WEEK 6 Lesson 1

Science and Engineering: Making Rainbows

Exploring Light

S & E **Big Ideas**	Light is made of 7 different colors visible to the human eye.
S & E **Guiding Question**	Why can I see different colors in a rainbow?
Content Objective	I can engage in 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 talk with my peers about how to refract light in order to see a rainbow. (Standard 1)
Vocabulary	**prism**: a piece of glass or other see-through material that has several flat sides, called faces **refraction**: when light changes direction, or bends when it moves from one material to another.
Materials and Preparation	● Colossal Questions: How are Rainbows Made? Epic video (https://tinyurl.com/yrdhw2k9) ● How is a Rainbow Formed video (https://www.youtube.com/watch?v=nCPPLhPTAIk) ● plastic cup, one per group ● water, for each cup ● small mirror, to be placed in the cup of water Place the mirror in the cup before the investigation. ● flashlight, one per group ● white paper, one piece per group ● chart paper and markers Children will work in small groups of 3-4. Prepare these groups ahead of time, if necessary.

Opening 10 minutes	Ask the children to share what they know about rainbows. Record their thoughts on chart paper. Share the Colossal Questions video. Ask children to share what they learned and what they wonder.
Investigation 10 minutes	Place the children into groups. Tell children they will be making rainbows. Warn children that part of this experiment requires the lights to be off. Optional step: show the How is a Rainbow Formed video. Procedure: ● Provide each group of children a clear cup with water and the mirror placed inside. ● Assign each child in each group a role. They will rotate these roles: flashlight operator, paper holder ● Shut off the classroom lights. ● The flashlight operator will shine the beam of light from the flashlight onto the mirror in the water. ● The paper holder will hold the paper at an angle over the glass to capture the refractured light. ● Allow the children to switch roles and repeat the process.
Discussion 8 minutes	Ask: ● What did it look like when you held the paper over the cup? ● What did you notice about the refracted light? ● What do you still wonder about?
Closing 2 minutes	Gather children in a circle on the rug. Ask children what new evidence they have that supports the ideas below. ● Light is made up of many colors
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.

WEEK 6 Lesson 2

Science and Engineering: Communicating with Light

Experimenting with Light

S & E **Big Ideas**	People use light to communicate.
S & E **Guiding Question**	How can we communicate using only light?
Content Objective	I can experiment with and create a form of communication with a flashlight. (1-PS4-4)
Language Objective	I can talk with and negotiate with my classmates. (Standard 1)
Vocabulary	**signal:** a way to communicate or get the attention of a person
Materials and Preparation	• flashlight, one per group • Flashlight Code sheet, one per child • The Red and White Striped Lighthouse This poem will be used for the closing. Teachers can project the poem, write it on the board, or simply read it aloud.
Opening 10 minutes	Tell children that they will be experimenting with light. *Light has been used as a signal for hundreds of years. A signal is a form of communication. Light is a good way of communicating because it can travel over a long distance.* Engage in discussion: • *Have you ever seen light used as a signal?* • *Where was it used?* • *How was it used and what did it communicate?* If children are unable to draw on a previous experience, prompt them with a clue about driving in a car/walking on the sidewalk and knowing when to stop and go.
Investigation	*Today, you will develop your own code, using light.*

10 minutes	Distribute the Flashlight Code sheets. Children will develop a way to communicate: What do you want to play at recess? And a selection of response choices such as run, tag, hide and seek, etc). They will develop an on/off code for each phrase/word. An example: What do you-On/Off/On want to-On shine the light up then down play at recess-Off/On/Off Allow partners to communicate a response then switch roles and have the other partner ask the question.
Discussion	Ask questions about the experiment: ● How do people use light to communicate? ● What are some other ways that light can help us signal or communicate with others?
Closing	Share the poem The Red and White Striped Lighthouse.
Standards	**1-PS4-1.** Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
Ongoing assessment	Check for understanding in the children's responses.

Notes