

# Soakin' Up the Sun

## Summary

Simple experiments with puddles show evaporation happens as water molecules escape from the earth's surface. When they escape, they change from liquid to gas, or water vapor in a process called evaporation. The sun is the source of energy that causes this to occur.

## Group Size

Small Groups

## Life Skills

Communication

## Materials

For each group:

Thermometer

Piece of chalk

Ruler or measuring tape

Science journal or pencil and paper

## Background for Teachers

Water exists in three forms: ice (solid), liquid water (liquid), and water vapor (gas).

Evaporation happens at any temperature, but it will evaporate very quickly if the sun is used as the source of energy. Evaporation occurs on both water from the ocean and on land. The warmer the water, the faster the molecules move into the air and the faster they evaporate.

Most water vapor comes from lakes, rivers, oceans, leaves of plants and wet ground. The heat from the sun causes the water to change from liquid to gas.

## Student Prior Knowledge

Students should understand water changes as it moves through the water cycle.

## Intended Learning Outcomes

Observe simple objects and report their observations.

Make simple predictions and inferences based upon observations.

Use instruments to measure length, temperature using appropriate units.

Use observations to construct a reasonable explanation.

Know science information specified for their grade level.

Record data accurately

Report observation with pictures.

## Instructional Procedures

Step 1. This investigation works well if done after a rain storm when the sun comes out before the end of the day. If rain isn't available, just create your own puddles!

Step 2. Tell students that as Water Cycle Detectives they will now be Evaporation Experts. Pass out the supplies for each group and go outside to the playground in an area with a hard surface such as a sidewalk or blacktop. Have each group find a puddle in one of the areas that will become their study site.

Step 3. Each group will keep track of their evaporation action. Have each group make an outline of a

puddle by drawing around the puddle's edge with their chalk. Measure the diameter of their puddle with the ruler or measuring tape. Take the temperature. Instruct them to record this data in their science journals or on a piece of paper. Observations should also include drawings of what they see.

Step 4. Every half hour, have the groups return to the puddle and draw new outlines. Have them continue to measure the size, draw and record temperatures. This process should be repeated until the puddle has completely disappeared or until the school day ends.

Step 5. Return to the class and discuss their observations together. Some questions might include:

How long did it take for the puddle to evaporate?

Did some puddles still have water left?

Does puddle size matter in the evaporation process?

Does temperature matter in the speed of evaporation?

Where did the water go?

Was the sun part of the evaporation process?

What did the sun do to the water molecules?

Does the water cycle require a source of energy?

Step 6. What conclusions can they state from their observations? (Students should infer that evaporation takes place as the liquid water becomes water vapor from the sun's warmth. They infer this because water can't just "disappear" but has to follow the next step in the water cycle.

Step 7. Discuss with students how the process of the sun's energy causing evaporation is important. Have them name some places on the earth where evaporation takes place. Ask them to identify situations in which evaporation causes problems (swimming pools and fountains lose water, water holes in deserts dry up) and situations where evaporation is helpful (drying cement, clothes hanging on the line, making raisins). Have they noticed that evaporation occurs more frequently in the summer months when the sun is warmer?

### Extensions

Repeat the experiment another day. This time, have each group pick a spot that is different from the original one. (in the shade, in the sun, on the sidewalk, on the pavement, different size.) Start with another puddle, either from rain, or one that they create. Have the group make predictions about changes, if any, in the data they will observe. Will the puddle take longer to evaporate? Does it take longer to evaporate on a hot day or a cold day? Compare the results with their previous observations. Try this experiment on pieces of paper using watercolors. Use a dropper to drip watercolor puddles on the paper. When the puddles are dry, puddle prints using evaporation will remain. Add more puddles to the paper after the first set has dried. Overlap them and try a variety of colors, experimenting as you go.

Place the papers in different places in the room and compare the time it takes for evaporation to take place. Does the sun or warmth play an important part in the evaporation process?

### Assessment Plan

Collect science journals. Look for recordings and drawings of observations and an explanation of evaporation taking place when the sun is used as the source of energy.

Create some type of Water Detective Badge, or Evaporation Expert certificate. In order to receive this, students must:

List the three parts of the water cycle (evaporation, condensation, and precipitation.)

Identify the source of energy for evaporation from the surface of Earth. (sun)

List three places on the earth that evaporation takes place. (lakes, rivers, oceans, leaves of plants, rain puddles, wet ground, garden, etc.)

When students have a badge, they can receive a reward, such as 5 minutes extra recess, or a mini-box of raisins renamed "Evaporated Grapes"!

## Authors

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