

Air, Water, and Soil in the Environment Curriculum Map

The lessons and experiments fall under thirteen topics that relate to two aspects of earth science: *Air, Water, and Soil in the Environment*.

The activities have two intentions:

1. to teach concepts related to earth and space science and
2. to provide students the opportunity to apply the necessary skills needed for mastery of science and technology curriculum objectives.

Throughout the experiments, the scientific method is used. In each section you will find teacher notes designed to provide you guidance with the learning intention, the success criteria, materials needed, a lesson outline, as well as provide some insight on what results to expect when the experiments are conducted. Suggestions for differentiation are also included so that all students can be successful in the learning environment.

Introduction, Assessments and Learning Expectations

- At A Glance – List of Skills
- Introduction
- Student Assessment Form
- Teacher Assessment Form

Lesson One: Learning About Air - Part One

Students will learn that air takes up space and that it has mass, identifying these as some characteristics of air.

Lesson Two: Learning About Air - Part Two

Students will learn that air expands and that it can create a force when it is compressed, identifying these as characteristics of air.

Lesson Three: The Movement of Air

Students will learn that air can be seen and felt when it moves.

Lesson Four: Using and Needing Air

Students will learn about the benefits of moving air and that all living things need air to survive.

Lesson Five: What is Water?

Students will explore water through their senses and learn about the three states of water.

Lesson Six: The Water Cycle

Students will learn about the water cycle and factors that affect evaporation rate.

Lesson Seven: Water Facts

Students will learn about the shape water takes, the space it takes up, and its mass, identifying these as some characteristics of water.

Lesson Eight: Waterproof or Waterlogged?

Students will learn about materials that absorb water and the materials that repel water.

Lesson Nine: Needing and Using Water

Students will learn about where water comes from, the water treatment process, their families' usage of water, and ways to reduce water consumption.

Lesson Ten: Soils

Students will learn about the four components of soil and the different types of soil.

Lesson Eleven: Earthworm Invasion!

Students will learn about the benefit of earthworms in making nutrient rich soil.

Lesson Twelve: Erosion

Students will learn about the effects of moving air and water on soil.

Lesson Thirteen: Pollution

Students will learn about how pollution affects the air, water, and soil in our environment.

THE WATER CYCLE

LEARNING INTENTION:

Students will learn about the water cycle and factors that affect evaporation rate.

SUCCESS CRITERIA:

- identify and describe the water cycle in our natural environment
- make predictions and investigate factors that affect evaporation
- gather data and record observations in a chart
- make conclusions about evaporation rate
- make a connection to the environment and daily living

MATERIALS NEEDED:

- a copy of “The Water Cycle” Worksheet 1 for each student
- a copy of “Evaporation Exposure!” Worksheets 2, 3, 4, and 5, for each student
- 2 jars (one with lid, other without), a ruler, a measuring cup (for each group of students)
- a few jugs of water
- 2 clothes drying racks, 2 small towels, 2 clothes pins, access to water, a warm windy day
- pencils

PROCEDURE:

***This lesson can be done as one long lesson, or be divided into two shorter lessons.**

1. Give students Worksheet 1. Read through the information about nature’s water cycle. Discuss the concepts of ‘condensation’, ‘precipitation’, and ‘evaporation’ with students to ensure their understanding of how each is created and part of the cycle.

2. In small groups or pairs, students will conduct an experiment to investigate evaporation. Give them Worksheets 2 and 3. Read through the question, materials needed, and what to do sections on Worksheet 2. After making a prediction, students will conduct the experiment and record observations on the first day and again seven days later. They will make a conclusion about water evaporation on the seventh day.
3. Students will conduct another experiment to investigate evaporation. Give them Worksheets 4 and 5. Read through the question, materials needed, and what to do sections on Worksheet 4. After making a prediction, students will conduct the experiment and record observations once the wet towels have been put on to the drying racks and again about three hours later. They will make a conclusion about what can affect water evaporation. They will make a connection by explaining the usefulness of this knowledge to their own daily lives.

DIFFERENTIATION:

Slower learners may benefit by having only to observe and record the changes in the height of the water in the jars for experiment #1 (eliminating step 9 in the ‘what to do’ section). Whiting out the mL sentences in the observation chart, and the challenge question will lend to less confusion on the page for these learners.

For enrichment, faster learners could make their own illustration of the water cycle, labeling it with information they have learned.



The Water Cycle

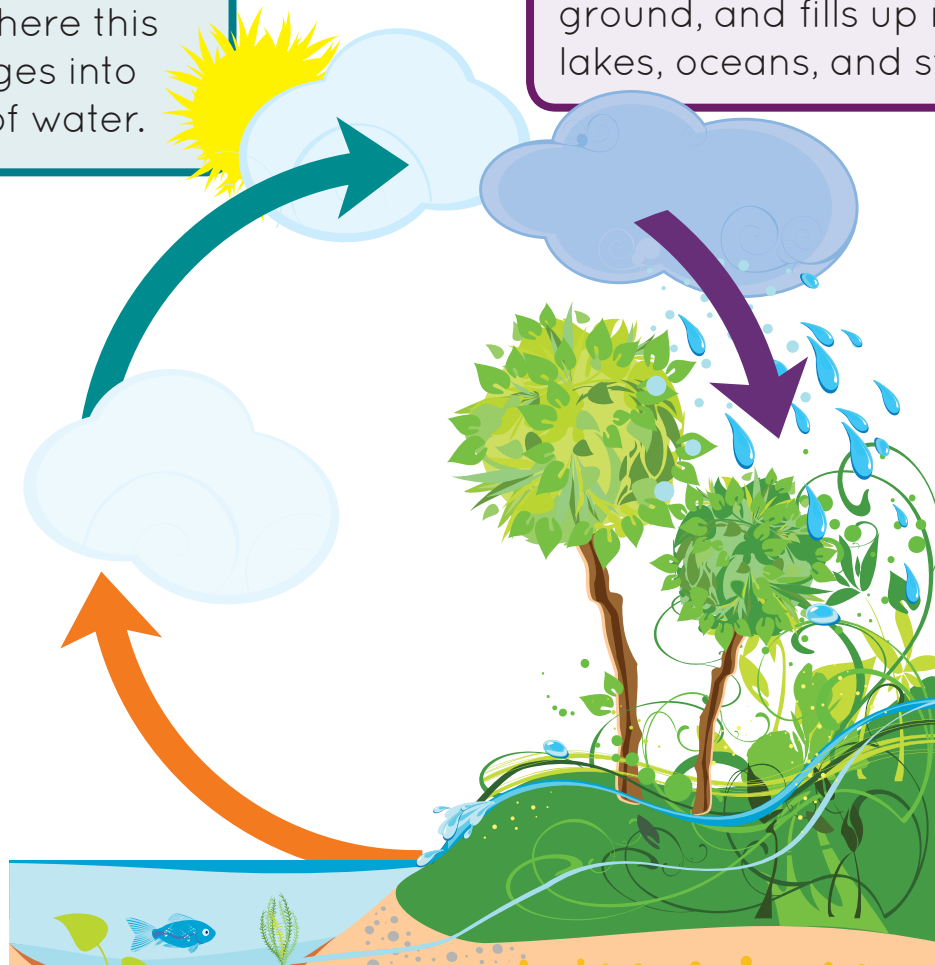
You have learned that water exists in three different forms. It can be a liquid, a solid, or a gas.

Now let's learn exactly how these forms of water cycle through our environment.

Condensation

happens when water in a gas form, meets cooler air. It will form a cloud in the sky where this gas changes into droplets of water.

These droplets of water, called precipitation, fall back down to Earth. **Precipitation** can be in the form of rain, snow, sleet, or hail. It wets the ground, and fills up rivers, lakes, oceans, and streams.



As the sun heats the ground, oceans, rivers, lakes, and streams, the water evaporates. **Evaporation** is water in its gas form rising again to condense as a cloud.

Evaporation Exposure! #1

Question: Does water need to be exposed to air in order to evaporate?

You'll need:

2 jars (one with a lid, the other without)



a ruler



a measuring cup



a jug of water



What to do:

1. Make a prediction about the answer to the question, record it on Worksheet 3.
2. Pour 200mL of water into the measuring cup.
3. Pour the water from the measuring cup into Jar 1.
4. Repeat steps 2 and 3, using Jar 2.
5. Put the ruler into each jar to measure the height of the water in each jar. Record this on Worksheet 3.
6. Put the lid onto Jar 1. Leave Jar 2 exposed to the air.
7. Wait seven days. Repeat step 5.
8. Record your observations about the height of the water in each jar.
9. Pour the water from Jar 1 into the measuring cup, record the amount of water. Repeat this step using Jar 2.
10. Make a conclusion about what you have observed.



Let's Predict

Does water need to be exposed to air in order to evaporate? Explain your thinking. _____

Let's Observe

	On the first day...	Seven days later...
JAR 1 (lid)	It had ____ mL of water. It had ____ cm of water.	It had ____ mL of water. It had ____ cm of water.
JAR 2 (no lid)	It had ____ mL of water. It had ____ cm of water.	It had ____ mL of water. It had ____ cm of water.

Let's Conclude

Was your prediction correct? Explain the results.

Challenge question:

How many millilitres of water evaporated from Jar 2 after seven days? _____

Evaporation Exposure! #2

Question: How do wind and heat affect evaporation?

You'll need:

2 clothes drying racks



2 small towels or
pieces of cloth



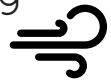
2 clothes pins



access to water



a warm windy day



What to do:

1. Make a prediction about the answer to the question, record it on Worksheet 5.
2. Soak the two small towels in water, and ring them out.
3. Hang one of the towels on a drying rack inside the classroom (away from open windows and the sun).
4. How does this towel feel? Record your observations on Worksheet 5.
5. Hang the other towel on the other drying rack, secure it with clothes pins. Place this rack outside in the sun, in the warm wind.
6. How does this towel feel? Record your observations on Worksheet 5.
7. Wait about three hours. How do both towels feel now? Record your observations on Worksheet 5.
8. Make a conclusion about what you have observed.



Let's Predict

How do you predict that wind and heat affect evaporation? _____

Let's Observe

	At first ...	Three hours later...
Towel 1 (inside)	It felt _____ _____ _____	It felt _____ _____ _____
Towel 2 (outside)	It felt _____ _____ _____	It felt _____ _____ _____

Let's Conclude

Was your prediction correct? Explain the results.

Let's Connect It!

How is this information useful to you? _____
