

Name: Jennifer Ova

Standard

Performance Standard

4-PS3-2

Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

Clarification Statement Emphasis is on the transfer of energy whenever objects are moving. Examples include how sound, light, and heat can transfer energy.

Assessment Boundary Assessment does not include quantitative measurements of energy

Engage

- **Phenomena:** <https://www.generationgenius.com/videolessons/energy-transfer-video-for-kids/>
- **Background Knowledge:**
- These rotations as well as the engaging video will act as an introduction to this standard. The whole group lesson will occur after the rotations. These rotations focus on discovering how heat, sound, and light can transfer energy.

Center 1

- **Challenge:** Students will discover how heat can transfer energy
- **Materials Needed:** 3 bowls of water (1 room temp, 1 with ice cubes, 1 warm water), timer
- **Learning Documents:** Science Journal
 - Students will answer the questions located in Appendix A on page 1 of their science journals.
- **Special Directions:** At this center you will be discovering how heat can transfer energy. The bowls are labeled (room temp, cold, warm). You will place one of your hands in the cold water and the other hand in the warm water at the same time. You will set the timer for 20 seconds and keep your hands in the water until 20 seconds is up. Then you will immediately place both of your hands into the room temperature water. You can now answer the questions posted at the center on page 1 of your science journals.

Center 2

- **Challenge:** Students will discover how sound can transfer energy.
- **Materials Needed:** tuning fork, piece of paper, plastic container half full of water
- **Learning Documents:** Science Journal
 - Students will fill out the chart located on Appendix B and cut and paste it on page 2 of their science journals.
- **Special Directions:** At this center you will be able to watch sound energy being transferred. As soon as you get to the station, grab a chart as you will be filling it out as you go through the activity. First take the tuning fork and strike it against the sole of your shoe. Observe the tuning fork and record what you hear and see in the corresponding row of the chart. Next strike the bottom of the tuning fork against the

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sole of your shoe again, but then quickly hold the fork next to a piece of paper. Record what you observed on the chart. Lastly, strike the tuning fork on the bottom of your shoe once again, but this time quickly stick the fork into the plastic container half full of water. Watch the movement of the water and the sides of the container. Record your observations on the chart. You can include illustrations in the second column of the chart if you wish. Cut and paste the chart on page 2 of your science journals.

Center 3

- **Challenge:** Students will discover how light can transfer energy.
- **Materials Needed:** a glass of water, a sheet of white paper, a sunny day or a flashlight
- **Learning Documents:** Science Journal
 - Students will write down their observations on page 3 of their science journal
- **Special Directions:** At this center, you will be able to observe how light can transfer energy. You will need the glass full of water. If you decide to use sunlight, place the glass of water so it is half on and half off the edge of the table, and so the sun shines directly through the water, onto the sheet of white paper on the floor. Adjust the paper and glass as you need until a rainbow forms on the sheet of white paper. If you are using a flashlight, place the glass of water on the white sheet of paper, and move the flashlight around until you see a rainbow on the sheet of white paper. Write down your detailed observations on page 3 of your science journals.

Whole Group Session

- Discuss the rotations. What were some of the students' observations? What did they learn about energy transfer?
- "Energy is the ability to do work. Energy makes things happen"
- "What are some examples of how we use/need energy in our everyday lives?"
- "Energy transfer takes place when energy moves from one place to another"
- "As you should have discovered, energy can be transferred as heat, light, and sound"
- Read the book *Sound Heat & Light: Energy at Work* by Melvin Berger
- Discuss energy transferred by heat
- Discuss energy transferred by sound
- Discuss energy transferred by light
- Students will fill out the exit slip found in Appendix C as a summative assessment

Assessment Plan:

- **Formative:** Students will record their answers/observations for each learning center rotation in their science journals on the designated pages.
- **Summative:** Students will complete the exit slip found in Appendix C as their summative assessment after participating in the learning center rotations and the whole group session.

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Appendix A

How does your hand feel that was in the cold water?

How does your hand feel that was in the warm water?

In terms of energy transfer, explain how this is possible. (3-4 sentences)

Does heat move from warmer objects to cooler objects or from cooler objects to warmer objects?

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Appendix B

	Transferring energy sounds like...	Transferring energy looks like...
Tuning fork		
Tuning fork against paper		
Tuning fork in water		

