



K-2 Earth Science
K-2 Physical science

Southern Nevada Regional Professional Development Program

Exploring Rain & the Changing States of Water

INTRODUCTION

Weather affects everyone on a daily basis, even young children, from the clothing we select to wear to the outdoor activities we plan to participate in. Our students may have very little background knowledge about rain because we live in such a dry climate. The activity *Exploring Rain & the Changing States of Water* will allow the students to observe the process of rain up close.

Water is the most important and amazing liquid on our planet. It covers close to seventy-five percent of Earth's surface, and yet it is still our most treasured substance.

WHERE'S THE SCIENCE?

Water is unique because it is the only material known to occur naturally on Earth's surface in all three basic states of matter: **solid, liquid, and gas.**

In the activity *Exploring Rain* the hot water in the glass jar will heat the air in the jar and add moisture to it. The moisture-laden hot air will rise. As it nears the cold pie tin at the top of the jar, the cool air will cool and condense. In time, it may actually begin

raining outside the jar, as water drops form on and fall from, the overhanging pan on to the paper plate.

MATERIALS

- Hand lens
- Rain gauge (available at your local Wal-Mart or Target)
- Quart-sized glass jar
- Paper plates
- Plastic cups
- Pitcher for pouring water
- Hot Water
- Ice cubes (Lessons #2 and #3)
- Aluminum or iron pie tin
- Science notebook

PROCEDURES

Lesson One: How can we measure rainfall?

1. Call the students to the group area and discuss rain. You may want to chart responses or, if working with second graders, have them respond to these questions in their science notebook. Pose some or all of the following questions: “What is rain?” “What do you think you already know about rain?” “What do you like to do when it rains?” “Has there ever been a time when you hoped it would not rain?” “When it does rain what do the clouds in the sky look like?” (dark stratus or cumulus clouds)
2. Tell the students that a **meteorologist** is a scientist who studies the weather. One condition of the atmosphere that meteorologists observe and record is the amount of water in the atmosphere, which includes the amount of rainfall.
3. Hold up a **rain gauge**, an instrument used to measure the amount of rain, and introduce it to the students. Explain how to use the lines on the rain gauge to measure the amount of

- rainfall. You can model how to read the rain gauge by filling it several times with various amounts of water.
4. Pass out science notebooks to the students and have them draw a sketch of the rain gauge and describe how meteorologists use a rain gauge to record rainfall.
 5. Read a section from a nonfiction selection about the rain or rain gauges. The Delta Science Reader *Weather Instruments* has a useful section titled “How Do We Measure Precipitation?” (see additional resources)
 6. Ask the students to write what they learned about recording the amount of rainfall in their science notebooks.

Lesson Two: The States of Water

1. Call the students to the group area and review what they learned about the rain and rain gauge in the last lesson. Allow time for sharing.
2. Review or introduce the three basic states of **matter**; anything that has mass: solids, liquids and gases. (see vocabulary section)
3. Hold up a quart-sized plastic bag filled with water. Ask the students what is inside the bag. Once someone has identified it as water, pose the following question: “Is water a solid, liquid or gas?” Next, pose the question: “How can water change?” Chart responses.
4. Tell the students that today they are going to investigate how water changes. Their first task is going to be to observe water in the liquid state and the solid state, recording observations in their science notebook.
5. Send the students back to their seats and pass out a clear plastic cup containing water and another containing an ice cube to each pair of students with a hand lens and science notebooks.
6. As students work, move from group to group checking their observations and ensuring they are recording in their science notebooks.

7. When the students are finished, call them back to the group area with their science notebooks and discuss and chart what they observed.

Lesson Three: Observing Rain

1. Call the students to a group area and review what they learned about the states of water.
2. Explain to the students that you are going to set up an investigation for them to observe and that you want them to observe and record their observations in their science notebook.
3. Pour a cup of hot water into one or more quart-sized jars (lid is not necessary). **Note:** Jars of hot water must be placed in a secure viewing location out of the reach of children but within view. To review the states of matter, ask the students “What state is the hot water currently in?” (liquid)
4. Next, put some ice cubes in a pie tin and place on top of the jar. Again ask the students to identify the state by posing the following question: “What state is water in as an ice cube?” (solid)
5. Instruct the students to carefully observe using the hand lens; allow several minutes for observation. Move from group to group discussing what is happening. After meeting with each group, ask the students to record what they observed in their science notebooks.
6. Call the students back to the group area and discuss what happened. Share out and chart responses.

Vocabulary:

Weather Instruments Delta Science Reader www.deltaeducation.com

Atmosphere-layer of air surrounding earth

Cloud-mass of tiny water droplets or ice particles in the air

Freeze- to change from a liquid to a solid state as a result of cooling

Gas-a state of a substance with no definite shape or volume:
usually invisible

Ice-the solid state of water

Liquid-a state of a substance with no definite shape but a
definite volume

Matter-anything that has mass

Melt-to change from a solid to a liquid state as a result of
warming

Meteorologist-scientist who studies the weather

Rain gauge-instrument used to measure the amount of rain

Solid-a state of a substance with a definite shape and volume

Water-a liquid earth material made of hydrogen and oxygen

Temperature-measure of the amount of heat energy in a
substance

Weather-state of the atmosphere at a certain place and time

Additional Resources

<http://ga.water.usgs.gov/edu> U.S. Geological Survey Water
Science for Schools website. This site is an excellent resource for
developing your own content knowledge regarding water.

Our Sun, Our Weather (Big book) www.newbridgeonline.com

Weather Instruments ISBN 1-59242-260-8 Delta Science Readers
www.deltaeducation.com

Nevada State Standards

E2A2 Students know water on Earth can be liquid (rain) or a solid
(snow and ice), and go back and forth from one form to the other.

E/S

E2A4 Students know weather can be described by measurable
quantities such as temperature, wind direction and speed, and
precipitation. I/L

P2A1 Students know matter can exist as solids and liquids. E/S

P2A2 Students know some properties of materials can be changed by heating, freezing, mixing, cutting, or bending. E/S

N2A1 Students know how to make observations and give descriptions using words, numbers and drawings. E/S

N2A2 Students know tools can be used safely to gather data and extend the senses. I/L

N2B2 Students know that, in science, it is helpful to work in a team and share findings with others. E/L

Safety Reminder:

Remind the students not to touch the jar as it contains hot water.

You may want to place the jar in a location where students are able to observe clearly without being able to reach the jar.