

EXPLORING ENERGY

KINDERGARTEN-SECOND

TEKS

<i>Kindergarten:</i>	K.5A, K.5B, K.6A, K.6B
<i>First Grade:</i>	1.5A, 1.5B, 1.6A, 1.6B
<i>Second Grade:</i>	2.5A, 2.5B, 2.5C, 2.6A, 2.6B

Vocabulary

attract, condensation, energy, evaporation, gas, heat, light, liquid, magnets, matter, precipitation, properties, pull, push, repel, solid, sound, vibration, water cycle

Pre-Show Activity

Pre-Show Lesson: The Disappearing Trick (Water Cycle)

Post this question on the board: “How does matter change when we heat it or cool it?”

Materials:

Per class: hot plate, foil, sugar packet, water

Per group: sugar packets, a cup of water, large metal or plastic bowl, some clear plastic wrap, a dry ceramic coffee mug, tape or a large rubber band, a pitcher and water

Procedure:

1. Perform the vanishing sugar act to get your students attention. Give each group a packet of sugar to look at. Discuss its properties. Tell the students that you are going to make the sugar inside a sugar package disappear. You should have packets of sugar on the table up front (You will need to empty the sugar out of one of the packets before the trick begins by tearing a small corner so that the sugar can fit through but the package still looks unopened.). Pick up the empty sugar packet and flick it on the side to pretend to get the sugar down to the bottom. Then tear the top off the packet to “open” it. Next, make a fist with one hand and pour the “sugar” into your fist from the empty packet. Now, say the magic words, open your fist and the sugar is gone! Ask kids, “Where did the sugar go?”

“Can it disappear into thin air?” “Can you explain it?” Explain to students that it was a magic trick. Ask: “In real life, can objects just disappear into thin air?”

2. Give each group a cup of water. Have students draw it and describe its properties.
3. Take the same cup of water and put it in a hot plate and heat it. Ask students, “Where did it go?” “Did it vanish into thin air?” “How can you explain it?” Ask students if the sugar could do that.
4. Tell students to dissolve their sugar packet into the cup of water. Take one of the cups and heat it. Put a piece of foil fashioned into a bowl inside the pan so that you can take the foil out to show the students. After the water has evaporated, show the students that the sugar did not evaporate. Ask: “Where is the water?”
5. Explain the water cycle to the students. Show students a diagram of this. They should have one in their science textbooks.
 - Evaporation: liquid water changes to a gas (water vapor) when heated.
 - Condensation: water vapor, when cooled up in the sky, changes back to a liquid.
 - Precipitation: when liquid water falls from the sky as rain, sleet, snow or sometimes hail.
6. Students will work in groups to create their own water cycle model. For younger students, you may want to do this as a class. You will need to do this on a sunny day. Each group will need a large metal or plastic bowl, some clear plastic wrap, a dry ceramic coffee mug, tape or a large rubber band, a pitcher and water.

Procedure:

1. Put the bowl in a sunny place outside.
2. Using the pitcher, pour water into the bowl until it is about $\frac{1}{4}$ full.
3. Place the mug in the center of the bowl. Be careful not to splash any water into it.
4. Cover the top of the bowl tightly with the plastic wrap.
5. Tape the plastic wrap around the bowl, or use a rubber band.
6. Leave the bowl for about an hour.

Have students draw and label a picture of their set up in their science notebooks.

7. Return to the classroom to discuss with students what they think is going to happen- make predictions. For older students you may want to have them write a prediction in their science notebooks.

8. While you are waiting, show the students a short video on the water cycle. Discuss what is happening.

Have kids think of times when heat is added and evaporation happens in our everyday life: blow drying your hair, a towel drying on a rack, clothes in the dryer, dishes in the dishwasher, your own sweat, the shower dries after you have used it, the water in the aquarium.

Have students think of times when matter changes because it has been cooled: condensation on a window, condensation on a cup of ice water, condensation on a mirror after a shower, dew on the grass.

9. Check your experiment. Students should draw and label what they see. Students should see that there are water drops on the plastic wrap. Some of the drops are dripping. Watch for a couple of minutes. You may need to move the bowl a little to speed this up. Peel back the plastic. Students should see that there is now water in the coffee mug. How did it get there? Lead students to understand that water from the bowl evaporated because of the heat and then condensed back into liquid water on the plastic wrap. When the drop got heavy enough, gravity worked to pull them down and it “rained” in the coffee cup.

Post-Show Enrichment Activities

Activity One: What Is Energy?

Materials: light, heat and sound energy pictures, magazines, Venn diagram

Procedure:

1. Ask students what kinds of energy they saw in the show. Students should identify light, heat and sound. They may also identify electrical and chemical.
2. Show students examples of light, heat and sound energy. If students see a picture of light energy, they will hold their hands out above their head like they are giving off light. If it is a picture of sound energy, they will cup their ear. If it is a picture of heat, they will wrap their arms around themselves to keep warm (Appendix A-1). Be sure to discuss how some of the pictures represent more than one type of energy. The campfire is an example of all three.
3. Have students look through magazines for pictures of energy and classify them as light, heat or sound.
4. Students could make a Venn diagram using two (or three for older students) energy sources. They can organize their pictures in the Venn diagram.

Activity Two: Condensation on a Cup

Materials:

Per group: dry glass cups, ice, cold water, room temperature water

Procedure:

1. Give each group two dry glass cups.
2. Have them put some ice inside one of them, making sure that no water drips on the outside of the cup.
3. Next, pour some cold water into the cup of ice making sure no water drips on the cup.
4. Pour the same amount of room temperature water into the other glass, making sure no water drips on the outside.
5. Students should draw this in their science notebook.

6. After about 10 minutes, students should notice condensation on the outside of the glass.
7. Discuss with students where this came from. Students will think that water came from inside the glass to the outside. Ask them why this did not happen in the cup with no ice. Lead students to understand that water vapor in the air outside the cup condensed on the cold surface on the outside of the cup.

You may want to extend this activity into an experiment by having students test different types of cups or temperatures of water. They could also test different substances inside of the cup.

Activity Three: Sound Energy

Materials: rubber band, various cups

Procedure:

1. Students will take a rubber band and place it around a plastic, glass or Styrofoam cup so that it stretches across the opening of the cup.
2. They will pluck the rubber band. Students should notice the rubber band vibrating.
3. Students can test different types of cups, different sizes of cups, different thicknesses of rubber bands.
4. Students can try to play a song using the rubber band and cup. Be sure that students understand that sound is caused by vibrations. If you have a guitar to show the students, even if it is a child's toy, it would be a good example to show the students.

Extension: Put out a variety of materials and have students create their own instruments and explain how they work using vibrations. Suggested materials are: hangers, string, craft sticks, straws, paper clips, cups, construction paper, tape, glue, scissors, fabric, dried beans, aluminum foil, plastic wrap, etc.

Groups can create a song and perform for the class.

Appendix

A-1



