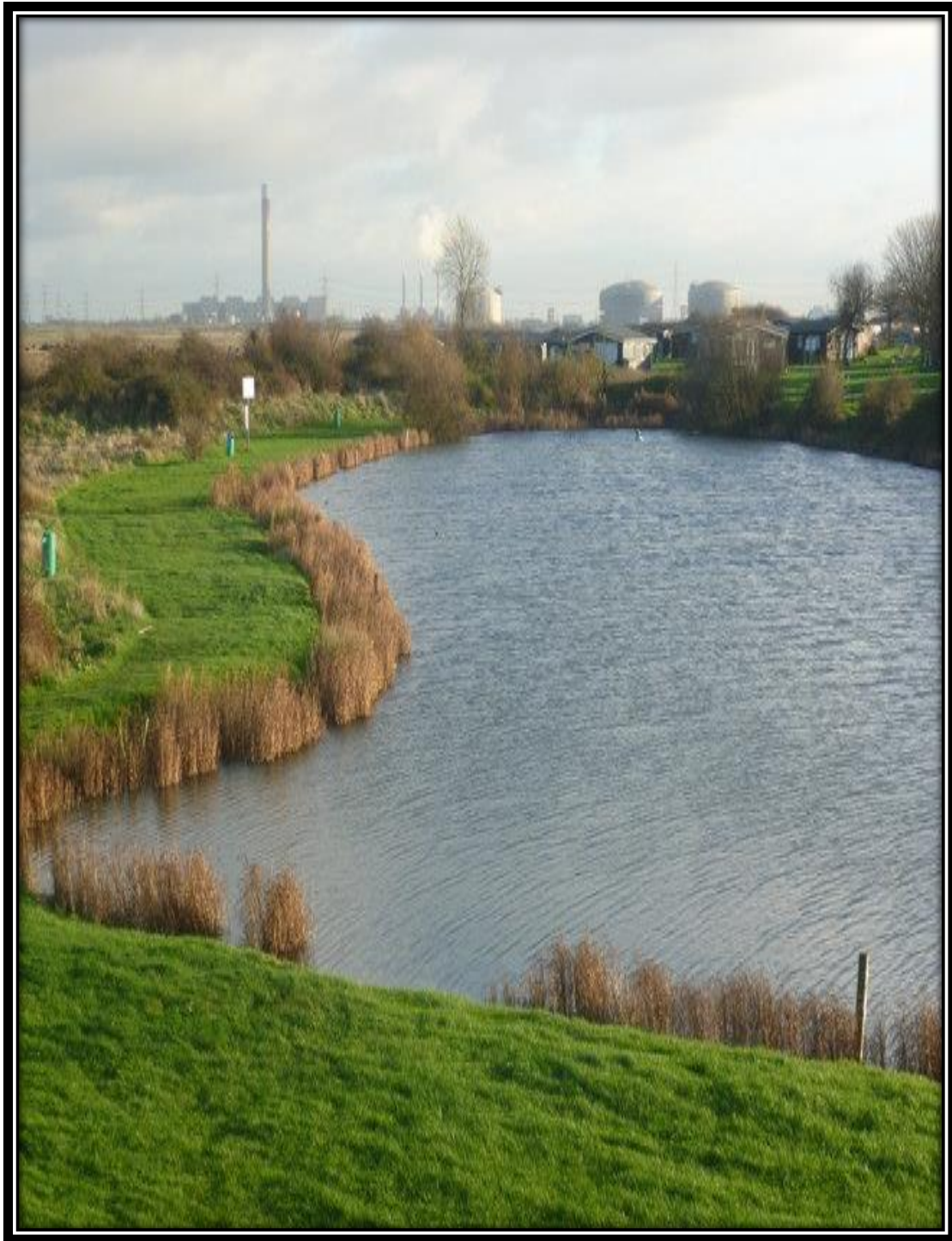
[Http://schools.clipart.com](http://schools.clipart.com)

GROUND



<http://www.johnharveyphoto.com/Japan2/Nikko/StreamByFallsHg.jpg>

STREAMS



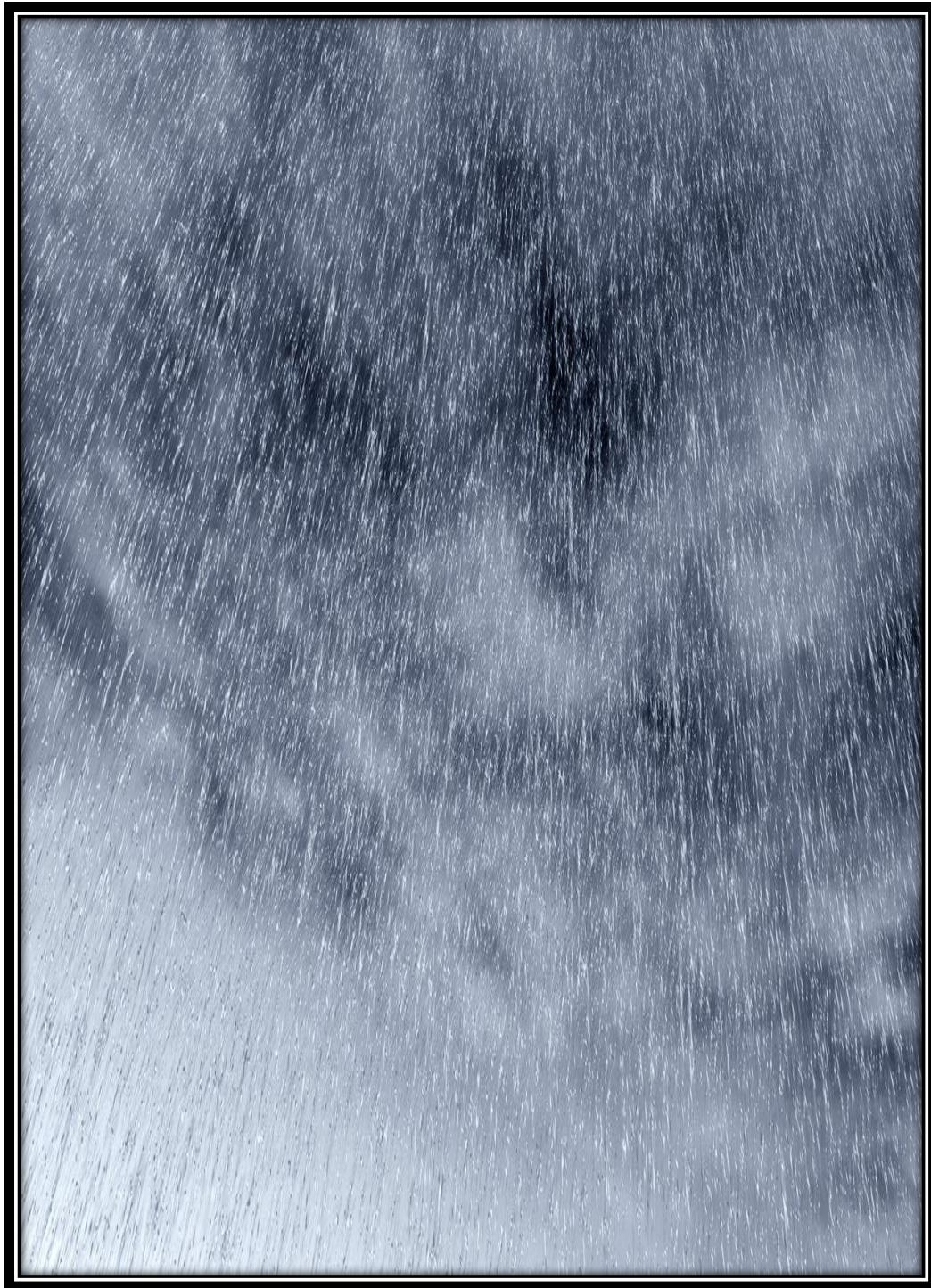
<http://schools.clipart.com>

LAKES



http://www.allmedicaltourism.com/Articles/destinations/barbados/barbados/images/Barbados_Island.jpg

OCEANS



<http://schools.clipart.com>

RAINDROPS



Water Cycle Worksheet

Use the following words to fill in the boxes with the correct word for each part of the cycle.

Accumulation

Condensation

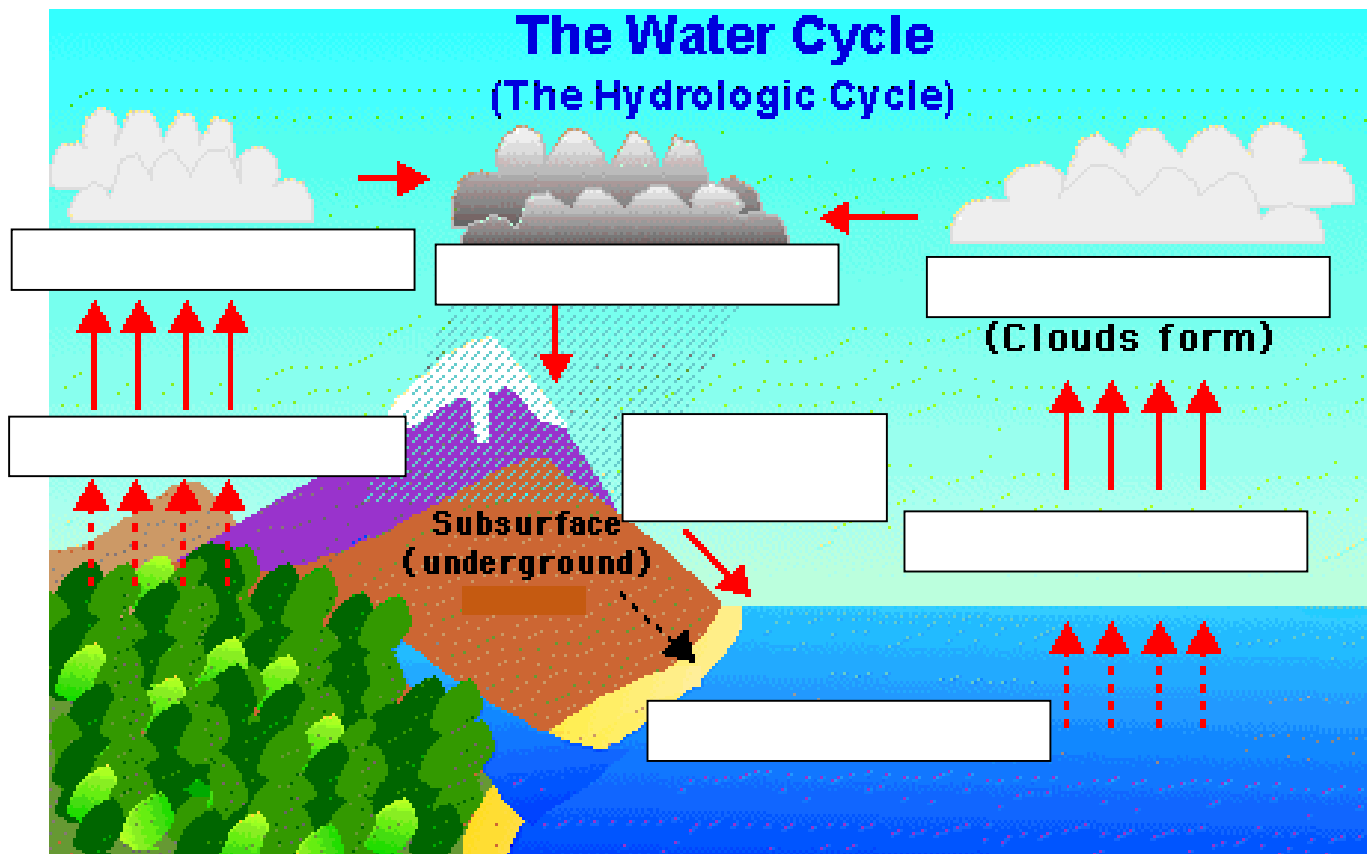
Condensation

Evaporation

Precipitation

Surface runoff

Transpiration





Water Cycle Worksheet

Use the following words to fill in the boxes with the correct word for each part of the cycle.

Accumulation

Condensation

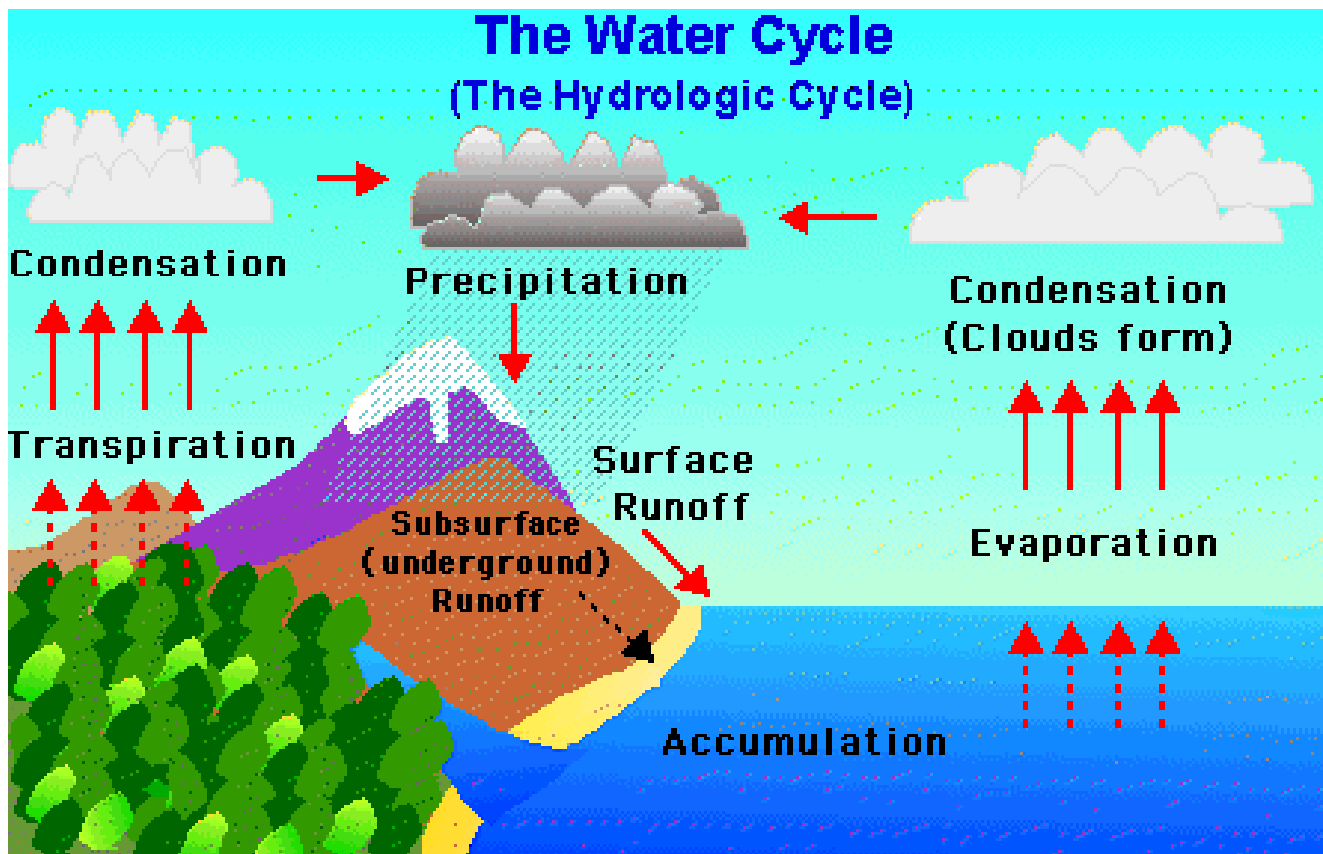
Condensation

Evaporation

Precipitation

Surface runoff

Transpiration





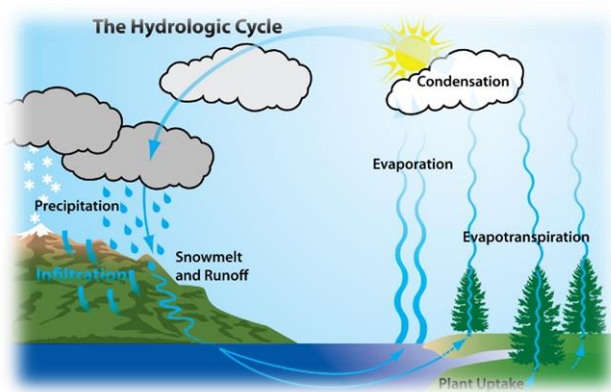
Lesson 5: Water Cycle

Key Learning Elements Covered

- *Easy*
 - Students will describe the water cycle.
 - Students will identify the different states of water.
- *Medium*
 - Students will describe cloud formation.
 - Students will identify the different states of water within the water cycle.
- *Advance*
 - Students will explain the importance of the water cycle in the environment.

Materials Needed

- *Water Cycle Dice Sample*
- *Water Cycle Dice Template*
- *Water Cycle Boogie* soundtrack
- *Game Instruction Sheet*
- Labels for the 10 stations
- Water cycle table
- Bell, whistle, or buzzer
- Journal and pencil



Introduction

Genesis 1:10 says “God called the dry land Earth, and the accumulated waters He called Seas. And God saw that this was good (fitting, admirable) *and* He approved it.” From the beginning of time, God separated the sky from the waters beneath. When God sent the Flood of Noah’s time, we see the Water Cycle in full force – water came from below the Earth and it rained for the first time and since then we have had a constant cycle of rain and evaporation. However, God has kept it all in balance and He will continue to keep things in order until He returns.

Procedure

1. Ask the students to identify the different places water can go as it moves through and around the earth. Write their responses on the board.
2. Tell the students that they are going to become water molecules moving through the water cycle. Compare the list created on the board to the 10 stations that are part of this activity.
3. Place the station labels and dice around the room or yard to mark the 10 stations:
 - a. Clouds
 - b. Plants
 - c. Animals



- d. River
 - e. Ocean
 - f. Lake
 - g. Caves
 - h. Groundwater
 - i. Soil
 - j. Glacier
4. Divide students evenly between the stations. (The cloud station can have an extra student if necessary.)
 5. Have each group identify the different places that water can move to
 6. Discuss the conditions that cause the water to move from one location in the water cycle to another.
 7. Explain that water movement depends on energy from the sun (electromagnetic energy) and gravity. Sometimes water will not go anywhere. Have each group share their list. The water cycle table provides an explanation of water movements from each station.
 8. Discuss the form in which water will move from one station to another. Most movement will take place when water is in the form of water vapor, with molecules moving rapidly and apart from each other.
 9. See Game Instruction Sheet.

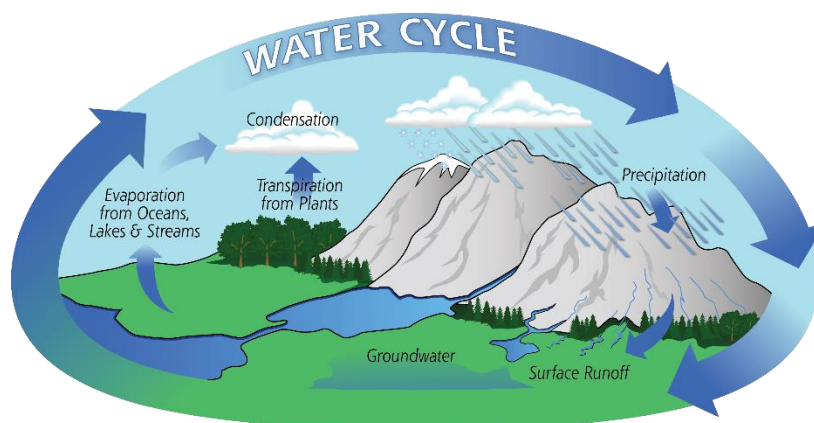
Evaluation

Students must successfully complete the game.

Homework/Cross-Curriculum Links

Language Arts

Students must write a journal entry on what they learned from playing the game in class. They must express how they felt while going to the different stations in the game.





Game Instruction Sheet

Overview

- Have students line up at their stations.
- Explain the rules of play, and tell them that the game will begin and end with the sound of a bell.
- After the bell, the first student in each line rolls the die and goes to the station indicated.
 - If they move as liquid, they will move in pairs (with the person behind them in line)
 - If they move as vapor, they move alone. The pairs represent many water molecules clinging together in a drop. In water vapor, the molecules move individually.
 - If the student rolls a “stay,” they go to the back of the line, staying at that location.
- The next student in each line then rolls the die.
- End with the bell.

Students should keep track of their movements. This can be done by having them keep a journal or notepad to record each move they make, including “stays.” Most students will end up in the ocean.

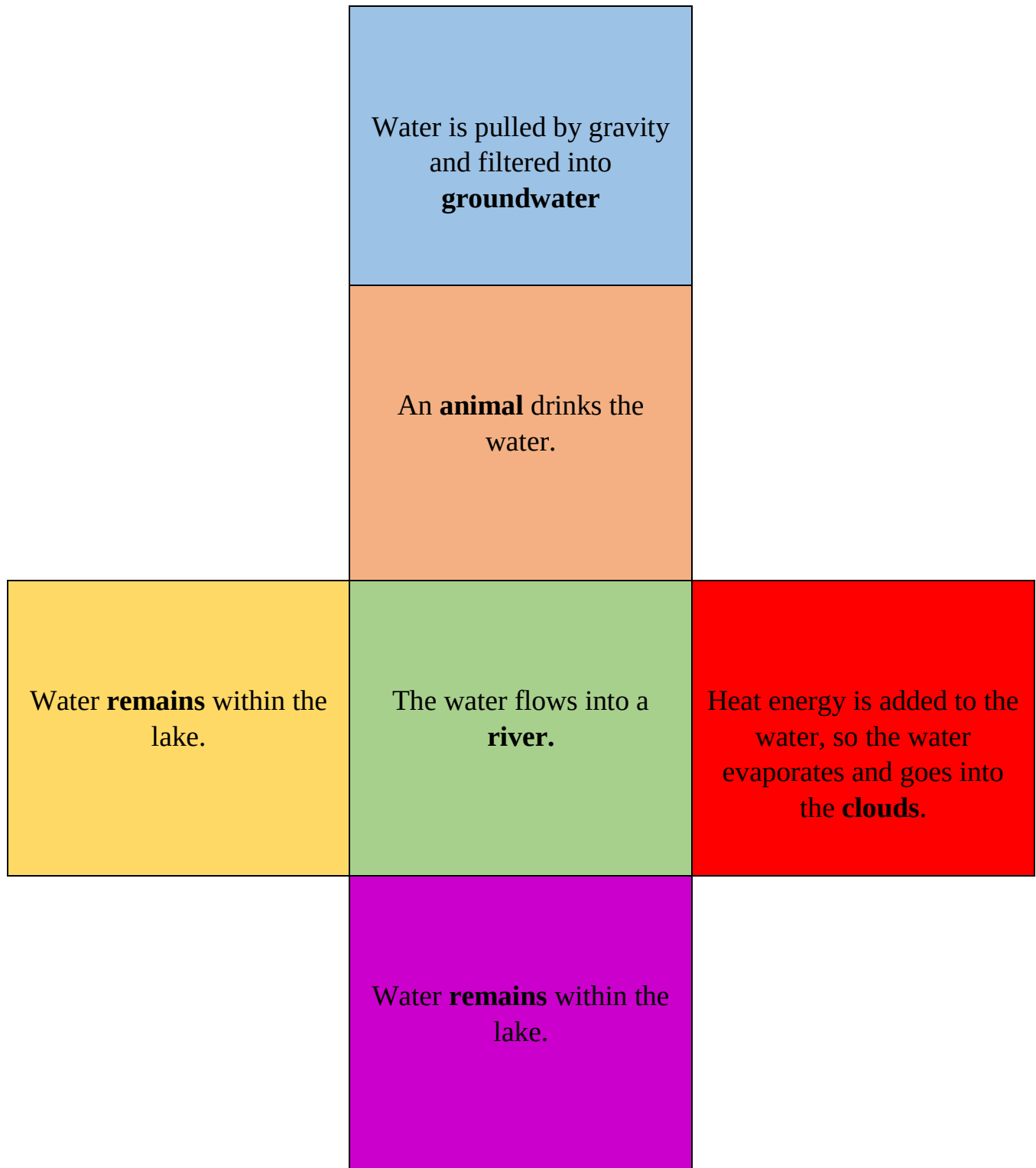
Play the *Water Cycle Boogie* while the students play.





Water Dice Sample

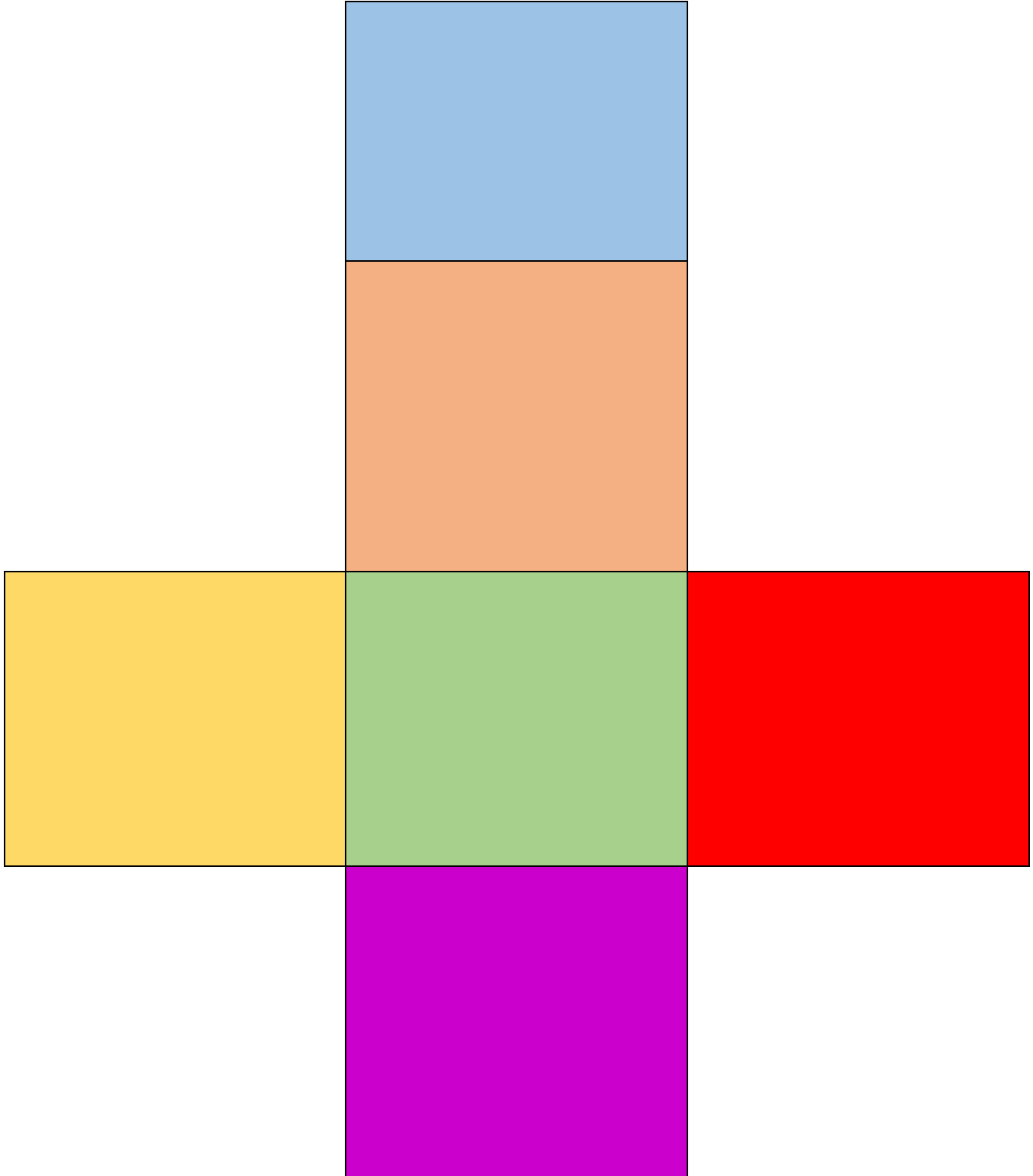
Cut the template out and trace it onto a piece of light-weight cardboard. Cut the cardboard and fold at the lines to create a box or die and tape the scenarios onto the sides of the die. The example shown is the lake state. BLANK TEMPLATE IS ON THE NEXT PAGE.





Water Dice Template

This is the blank template that you will use to make a set of water cycle dice. There will be a total of 10 dice in the set. Words to add to the blank dice follow this.





Lake Station

1. Water is pulled by gravity and filters into *groundwater*.
2. An *animal* drinks the water.
3. Water flows into a *river*.
4. Heat energy is added to the water, so the water evaporates and goes into the *clouds*.
5. Water *stays* within the lake.
6. Water *stays* within the lake.

Animal Station

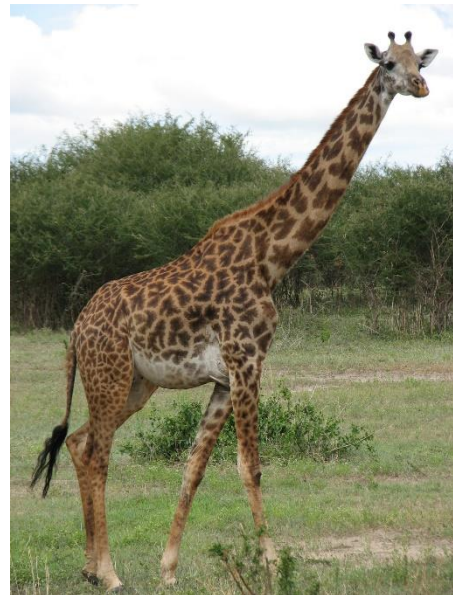
1. Water is excreted onto the *soil* through feces and urine.
2. Water is excreted onto the *soil* through feces and urine.
3. Water is respired or evaporated from the body and goes into the *clouds*.
4. Water is respired or evaporated from the body and goes into the *clouds*.
5. Water is respired or evaporated from the body and goes into the *clouds*.
6. Water is incorporated into and *stays* in the body.

Groundwater Station

1. Water filters into a *river*.
2. Water filters into a *lake*.
3. Water filters into a *lake*.
4. Water filters into a *cave*.
5. Water *stays* underground.
6. Water *stays* underground.

Cave Station

1. Water filters through the cave to *groundwater*.
2. Water filters through the cave to *groundwater*.
3. Water *stays* hanging on stalactites.
4. Water *stays* hanging on stalactites.
5. Water *stays* contained in pockets in the cave.
6. A cave-adapted *animal* drinks the water.





Soil Station

1. Water is absorbed by *plant* roots.
2. The soil is saturated, so water runs off into a *river*.
3. Water is pulled by gravity; it filters into the *groundwater*.
4. Water is pulled by gravity; it filters into the *cave*.
5. Heat energy is added to the water, so the water evaporates and goes to the *clouds*.
6. Water *stays* on the surface (perhaps in a puddle).

Plant Station

1. Water leaves the plant through the process of transpiration going into the *clouds*.
2. Water leaves the plant through the process of transpiration going into the *clouds*.
3. Water leaves the plant through the process of transpiration going into the *clouds*.
4. Water leaves the plant through the process of transpiration going into the *clouds*.
5. Water is used by the plants and *stays* in the plant's cells.
6. Water is used by the plants and *stays* in the plant's cells.

River Station

1. Water flows into a *lake*.
2. Water is pulled by gravity; it filters into the *soil*.
3. Water flows into the *ocean*.
4. An *animal* drinks the water.
5. Heat energy is added to the water, so the water evaporates and goes to the *clouds*.
6. Water *stays* in the current of the river.



Cloud Station

1. Water condenses and falls on *soil*.
2. Water condenses and falls as snow onto a *glacier*.
3. Water condenses and falls into a *lake*.
4. Water condenses and falls into the *ocean*.
5. Water condenses and falls into the *ocean*.
6. Water *stays* as a water droplet clinging to a dust particle.



Ocean Station

1. Heat energy is added to the water, so the water evaporates and goes to the *clouds*.
2. Heat energy is added to the water, so the water evaporates and goes to the *clouds*.
3. Water *stays* in the ocean.
4. Water *stays* in the ocean.
5. Water *stays* in the ocean.
6. Water *stays* in the ocean.

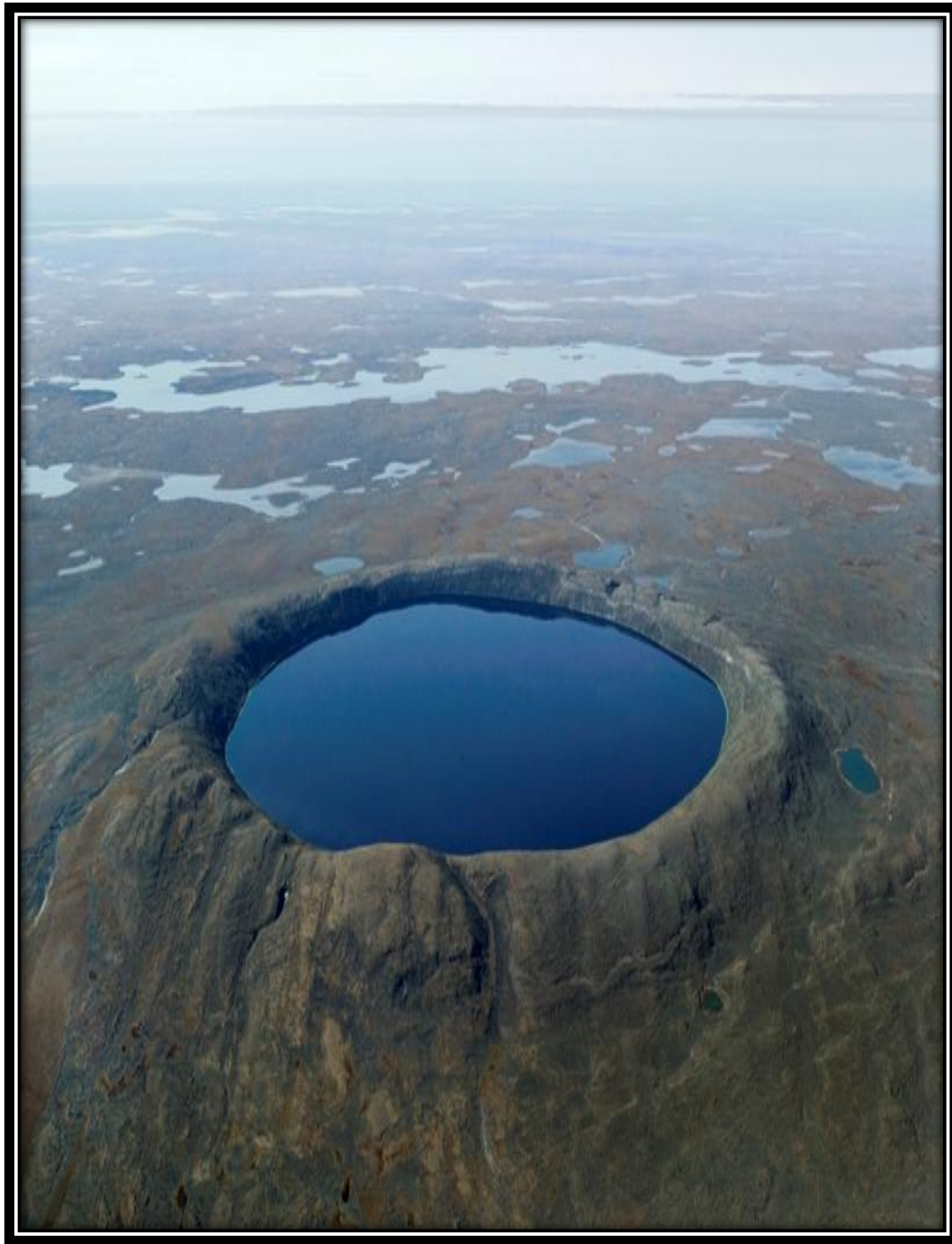
Glacier Station

1. Ice melts and water filters into the *groundwater*.
2. Ice evaporates and water goes to the *clouds*.
3. Ice melts and water flows into a *river*.
4. Ice *stays* frozen in the glacier.
5. Ice *stays* frozen in the glacier.
6. Ice *stays* frozen in the glacier.



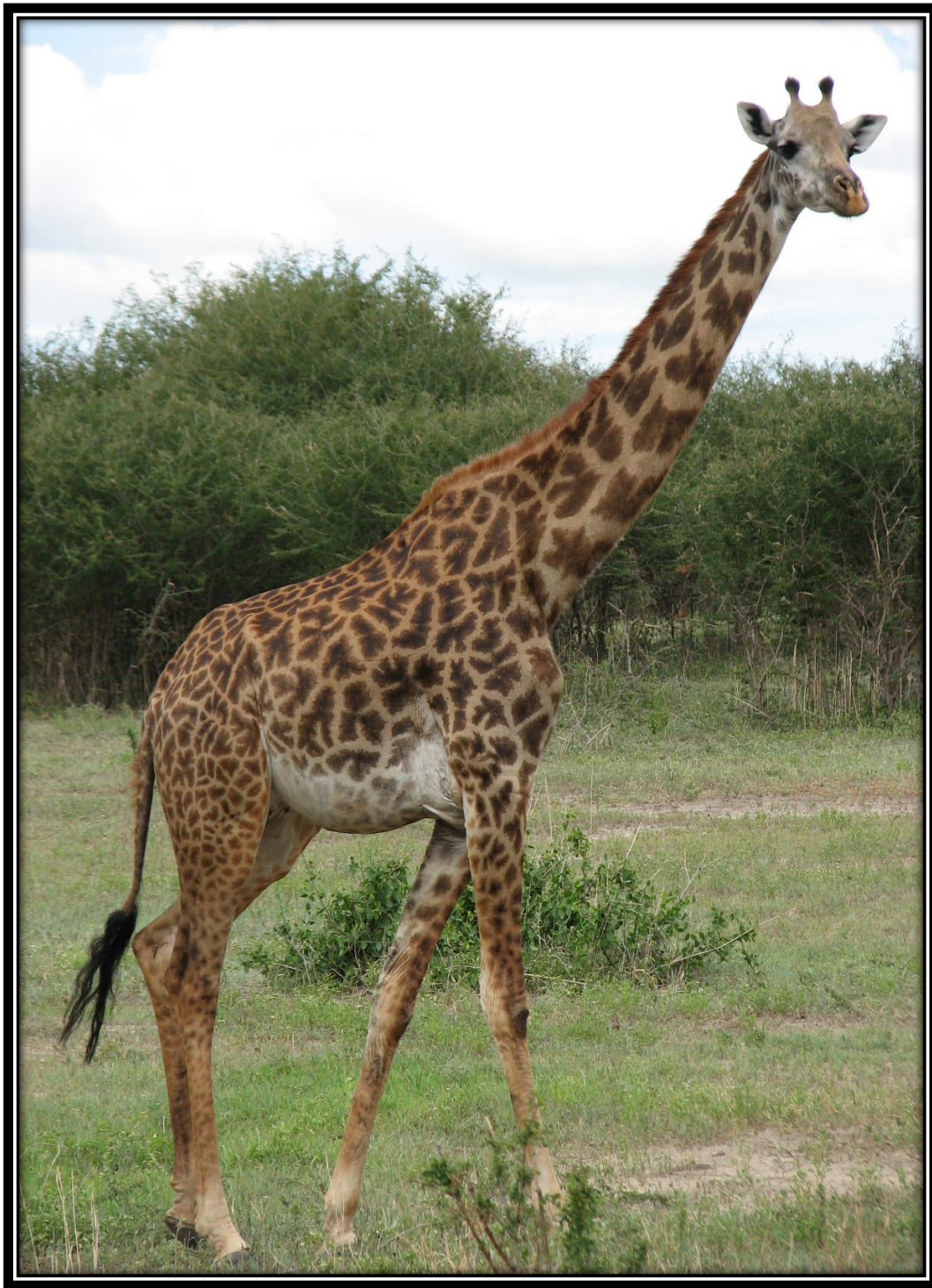


Station Labels



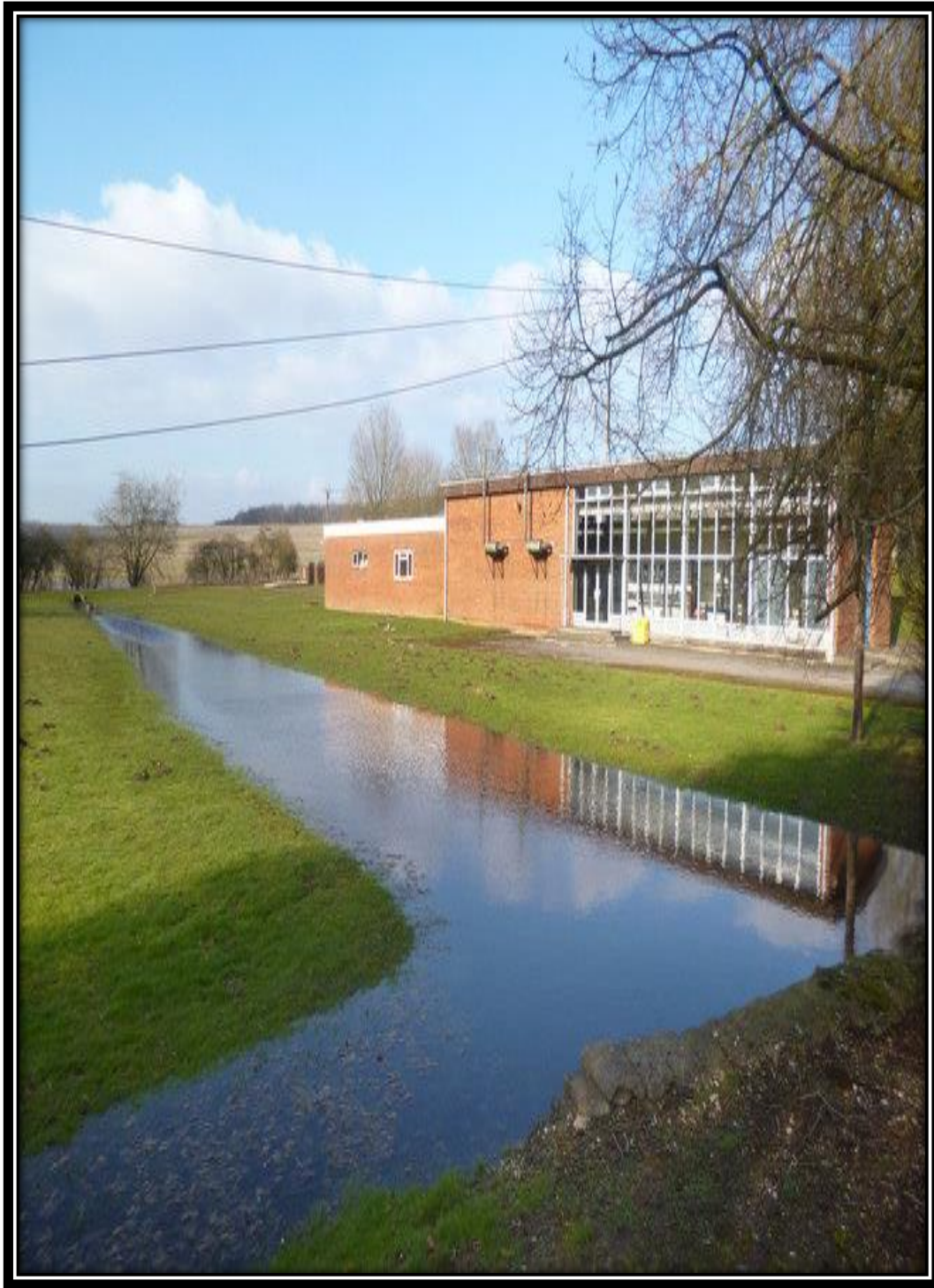
http://1.bp.blogspot.com/-bXIGZUka_jo/T4e1xdKQ1vI/AAAAAAAAAI8o/HiwOyZfliw0/s1600/CraterLakeRF2.jpg

LAKES



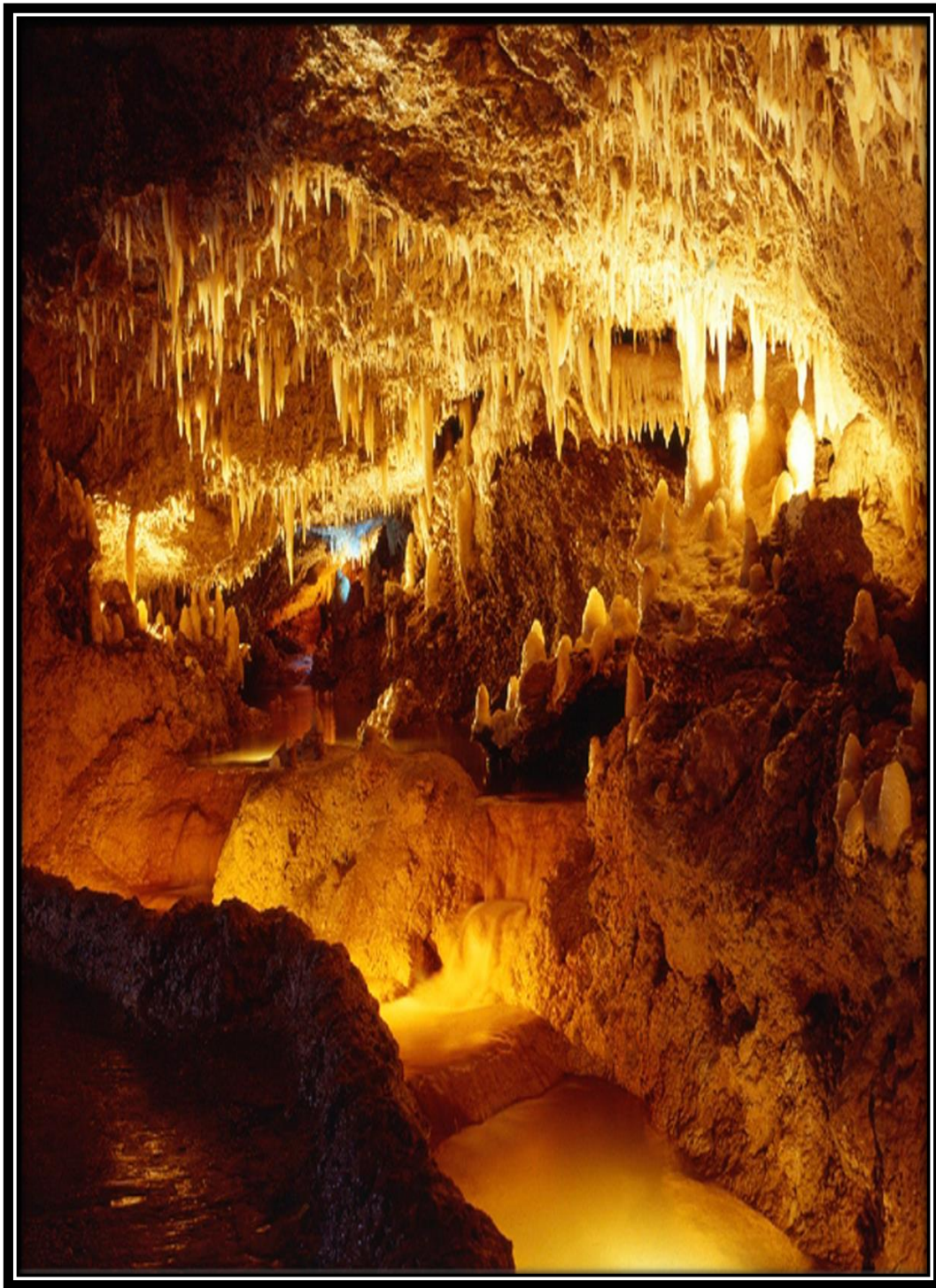
<http://schools.clipart.com>

ANIMALS



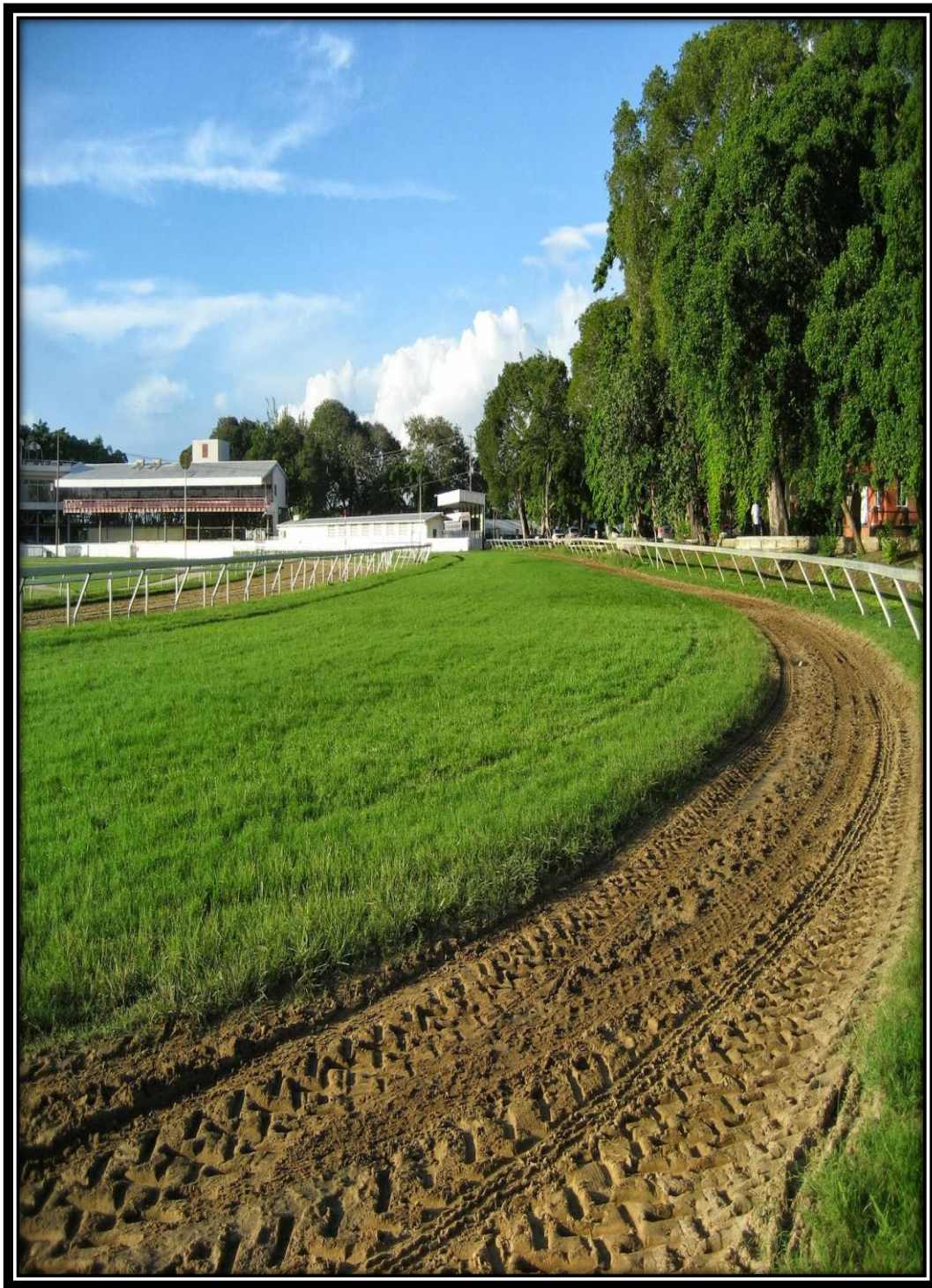
<http://schools.clipart.com>

GROUNDWATER



<http://caribbeantl.com/wp-content/uploads/2010/01/Harrisons-Cave.jpg>

CAVES



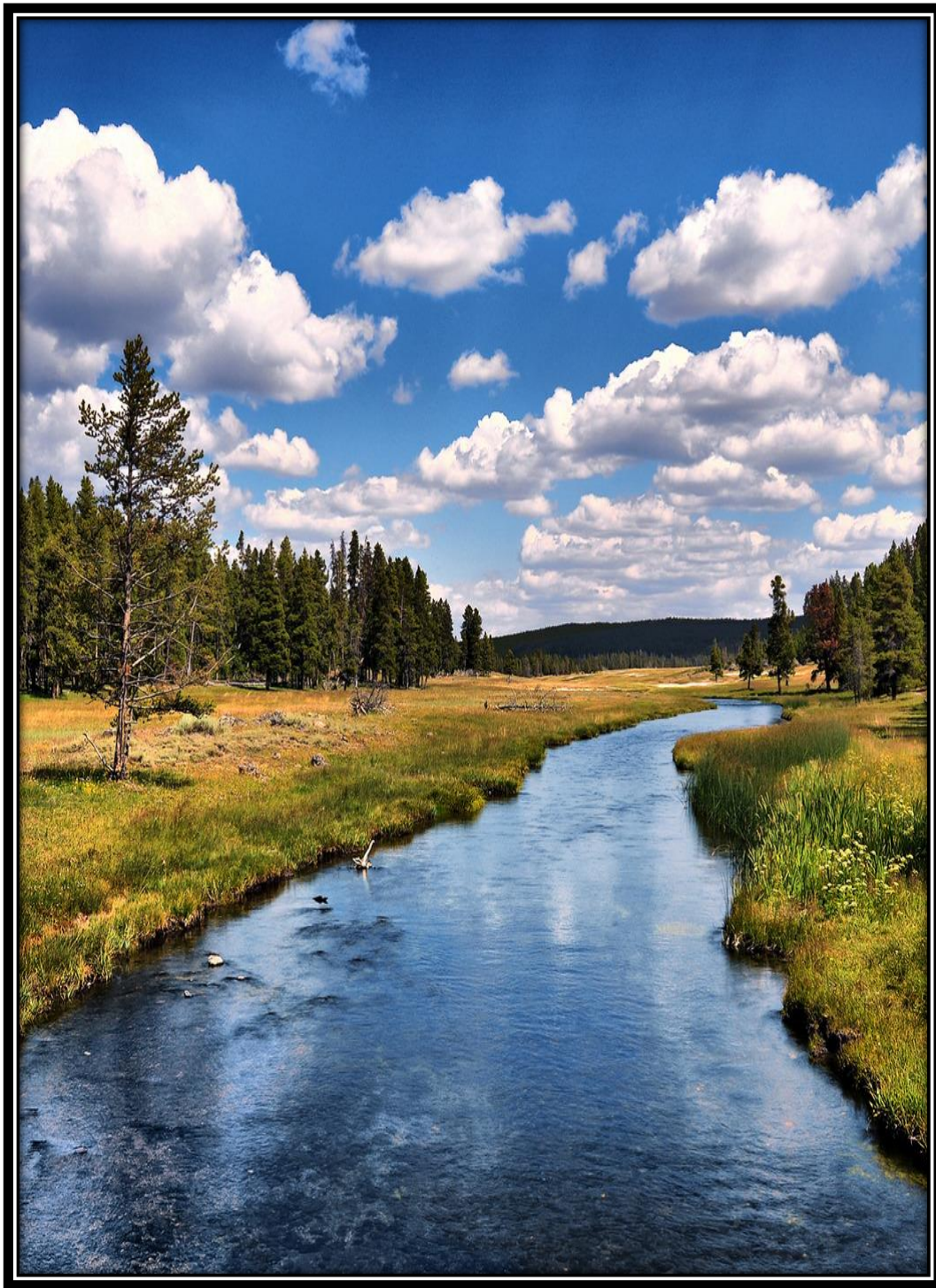
<http://static1.mydestination.com/barbados/Pictures/HomePageGallery/20110727-163745.Full.jpg>

SOIL



<https://sp.yimg.com/ib/th?id=JN.F%2fonRSkUWapAW9GUoR7IZw&pid=15.1&P=0>

PLANTS



<http://ipadflava.com/wp-content/uploads/peaceful-river.jpg>

RIVERS



http://1.bp.blogspot.com/-1Tx6oHaSBBY/TbHP17I-23I/AAAAAAAAAAM/BzhmK8KSNi4/s1600/IMG_8985.JPG

CLOUDS



http://www.allmedicaltourism.com/Articles/destinations/barbados/barbados/images/Barbados_Island.jpg

OCEANS



<http://pirate.shu.edu/~jamesjan/images/GLACIER7.JPG>

GLACIERS



Resources

EdHelper

<http://www.edhelp.com>

Enchanted Learning

<http://www.enchantedlearning.com/Home.html>

Learn360

<http://www.learn360.com>

Lesson Planet

<http://www.lessonplanet.com>

NAD Curriculum Guided – Science Grades K-8

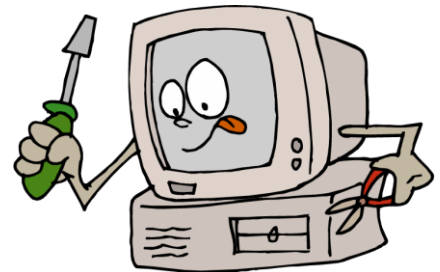
http://www.nadeducation.org/client_data/files/730_sciencek8.pdf

NAD SMART Science Curriculum K-8

<http://circle.adventist.org/files/download/SMART08.pdf>

Phillip Martin

<http://www.phillipmartin.info/clipart/terms.htm>





Annotated Internet Links: Teacher

1. **ABC Teach – The Teacher’s Online Resource**

Pre-made worksheets and activities across varying subject matter and topics. You can also use it to make customized sheets. Covers a wide expanse of grade levels.

www.abcteach.com

2. **Bible Gateway**

Ever needed to badly find a text but could only remember one key word? Ever wanted to find a simpler way of saying a text so that your students could understand it more easily? This site has dozens of Bible versions so you can find that perfect text for your classroom

www.biblegateway.com

3. **Circle**

This is the Adventist website that links educators with the resources needed to teach a lesson a faith-based and effective lesson. Curriculum Guides are also available here.

www.circle.adventist.org

4. **Clipart.com – School Edition**

Clipart and pictures that are non-copyrighted and hence available for re-use without having to contact the owner for rights of usage. *Subscription Needed*

Schools.clipart.com

5. **Dictionary**

An online dictionary that you can access on numerous devices – internet, iPad, iPhone, iPod, Android. It not only gives the definition of words but also give the correct pronunciation of the word as well.

www.dictionary.com

6. **Discover Magazine**

Archived articles and newly breaking articles are available here with related pictures.

www.discovermagazine.com

7. **Educational Travel Adventures**

Though you may not be booking a field trip through this site, it is a good resource as it lists places in different states that can be used for an educational field trip in and around where your school may be located.

etadventures.com/destinations

8. **eHow**

This is a good place to find art projects that can be tied back into classroom topics.

www.ehow.com





9. Fact Monster

Created with the child in mind, this site is good for gathering information on different topics and subjects.

www.factmonster.com/

10. Highlight Kids

This is linked to the Science Magazine, *Highlight Kids*. There are many scientific facts covered in the pages of this site. Furthermore, there are also experiments and games all based around scientific facts that make learning science fun.

www.highlightkids.com

11. Kaboose

This is a good place to find art projects that can be tied back into classroom topics.

www.kaboose.com

12. Kidzone Fun Facts for Kids

Send your students on a hunt to find out about an animal or use the site to produce lessons. It has pictures and facts and activities.

www.kidzone.ws

13. LanternFish – Jobs, Worksheets, and Flashcard for the ESL and TEFL Teacher

Not only can the material here be used for ESL, it is also good for the lower grades as it keeps things simple.

www.bogglesworldesl.com

14. National Geographic

Archived articles and newly breaking articles are available here with related pictures.

www.nationalgeographic.com

15. Prezi

Tired of making PowerPoints? You can now make a Prezi which allows you to show a presentation in a more relaxed manner. It also can easily link directly to YouTube videos. It is more captivating in a classroom as the slides transition in new ways that PowerPoint cannot. Download the presentations to your computer.

www.prezi.com

16. Pro Teacher

A resource pool for worksheets and activities. It is categorized to have items not only for teaching a lesson but also things to use for classroom management and special needs students.

www.proteacher.org





17. Rubistar

This is a site that helps you create professional rubrics for all subjects and projects in under 15 minutes.

<http://rubistar.4teachers.org/>

18. Save You Tube/KeepVid

Ever wanted to save a particular YouTube Video for future use or to use it where you will not have Internet? Simply copy and paste the link and you are able to download for future reference.

www.saveyoutube.com / www.keepvid.com



19. Star Teaching

Many teacher articles and links. There are activities here that can be adapted to use in the classroom.

www.starteaching.com

20. Vidtomp3

Ever had a song on YouTube that you wished you could get? This site allows you to download the audio from the videos on YouTube.

<http://www.vidtomp3.com>

21. Weebly For Education

Designed with the educator in mind, you can use this site to build WebQuests or a personal website. One account allows you to add multiple sites that you can use for different purposes in your classroom.

education.weebly.com

22. World of Teaching

This is a site of collected PowerPoint presentations on various topics. You can use them directly or you can edit them for your own needs or get inspiration for your own needs.

www.worldofteaching.com

23. YouTube

There are many educational videos available here that can be used. Furthermore, you can also upload your own videos to have them for future use or to share with students when they are not in the classroom. Note there are new License Laws on YouTube that limit some videos from being redistributed.

www.youtube.com

24. Zunal

Want to make a nice looking WebQuest and you do not have an Apple computer? Zunal is built to easily put together WebQuests for teachers. All the needed information is already laid out for you. Just point, click, and enter what you want it to say.

www.zunal.com



Annotated Apps

1. Bible

The ability to read and listen to the Bible across 200+ different versions. Built in search to pull up texts based on a particular word. You can also email passages to yourself (requires Internet connection).

2. Common Core Standards

View the Common Core Standards in one convenient application.

3. DropBox

Easily access your computer files on-the-go when stored in the cloud on the DropBox Server.



4. EGW Classics

Released by the Ellen G. White Estate, this puts all of her writings at your fingertips no matter where you are. You can even copy, paste, and email portions of text and do topic searches across all her books if you are looking for a particular word or phrase.

5. Garage Band

Turns your iDevice into a collection of instruments with a recording studio allowing you to create your own pieces of music for your classroom.

6. iBooks

Not only to be used to read novels and textbooks, use it to preview how an article will look when printed (for example flip through an entire teacher bulletin unit in book form and book mark pages you want to review later.)

7. iMovie

Make HD movies by combining images and videos you already have. Additionally, you can add narration to a movie or music. Pre-set themes allow you to make them look like news reports and so on.

8. Pages

View, edit, and create documents on the go. Email them out or print them as .pdf files. Type work while sitting on the train or bus without having to have a computer.

9. Prezi

View your online Prezi presentations from on your device. You are even able to edit them. With the correct additional add-ons, you can also display the presentation as well. Once a change is made online, it shows on your device that there is a new version of that file to update.

10. QuickOffice

View, edit, and create documents on the go. Email them out or print them as .pdf files. Type work while sitting on the train or bus without having to have a computer.



11. Weebly

View and edit your Weebly Sites on your device.

12. YouTube

Not only can you use this to search for videos but you can also upload a movie made in iMovie directly to your YouTube account.

**iDevices include iPad, iPhone, and iPod. However, the above Apps were used on an iPad.*





Annotated Internet Links: Student

1. Bible Gateway

Read the Bible in a version that you are comfortable with and find texts easily.

www.biblegateway.com

2. Dictionary

An online dictionary that you can access on numerous devices. It not only gives the definition of words but it also pronounces the word and breaks it into correct syllables.

www.dictionary.com



3. Diorama Man – Having Fun With Dioramas

This is a great site for students who have to make dioramas for class. It goes through different techniques to use in order to make realistic looking scenery. Such an example is a video entitled “How to Make Miniature Trees for Dioramas.”

www.stormthecastle.com/mainpages/dioramas

4. Discover Magazine/ Discover Kids

Archived articles and newly breaking articles are available here with related pictures. There is also a kids’ version of the website.

www.discovermagazine.com / www.kidsdiscover.com

5. eHow Family

Not only does this site give you great projects to do at home, but it also gives help in completing science projects.

www.ehow.com

6. Fact Monster

Created with the child in mind, this site is good for gathering information on different topics.

www.factmonster.com

7. Highlight Kids:

This is linked to the Science Magazine, *Highlight Kids*. There are many scientific facts covered in the pages of this site. Furthermore, there are experiments and games all based around scientific facts that make learning science fun.

www.highlightkids.com

8. Kaboose Crafts

Ever been at home with nothing to do? Go to caboose and find a kid-friendly project to complete. Some projects may require the help of an adult so review them before beginning any project.

crafts.kaboose.com



9. Kidzone Fun Facts for Kids

You can hunt to find out about an animal or use the site to produce lessons. It has pictures and facts and activities.

www.kidzone.ws

10. KidzWorld

This site makes education fun by combining bright colors, games, entertainment, and chat rooms in one location. It also has articles on various topics to be covered in the school curriculum.

www.kidzworld.com

11. National Geographic/National Geographic Kids

Archived articles and newly breaking articles are available here with related pictures. There is also a kids' version to the website.

www.nationalgeographic.com / kids.nationalgeographic.com/kids



12. Prezi

This is a useful site if your teacher uses Prezis for presenting subject matter as you can look at the presentation after class is over.

Additionally, you can also search for other presentations on similar topics to those you have covered in class in order to get more background information.

www.prezi.com

13. Science Kids – Fun Science and Technology for Kids

Learn more about the amazing world of science by enjoying our fun science experiments, cool facts, online games, free activities, ideas, lesson plans, photos, quizzes, videos, and science fair projects.

www.sciencekids.co.nz

14. Sheppard Software – We Make Learning Fun

You are able to quiz yourself on various topics and also play games across varying subjects at different levels. There is even a game on food chains.

www.sheppardsoftware.com

15. Weebly For Education

With the help of your teacher, this is another way you can display information from a project – via a free website.

education.weebly.com

16. You Tube

This is a good website to see educational videos that can be used to supplement material taught in class and can also be used to find videos that will help students better understand topics for their own knowledge.

www.youtube.com



17. Worksheets for Young Leaders

Find worksheets that you can use to reinforce content you were taught in class.

bogglesworldesl.com/kids_worksheets/

