EARTH SCIENCE

GRADE 5

ASSESSMENT PACKET

Far from static rocks and minerals, water remains the most influential Earth Science system that we experience every day, since it influences our energy, vegetation, biology, climate, and weather patterns. You'll get to learn about the important connections between the water systems of earth and the sun, whose energy powers the water cycle and climate.

Created by Aurora Lipper, Supercharged Science

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This curriculum is aligned with the California State Standards and STEM for Science.

Educational Goals

Far from static rocks and minerals, water remains the most influential Earth Science system that we experience every day, since it influences our energy, vegetation, biology, climate, and weather patterns. You'll get to learn about the important connections between the water systems of earth and the sun, whose energy powers the water cycle and climate.

This section of Earth Science focuses on the interaction of water in the atmosphere on the physical phenomena we experience, often as weather. Because the majority of the earth's surface is water, it has a huge influence on our lives and the dynamic systems of the planet. Far from static rocks and minerals, water remains the most influential Earth Science system that we experience every day, since it influences our energy, vegetation, biology, climate, and weather patterns. Students will form important connections between the water systems of earth and the sun, whose energy powers the water cycle and climate.

Here are the scientific concepts:

- Most of the Earth's water is present as salt water in the oceans, which cover most of the Earth's surface.
- When liquid water evaporates, it turns into water vapor in the air and can reappear as a liquid when cooled, or as a solid if cooled below the freezing point of water.
- Water moves in the air from one place to another in the form of clouds or fog, which are tiny droplets of water or ice, and falls to the Earth as rain, hail, sleet, or snow.
- The amount of fresh water, located in rivers, lakes, underground sources, and glaciers, is limited, and its availability can be extended through recycling and decreased use.
- Uneven heating of the Earth causes air movements (convection currents).
- The influence of the ocean on weather, and the role of the water cycle in weather.
- Causes and effects of different types of severe weather.
- How to use weather maps and weather forecasts to predict local weather, and that prediction depends on many changing variables. *Video and experiment coming soon*
- The Earth's atmosphere exerts a pressure that decreases with distance above the Earth's surface, and is the same in all directions.
- Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.

By the end of the labs in this unit, students will be able to:

- How to record data and interpret results
- How to measure rainfall, wind speed, temperature, and atmospheric pressure
- Demonstrate how air pressure influences an object in relation to moving air
- Differentiate observation from inference (interpretation) and know scientists' explanations come partly from what they observe and partly from how they interpret their observations.
- Measure and estimate the weight, length and volume of objects.
- Formulate and justify predictions based on cause-and-effect relationships.
- Conduct multiple trials to test a prediction and draw conclusions about the relationships between predictions and results.
- Construct and interpret graphs from measurements.
- Follow a set of written instructions for a scientific investigation.

Earth Science Grade 5 Evaluation

Teacher Section

Overview Kids will demonstrate how well they understand important key concepts from this section.

Suggested Time 45-60 minutes

Objectives Students will be tested on the key concepts of weather as expressed in this Earth Science Unit. The concepts are listed below:

- Most of the Earth's water is present as salt water in the oceans, which cover most of the Earth's surface.
- When liquid water evaporates, it turns into water vapor in the air and can reappear as a liquid when cooled, or as a solid if cooled below the freezing point of water.
- Water moves in the air from one place to another in the form of clouds or fog, which are tiny droplets of water or ice, and falls to the Earth as rain, hail, sleet, or snow.
- The amount of fresh water, located in rivers, lakes, underground sources, and glaciers, is limited, and its availability can be extended through recycling and decreased use.
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Materials (one set for entire class)

- Two balloons, each with a string attached

Lab Preparation

1. Print out copies of the student worksheets, lab practical, and quiz.
2. Have the materials in front of you at your desk. Kids will come up when called and demonstrate their knowledge using these materials.

Lesson

The students are taking two tests today: the quiz and the lab practical. The quiz takes about 20 minutes, and you'll find the answer key to make it easy to grade.

Earth Science Grade 5 Evaluation

Student Worksheet

Overview Today you're going to take two different tests: the quiz and the lab practical. You're going to take the written quiz first, and the lab practical at the end of this lab. The lab practical isn't a paper test – it's is where you get to show your teacher that you know how to do something.

Lab Test & Homework

1. Your teacher will call you up so you can share how much you understand about Earth Science and how it works. Since science is so much more than just reading a book or circling the right answer, this is an important part of the test to find out what you really understand.
2. While you are waiting for your turn to show your teacher how much of this stuff you already know, you get to choose which homework assignment you want to complete. The assignment is due tomorrow, and half the credit is for creativity and the other half is for content, so really let your imagination fly as you work through it. Choose one:
    a. Write a short story or skit about weather from the perspective of the air or water vapor. You'll read this aloud to your class.
    b. Make a poster that teaches the main concepts of weather. When you're finished, you'll use it to teach to a class in the younger grades and demonstrate each of the principles that you've learned.
    c. Write and perform a poem or song about sub-cooling. This will be performed for your class.

Earth Science Grade 5 Quiz

Teacher's Answer Key

1. What is the chemical name for table salt? (Sodium chloride)
2. Where is the majority of the earth's salt found? (The oceans)
3. Where can we find supercooled liquids naturally or man-made? Name two. (Clouds, freezing rain, refrigerators.)
4. What most frequently determines the phase of water in the earth's atmosphere? (Temperature)
5. Name one example of water on the earth's surface as it occurs naturally as a solid, liquid, and gas. (Solid=polar ice, glacier, etc. Liquid=rivers, lakes, oceans. Gas=clouds, etc.)
6. What determines how water exists in nature as solid, liquid, or gas? (Temperature)
7. When water becomes a liquid from a gas, what is this called and where do we find it on Earth? (Condensation, clouds and rain.)
8. Can fish drown? How? (If the water becomes stagnant and no oxygen is replaced, the fish will drown) Name two types of heat transfer, and **g**ive an example of each type. (Conduction: sitting on a hot car seat, touching a cold piece of ice; Convection: radiator heating, coffee cooling down.)
9. If you hold a full water bottle with the camp on, and then poke a hole in a water bottle, when does the water flow out of the hole and why? (The water streams out when you either remove the camp or squeeze the bottle. As the water streams out, the water level in the bottle moves downward. The water line wants to move down, but since there's no incoming air to equalize the pressure, the flow of water through the holes stops. There's a small decrease in pressure in the air pocket in the top of the bottle and therefore the air outside the bottle has a higher pressure that keeps the water in the bottle. Higher pressure pushes!)
10. What is the pressure of air in the atmosphere? (14.7 psi, 101.3kPa, or 1 atm)
11. Why do air bubbles float to the surface of the water? (Gaseous air is less dense than liquid water.)
12. Does warm or cool air rise? (Warm air)
13. A higher pressure will (circle one): <u>push / pull</u> on an object. (Push on)
14. If an object is higher in altitude above the earth, it experiences which pressure in relationship to an object at sea level? (Circle one) (Less Pressure)
    a. Greater Pressure
    b. Less Pressure
    c. Equal Pressure

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5. Name one example of water on the earth's surface as it occurs naturally as a solid, liquid, and gas.

6. What determines how water exists in nature as solid, liquid, or gas?

7. When water becomes a liquid from a gas, what is this called and where do we find it on Earth?

8. Can fish drown? How?

9. Name two types of heat transfer, and **g**ive an example of each type.

10. If you hold a full water bottle with the camp on, and then poke a hole in a water bottle, when does the water flow out of the hole and why?

11. What is the pressure of air in the atmosphere?

12. Why do air bubbles float to the surface of the water?

13. Does warm or cool air rise?

14. A higher pressure will (circle one): push / pull on an object.

15. If an object is higher in altitude above the earth, it experiences which pressure in relationship to an object at sea level? (Circle one):
    a. Greater Pressure
    b. Less Pressure
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Earth Science Grade 5 Lab Practical

Teacher's Answer Key

This is your chance to see how well your students have picked up on important key concepts, and if there are any holes. Your students also will be working on their homework assignment as you do this test individually with the students.

Materials:

- Two balloons, each with a string attached
- Ping pong ball
- Sheet of paper

Lab Practical: Ask the student *Note: Answers given in italics!*

1. Design two experiments using the materials provided to demonstrate how higher pressure always pushes.
    a. *Student can blow between the balloons and they will come together. Higher pressure surrounds the balloons except for the area of lower pressure which between the balloons.*

    (Ask the student to identify the areas of higher and lower pressure.)

    b. *Students can perform this with a ping pong ball if they also make a cone from the sheet of paper and insert the ball into the cone and blow into the cone from the small end. The ball will remain in the cone and not be pushed out since the lower air pressure is pushing the ball into the cone.*
    c. *Students can also use a sheet of paper and bring it to their lips and blow over the top surface, causing the paper to rise up even though they are blowing across it. The lower pressure (under the paper) is pushing the paper up to a horizontal position.*

Earth Science Grade 5 Lab Practical

Student Worksheet

This is your chance to show how much you have picked up on important key concepts, and if there are any holes. You also will be working on a homework assignment as you do this test individually with a teacher.

Materials:

- Two balloons, each with a string attached
- Ping pong ball
- Sheet of paper

Lab Practical:

1. Design two different experiments using the materials provided to demonstrate how higher pressure always pushes.