

Lesson Plan Shadow Puppets 4th

Grades and Subjects

Grade 4 Science and ELA

Topic

Exploring Light and Shadows

Enduring Understanding

- **Light, as a form of energy, has specific properties including color and brightness. Light travels in a straight line until it strikes an object. The way light reacts when it strikes an object depends on the object's properties.**
- Employ a reciprocal communication process that includes planning, drafting, revising, editing, reviewing, presenting, and reflecting.

Primary Standards/Indicators

Science

4.P.4A.3: Obtain and communicate information to explain how the visibility of an object is related to light.

4.P.4A.4: Develop and use models to describe how light travels and interacts when it strikes an object (including reflection, refraction, and absorption) using evidence from observations.

4.P.4A.5: Plan and conduct scientific investigations to explain how light behaves when it strikes transparent, translucent, and opaque materials.

Secondary Standards/Indicators

ELA

W.3.1: Gather ideas from texts, multimedia, and personal experience to write narratives that:

- a. develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences;
- b. orient the reader by establishing a situation and introducing a narrator and/or characters;
- c. organize an event sequence that unfolds naturally;

C.1.3: Apply techniques of articulation, adequate volume, eye contact, facial expressions, posture, gestures, and space; take one's own turn in a respectful way

Academic Language

Vocabulary

- Opaque
- Translucent
- Transparent
- Reflection
- Illuminate
- Refraction
- Absorption

Language Function and Content Objective

- Explain how light travels through different objects.
- Compare how light changes when shined on different materials
- Perform a shadow puppet play with characters and a clear event sequence using appropriate space/gestures and voice volume.



Assessment Plan

- Pre-Assessment-
 - Prior to the lesson, the teacher should ask students what they think is necessary to form shadows. Students should think, pair, share to explain their thinking. Teacher will list their answers on the board. Next, the instructor should ask students to what makes objects visible? Is there anything that is visible without light? Again, allow students to think, pair share and list answers on the board.
 - Next, students will complete an anticipation guide in which they will either agree or disagree with each statement.
- Post-Assessment-
 - After students have completed their puppet shows, they will go back to their anticipation guide and complete the after reading section.
 - Next, students will be asked to list the three things necessary to make a shadow. They will also explain reflection, refraction, absorption.
 - A sample rubric has been included for the shadow puppet
- Criteria for Mastery-
 - Student is able to explain that light is energy that is required in order for objects to be visible.
 - Objects can be luminous (put out light: the sun, light bulb, etc) and some are illuminated (reflect light from another source, the moon, mirror)
 - Student can explain the difference between translucent, opaque, and transparent.
 - Student is able to correctly describe what happens to light when light shines on different objects (Reflection/Refraction/Absorption)
 - Student can successfully share findings about their shadow puppet in video format using the provided sentence starters.

Materials

- Anticipation Guide
- Shadow Story by Nancy Willard
- Flashlight/projector screen
- Cotton sheet or other material to use as shadow puppet screen
- Black construction paper
- White pencils
- Scissors
- Wooden dowels
- Glue, tape
- Cellophane, feathers, tulle, lace, etc.
- Mirror, Convex/Concave lenses
- Video cameras

Teacher Preparation

For this lesson it is important to have all materials ready to go. Each student will need black construction paper, scissors, a white pencil, a wooden dowel and a sample transparent and



translucent material. A projector or light source should be available with a sheet or material to project on.

The discussion guide is a helpful tool to ensure important concepts are covered. There are suggestions for pre- and post-assessments as a way to measure student learning. A rubric for the shadow puppets has also been included.

The “Table O” represent opaque materials. “Table A” will represent translucent and “Table B” will represent transparent. It is helpful to separate all materials and put them on different tables in the room. Rather than provide these vocabulary words up front, students will use them in their puppets and need to explain their findings when they test their puppets.

To support students with their puppets and their play plots, it may be helpful to remind students of plots of traditional literature fables/folktales/fairy tales and consider doing a puppet remake. This will help reinforce plot analysis skills as well as encourage them to use those plot line as scaffolds for their own puppet shows.

To keep students on task, it is helpful to stress that during Makerspace time, they are the experts and need to help each other if they get stuck. When they use the video cameras, students should work in groups of 3-4 to help each other record and ensure they answer all questions.

Meat of Lesson

- **Hook**

1. Ask students - “What can you see when it is dark outside? What can you see when it's sunny outside? How does what you see change when you turn on lights or walk outside?”
2. Students should complete the “Before Reading” section of the anticipation guide. Next, read Shadow Play
3. Allow students to take turns making shadows by putting their hands in front of the projector.
 - a. Now, ask them to list what is needed to create a shadow. (Light source, object to block light and surface to project shadow.)
 - b. Next, ask students how light travels. “Does it move in angles, around corners or in a straight line?”
 - c. Again, allow students to use projector or flashlight to make shadows. You can provide additional materials for them to use such as two papers with a hole punched in each. Does the light shine through if they do not align both holes? (As a class, have students share their findings. Light does not bend. It travels in a straight line.)
 - d. Ask students, “What if the light moves? Does it still only move in a straight line?” and move projector or flashlight to a different angle. (The light still moves in a straight line but the shape of the shadow will look different because of the angle)



4. Directions- Today you will design a shadow puppet to show how light travels and how it moves through different objectives. You will use different materials to make your puppet to see how different materials interact with light. You will also review basic plot structure for your play (if needed take moment to review).
- **Brainstorm**
 - Show an example of a shadow puppet. (Provided). Point out that it is just the outline of the character but that there are parts that have different materials on them.
 - Students will plan what they want their puppet to look like. They can make an animal, person or create an imaginary creature.
 - Students then sketch out their ideas for their puppet on the anticipation guide. They do not have to cut and paste at this step, but should have a plan.
 - How will they incorporate the extra materials? This must be in the design before they can begin to make their puppet.
 - They may also want to think about a simple plot for their shadow puppet play. There is a plot diagram (similar to the plot structure of a fable) for students to follow.
 - **Prototype**
 - Each student will receive a piece of black construction paper from “Table 1.” They will draw the outline of their puppet with the white pencil.
 - Next, they should cut out the shape of their puppet using scissors. They can attach the puppet to the wooden dowel using tape.
 - Once the basics of the puppet have been put together, they will visit the “Table 2” and “Table 3” and add one item from each to their puppet.
 - An optional table or box could include mirrors and concave/convex lenses for students to experiment with.
 - When they complete these steps, they may go to the projector screen and practice using their puppet.
 - If they find that there are parts of the puppet that do not work as they had planned, they should make changes and retest. Can it be improved?
 - **Share**
 - On the back of the anticipation guide, students have sentence starters they will need to answer. They can only begin recording once they have answered these questions.
 - Note - They should use the vocabulary words to help them.
 - Students will take turns recording their puppets in groups of 3-4. They should stand behind the sheet to show off the shadow puppet and talk about what their puppet is, using their sentence starters to talk about their puppets.
 - They may have multiple students behind the sheet at once and the puppets can interact with each other.
 - While being recorded, can also talk about what went well and what made it difficult to create their puppet.



- **Synthesize**
 - Bring students back together for a final discussion. During this conversation, students will discuss how the light reacted to materials from Table 1, Table 2 and Table 3. Have each student complete the final questions. *See discussion guide for questions.*
 - To further student understanding of light, allow students to use a flashlight and a mirror to see what happens to light when it is reflected and/or use varying lenses.
 - Finally, have students look back at the lists from brainstorming about what is needed for a shadow. They will complete the [anticipation guide](#).

Supports for Student Learning

Accommodations

- **ELs**- Provide labels and written directions for each of the steps. The instructor can also use props to further help students understand major concepts and instructions. Due to the visual and hands-on nature of this lesson, there is little written work but it is very important that students be able to identify the opaque, translucent and transparent parts of their shadow puppets.
- **Grade Level adaptations**- Stencils can be provided to scaffold for those that need more support. Definitions can be introduced and practiced ahead of time. Those that need help explaining their puppet on the video can be paired with other students or work in groups to complete the sentence starters.
- **Advanced students**- Those students who are able to grasp these concepts quickly will be asked to incorporate mirrors into their video. They will use these to examine how light changes when mirrors are incorporated or when the light is moved closer or further away.
- **Additional supports**- As needed.

Discussion Guides

- Read Aloud:
- Synthesis-
 - Ask students, “What went well and what was difficult about making the puppets?” Allow them to share their answers and see if any talk about how they adapted their puppets.
 - What happened to the materials from Table O? Did they make a shadow? *(These objects are opaque, meaning they blocked out all of the light.)*
 - What happened to the materials from Table A? Did they make a shadow? Did the shadow look the same as Table O? How were they different? *(Table A represents translucent materials. These only allow some light to come through.)*
 - What happened to the materials from Table B? Did they make a shadow? Why or why not? *(Table B represents transparent materials, which allow light to come through clearly.)*
 - Looking back at the list from the beginning of the lesson, what is needed to create a shadow? Can you name the three things? *(Light source, object to block light, surface to project on)*



- What happens when you shine light on a mirror? (*The light reflects, or bounces off the mirror*)

More to Explore (Resources)

- http://artsedge.kennedy-center.org/educators/lessons/grade-6-8/Shadows_and_Light.aspx#Instruction
- <https://www.pbslearningmedia.org/resource/lsp07.sci.phys.energy.lplightmoves/how-light-moves/#.WqxTpROPJpU>
- <https://www.teachingchannel.org/videos/science-lesson-on-light>
- <https://betterlesson.com/lesson/627218/let-s-explore-light-sources>
- <http://www.optics4kids.org/home/content/classroom-activities/easy/>
- http://www.sedl.org/pubs/mosaic/units/Mosaic_Grade3.pdf

