

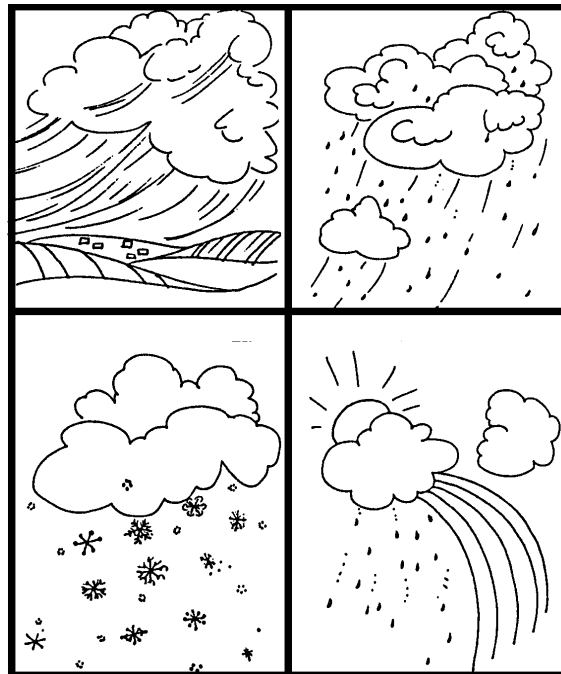


Water Cycle

The Earth's Gift



SECOND GRADE OCEANS



1 WEEK
LESSON PLANS AND
ACTIVITIES

WATER CYCLE OVERVIEW OF SECOND GRADE

WATER

WEEK 1.

PRE: *Exploring the properties of water.*

LAB: *Experimenting with different soap mixtures.*

POST: *Analyzing the water cycle.*

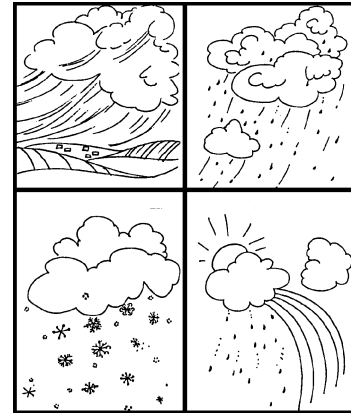
OCEANS

WEEK 2.

PRE: *Interpreting how water is recycled.*

LAB: *Distinguishing polluted, dirty, and clean water.*

POST: *Comparing solvents and solutes.*



ATMOSPHERE

WEEK 3.

PRE: *Distinguishing air.*

LAB: *Experimenting with air and water.*

POST: *Interpreting why water is important in the atmosphere.*

WEATHER

WEEK 4.

PRE: *Comparing climate and weather.*

LAB: *Exploring how topography influences climate.*

POST: *Discovering the four elements of weather.*

WATER CYCLE - OCEANS (2)

PRE LAB

Students use a worksheet to look at the world's oceans.

OBJECTIVES:

1. Investigating the Earth's water cycle.
2. Interpreting how water is recycled.

VOCABULARY:

ocean
recycle
resource
salinity

MATERIALS:

hydrographic globe
worksheet



BACKGROUND:

The rain that falls on the land is slightly acidic due to carbonic acid (which forms from carbon dioxide and water). The water erodes the rock and the acid helps break down the rocks and carries it along in a dissolved state as ions. Many of the dissolved ions are used by organisms in the ocean and are removed from the water. Others are not used up and are left for long periods of time where their concentrations increase over time. The two ions that are present most often in seawater include chloride and sodium. These two ions are over 90% of all dissolved ions in seawater. The concentration of salt in seawater (salinity) is about 35 parts per thousand. In other words, about 35 of 1,000 (3.5%) of the weight of seawater comes from the dissolved salts.

The water that forms the oceans is only part of the reason we have oceans. Plate Tectonics or the moving of the Earth's crust cause low and high parts of the Earth's surface. The low portions are the basins of the oceans. The high portions of the surface are the continents. Remember about 70% of the surface of the Earth is covered with water.

Through geologic time ocean levels and its salinity have changed, as the Earth's crust have moved. Polar ice also takes fresh water out of the system, but when they melt they add more liquid. The Earth's water is a dynamic, changing system.

PROCEDURE:

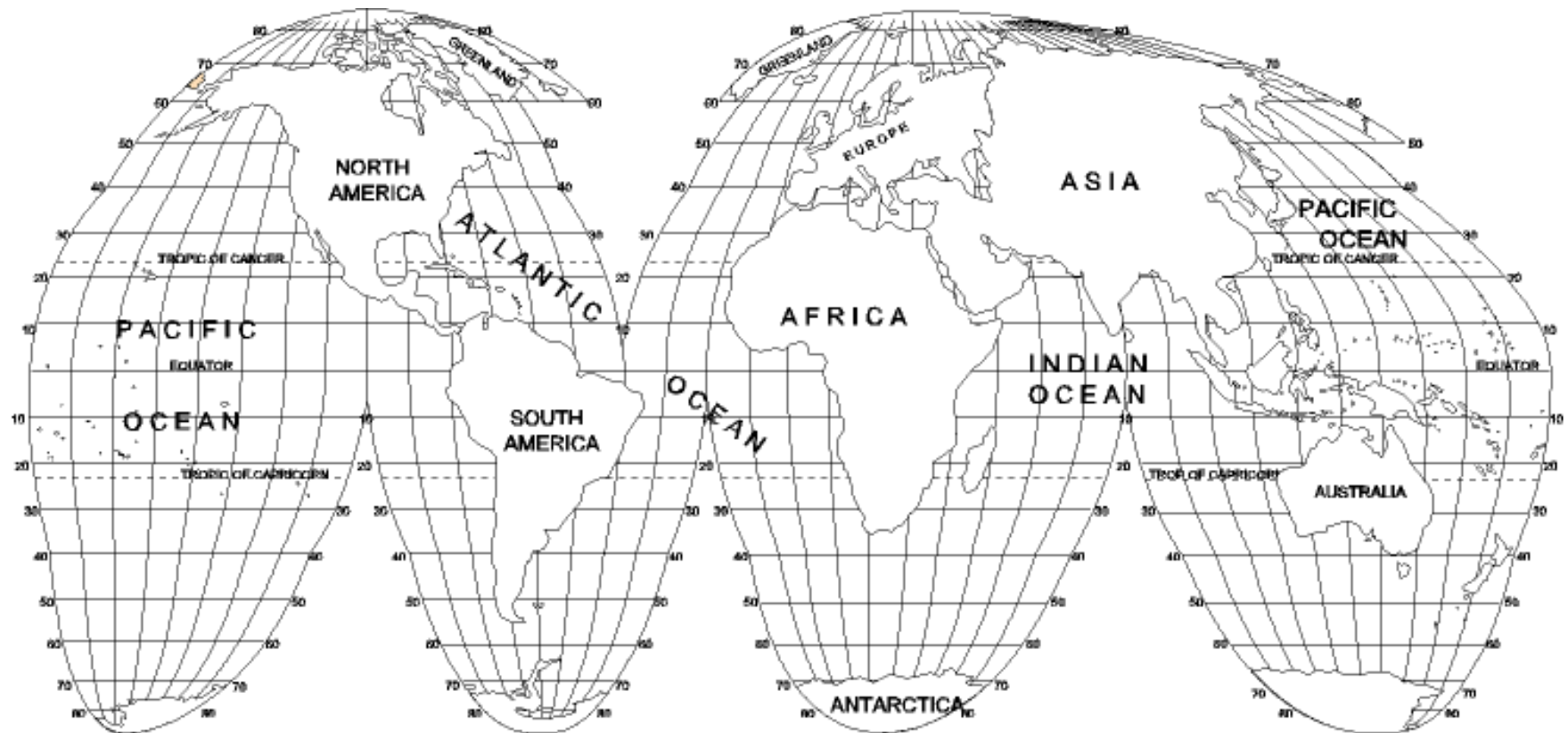
1. Children may ask why there will never be any more water than we have now. Why can't we just make more water? Water is a naturally occurring substance that we can't make. The amount of water on Earth will remain relatively constant in our life time. Children may ask, "Where did the water come from?" It basically came from steam that was emitted from volcanoes when the Earth was forming millions of years ago. Our atmosphere trapped the gases and the water cycle started.

2. Explain that although we may drink some of the same water that a dinosaur drank millions of years ago (the dinosaur would have to urinate and the water would evaporate), the water has gone through several states since that time. It has evaporated into water vapor, condensed into clouds and fallen back to the Earth as rain and snow. A natural recycling program, that requires time to clean the water. In the process of "cleaning" salts are left behind. Salt cannot evaporate. So our oceans become salty.

3. Students should use the worksheet to look at the different oceans. Use the hydrographic globe to show students that the ocean bottoms have depth and topography.

WATER CYCLE - OCEANS (2)

LABEL THE ARCTIC OCEAN.
COLOR EACH OF THE 4 OCEANS A DIFFERENT SHADE OF BLUE.



WATER CYCLE - OCEANS (2)

LAB

Students look at drops of water under the microscope.

OBJECTIVES:

1. Distinguishing polluted, dirty, and clean water.
2. Using the microscope to test samples of water.

VOCABULARY:

dissolve
pollute
sediment

MATERIALS:

sand
food coloring
oil
soap
salt
Swift GH microscope
slides
jars with lids
eyedropper
beakers



BACKGROUND:

Water is an important resource for all people in the world. People can die from lack of clean water to drink. Most students do not think about water because in the United States it is almost an unwritten rule that cities, counties, states and the federal government will provide this resource. Early in our country this was not so. Many people died because the rain did not bring water or that sewage from a city polluted the waterways. The United States is aware of the dangers of polluted water and have one of the strictest laws in the world. Not all nations in this world have water privileges that Americans have.

The world's oceans have always been a "dumping" ground for pollution. In many areas raw sewage and other wastes are put into the oceans. Many humans see the oceans as such a vast place that it could never get polluted. But this is wrong. Currents in the oceans move the pollution away from the land, but it still remains in the system. Some wastes are sometimes used by plants and animals in the oceans to help them grow, but too much will upset the natural balance.

There are some substances that will dissolve and others that will remain in the system. For instance, plastic will not degrade and remains floating on the world's oceans. Other substances like phosphorous (from soaps) can be used by small plants in the oceans as fertilizer.

Pollution is a term used by the media and general public frequently. However, most children do not understand how the word differs from dirty. Pollution is when water (or any other part of the environment) becomes offensive or harmful to organisms. Fresh and salt water can become polluted. However, seawater is not polluted just because it is salty.

Salt water, although not useful to drink by humans, is not polluted or dirty; it has mineral salts dissolved in it. This lab has the students think about the difference between dirty, polluted, and clean water.

PROCEDURE:

1. Brainstorm with students and make a list of polluted and dirty components of water.

POLLUTED: oil, harmful chemicals (like mercury, lead), too many dead animals, plastic bags, metal

DIRTY: wood, mud, rocks, algae (kelp)

2. Each group of students should have two jars for Exercise I. Students should fill up each jar with 50 ml of water and mix one with 25 ml of vinegar and the other with 2 ml of sand. Students should shake the jars and determine which jar is dirty or polluted. The sand jar is dirty because the sand will settle out, however, the vinegar cannot be removed easily and the solution is therefore polluted.

3. Pre-mix 5 containers (baby food jars work well) and have students look at one or two drops of each of the containers under the microscope. You may want to label each jar as UNKNOWN 1, UNKNOWN 2, etc. Below are suggested contents:

jar 1 = 1/4 water + soil

jar 2 = 1/4 water + 2 drops of food coloring

jar 3 = 1/4 water + 3 drops of oil

jar 4 = 1/4 water + 3 drops of soap

jar 5 = 1/4 water + salt

4. Students should figure out if the water is polluted or dirty and record the observations on the sheet. Use the microscope to look at a drop of each of the water to see if students can identify particles in the water. You must remember that polluted or dirty water sometimes depends on the type of animal using that water. What may not be toxic to humans, may be toxic to little animals, or vice versa. For instance, soap in water is not polluted if we wash our face, but if we had to drink soapy water it would be polluted. Students should be encouraged to justify their answers. Consider it correct if their justification is logical.

WATER CYCLE - OCEANS (2)

PROBLEM: What is the difference between dirty, clean, and polluted water?

PREDICTION: _____

EXERCISE I Listen to the instructions from your teacher.

Which jars of water is dirty? _____

Which jars of water is polluted? _____

WHY? _____

EXERCISE II Look under the microscope at the samples of water. Record if you think they are polluted or dirty.

SAMPLE #	COMMENTS
1	
2	
3	
4	
5	

CONCLUSION: The difference between dirty water, clean water, and polluted water is: _____

WATER CYCLE - OCEANS (2)

POST LAB

Students use a worksheet to explore solvents and solutes.

OBJECTIVES:

1. Comparing fresh and salt water.
2. Distinguishing solvents and solutes.

VOCABULARY:

clean
dirty
dissolved
fresh
polluted
salty
sediments
solution
solvent

MATERIALS:

jar
hot water
ice cube
worksheet



BACKGROUND:

Water is an universal solvent which means it can dissolve many other substances within the molecular structure of water. Water becomes salty because many different components that erode from the land will dissolve and become part of the water. Over eons of time the water cycle evaporates only fresh water, leaving the “salts” behind.

The term solution means a system in which one or more substances are uniformly mixed or dissolved in another substance. A solution has two components, a solute and a solvent. The solute is the substance that is dissolved. The solvent is the substance doing the dissolving. A solute plus a solvent equals a solution.

Water is considered a universal solvent, in other words, many other substances can be dissolved into water. Seawater is an example, it contains many ions of dissolved elements like sodium, chlorine, bromine, calcium, carbon, and many more. Seawater starts as fresh water but as water falls on the land causing the erosion of rocks, minerals become a part of the water, and then become part of seawater. Salt water is neither dirty nor polluted, it is a solution that is clean, unless polluted by humans or nature.

PROCEDURE:

1. Go over the terms solute, solvent, and solution. Make sure students know that solute + solvent = solution.

2. You may want to put boiling water with salt in a jar and then put a lid on it. Make sure the jar can withstand boiling water. Watch what happens. The steam will make fresh water droplets. If it is a warm day you might want to put an ice cube in a jar and put it in a warm place. Students can watch as the water turns from solid, to liquid, to gas. Water droplets should form on the lid, illustrating condensation. Afterwards, take the top off and release the steam. Where did it go? Although it seems that it has disappeared, it's really in a gaseous state in the atmosphere. You have proven to the students that water vapor is part of the atmosphere and the salt is left behind.

3. The worksheet has the students determining solutes, solvents, or solutions. The answers are: 1. salt + water = seawater; 2. kool aid + water = punch; 3. orange + water = orange juice 4. apples + water = apple juice; 5. dirt + water = dirty water

WATER CYCLE - OCEANS (2) POST

SOLUTE + SOLVENT = SOLUTION

**CHOOSE ONE OF THE FOLLOWING WORDS:
SOLUTE, SOLVENT, OR SOLUTION**



1. SALT (SOLUTE) + _____ = SEAWATER (SOLUTION)
(SOLVENT)

2. KOOL AID (SOLUTE) + WATER (SOLVENT) = _____
(SOLUTION)

3. ORANGES (SOLUTE) + WATER (SOLVENT) = _____
(SOLUTION)

4. _____ + _____ = APPLE JUICE (SOLUTION)
(SOLUTE) (SOLVENT)

5. DIRT (SOLUTE) + WATER (SOLVENT) = _____
(SOLUTION)