

WEEK 5 Lesson 1

Science and Engineering: Light and Shadows
Experimenting with Light

S & E Big Ideas	For a shadow to be formed an object must block light. The object must be opaque or translucent to make a shadow. A transparent object will not make any shadow, as light passes straight through transparent objects.
S & E Guiding Question	What is a shadow? How are shadows formed?
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 engage in conversations with my peers about light and shadows. (Standard 1)
Vocabulary	<p>shadow: a dark area or shape produced by a body coming between rays of light and a surface.</p> <p>opaque: something that is not see through</p> <p>translucent: something that allows some light to pass through but it is not clear</p> <p>transparent: something that is clear and light can pass through</p>
Materials and Preparation	<ul style="list-style-type: none"> ● flashlights, 1 per group ● opaque paper, construction or felt ● translucent object, such as white paper, wax pape ● white paper, 1 page per child ● crayons, markers ● sidewalk chalk (for alternate activity)
Opening 4 minutes	<p>Review with the children the definitions of opaque, translucent, and transparent. Ask the children to define a shadow.</p> <p style="text-align: center;"><i>Have you ever seen your shadow? How did it get there? Does your shadow look exactly like you?</i></p> <p>Share that today children will be experimenting with shadows.</p>

Investigation 15 minutes	<p>The children will use building blocks, small toys or figures, or items from the classroom to cast shadows. Use the flashlight to cast a shadow of the figure on a piece of white paper. Demonstrate for the children how to cast the shadow and how to use a marker to outline the shadow.</p> <p><i>How does the shadow change if you rotate the block?</i> <i>How does the shadow change when you move the light closer, further away, or from a different angle?</i></p> <p>An alternative to this activity: Go outside on a sunny day. Stand in a place where children’s shadows are cast. Have one child strike a pose, while another child traces it with sidewalk chalk. Then, repeat the process for the child who was tracing.</p>
Discussion 5 minutes	<p><i>What materials created the best shadow?</i> <i>How did the shadow change when the light was moved?</i></p>
Closing 6 minutes	<p>Review the vocabulary terms from today’s lesson and the guiding questions.</p>
Standards	<p>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.</p> <p>Standard 1: Prepare for and participate in conversations across a range of topics, types, and forums, building on others’ ideas and expressing their own.</p>
Ongoing assessment	<p>Check for understanding in the children’s responses.</p>

Notes

WEEK 5 Lesson 2

Science and Engineering: Mirrors and Beams
Exploring Light

S & E Big Ideas	Materials interact with light in different ways. Light and sound travel.
S & E Guiding Question	How can we redirect a light beam?
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 engage in conversations with my peers about light beams. (Standard 1)
Vocabulary	<p>light beam: energy from a light source that you can see</p> <p>mirror: a shiny surface that reflects light</p> <p>redirect: to change the direction</p> <p>reflection: the bouncing of light off an object</p>
Materials and Preparation	<ul style="list-style-type: none"> ● mirror, one per small group ● flashlight, one per small group ● book, one per small group <p>On the board, write: How can we redirect a light beam?</p>
Opening 3 minutes	<p>Invite children to share what they know about light and about what questions they still have. Record questions on the board.</p> <p>Show the flashlight and mirror. Confirm that a mirror must be handled very carefully. Show children the two sides of the mirror and ask them how they are different. [One is shiny and one is dull].</p> <p><i>How could we find out if the mirror is transparent, translucent, or opaque?</i> [Shine light at it and see if the light goes through.]</p>

	<p>Ask the children to look through the mirror from the dull side. Shine the flashlight at the dull side of the mirror. Have children confirm that the mirror is not transparent. No light goes through the mirror, so it is an opaque object.</p> <p><i>What would happen if I shined the beam of light onto the shiny surface of the mirror?</i></p> <p>Children will work with a partner to find out.</p>
<p>Investigation 10 minutes</p>	<p>Refer to the focus question on the board. <i>How can we redirect a light beam?</i></p> <p>Show the children how to shine the flashlight beam so you can see the circle of light on the tabletop. Give them this challenge: use the mirror to redirect the light beam onto the ceiling without pointing the flashlight toward the ceiling. Ask the children to turn to their partner and describe to each other what the challenge is.</p> <p>Distribute the flashlight, mirror, and book to each small group. Invite them to complete the light-and-mirror challenge.</p> <p>When visiting the small groups: <i>How can you get the light to shine on the book with the flashlight facing the other direction?</i></p> 

