WEEK 4 Lesson 1

Science and Engineering: Light is Energy

Experimenting with Light

S & E **Big Ideas**	Light is energy that we can see.
S & E **Guiding Question**	What is light?
Content Objective	I can conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. (1-PS4-3)
Language Objective	I can listen to my peers and engage in conversations about light. (Standard 1)
Vocabulary	**opaque:** something that is not see through **translucent:** something that allows some light to pass through but it is not clear **transparent:** something that is clear and light can pass through
Materials and Preparation	• Where Does Light Come From? video (https://www.youtube.com/watch?v=zBosbqByR3c) • black construction paper • clear plastic cups, 2 Wrap the outside of one cup with black construction paper. • water When ready to conduct the investigation, fill the cups halfway with water. • scissors • tape • thermometer • digital timer • Light Energy Experiment Data Chart, one ½ sheet per child This activity is best done outside on a warm day, but a sunny window

	will also do. The investigation requires checking on the cups of water every hour, therefore, if possible, start the investigation in the morning.
Opening 10 minutes	Explain to the children that light is a form of energy. *What can we use solar energy for? Have you ever seen a solar farm?* Draw children's attention to the recent addition of solar farms in Maine. Solar energy, energy that comes from the sun, uses light to create energy for homes and even some cars. *The sun is like a big battery that has lots of stored energy in the form of light and heat. Without that energy, we could not live on Earth.* Show the video.
Investigation 5 minutes After, check on the water in 1 hour intervals	Share that today children will be testing the sun's energy. They will be using the light energy to heat up water. Explain that black is a color that absorbs light and heat quickly. *Have you ever worn a black shirt on a hot summer day and someone has told you to change into a different colored shirt?* Explain that this is because black holds the light and heat energy very well. Distribute the Data Charts. Present to the whole group one clear cup of water and a thermometer. Take the temperature of the water and have the children record the measurement on their chart. Then, show the children another cup that has the outside covered with black construction paper. Repeat the measurement reading and have the children record the temperature. Place both cups in the sun. Set a time. Check in on the two cups in 1 hour intervals. Have the children record the temperature readings each time.
Discussion 5 minutes	*Why did the cup with the black paper reach a higher temperature?* *What is light?*
Closing 2 minutes	*How can we apply this knowledge to our own lives?*
Standards	**1-PS4-3** Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. **Standard 1:** Prepare for and participate in conversations across a range of topics, types, and forums, building on others' ideas and expressing their own.

Ongoing assessment	Check for understanding in the children's responses.

Notes

WEEK 4 Lesson 1

Science and Engineering: Lights Interactions with Materials

Exploring Light

S & E **Big Ideas**	Materials interact with light in different ways.
S & E **Guiding Question**	Can light pass through any object?
Content Objective	I can conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. (1-PS4-3)
Language Objective	I can listen to my peers and engage in conversations about light. (Standard 1)
Vocabulary	**opaque:** something that is not see through **translucent:** something that allows some light to pass through but it is not clear **transparent:** something that is clear and light can pass through
Materials and Preparation	• Light The Dr.Binocs Show video (https://www.youtube.com/watch?v=d7yTlp4gBTI) • chart paper and markers • flashlights, one per group • clear plastic (or transparency, or ziploc bag), one per group • wax paper, one piece per group • black felt, one piece per group Children will work in small groups of 3. If necessary, prepare these groups ahead of time.
Opening 10 minutes	Introduce the lesson vocabulary. Explain that like sound, light also travels in rays. Some materials allow the light waves to pass through without disturbing them. Some materials allow some light waves to pass through,

	and other materials don't let any light waves pass through. Collect ideas from the children. *What materials do you think let light waves through clearly?* *What materials do you think stop light waves from passing through?* *What materials do you think let some light through?* Record their responses on the chart.
Investigation 10 minutes	Place the children into small groups. They will take turns being the Flashlight Operator and Material Testers. The children will test each material and determine if it is opaque, transparent, or translucent.
Discussion	Ask the children to share their observations. Encourage them to agree, disagree, and build on each other's ideas. Use these questions to guide the discussion. ● *Which material do you think was transparent?* ● *How did you reach that conclusion?* ● *Which material do you think was translucent?* ● *How did you reach that conclusion?* ● *Which material do you think is opaque?* ● *How did you reach that conclusion?* Show the video.
Closing	*Light waves can travel, but they cannot pass through all objects.* Ask the children about new evidence that supports this idea.
Standards	**1-PS4-3** Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. **Standard 1**: Prepare for and participate in conversations across a range of topics, types, and forums, building on others' ideas and expressing their own.
Ongoing assessment	Check for understanding in the children's responses.

Notes