Wave Inventions: Light

Light

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Grade Level	1st Grade	**Time Frame**	2-3 class period(s)
		Duration	120 minutes

Essential Question

How does light work when shined on different materials?

Summary

This lesson is the second in the series of lessons, Wave Inventions. In this lesson students will make observations and conduct investigations to explore how light interacts with a variety of materials.

Snapshot

Engage

Students work as a class to make their classroom completely dark.

Explore

Students design an investigation to explore how light works with various materials.

Explain

After completing the investigation, students share what kind of material lets the least amount of light through.

Extend

Students apply their learning about light to understand how sunglasses work.

Evaluate

Students complete a Four Corners activity to explain the best material to use in various scenarios with light.

Standards

Next Generation Science Standards (Grade 1)

1-PS4-2: Make observations to construct an evidence-based account that objects can be seen only when illuminated.
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.

Oklahoma Academic Standards (Kindergarten)

K.ESS3.1: Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.
K.ESS3.1.2: Humans use natural resources for everything they do.

Attachments

- Investigation Notes.docx
- Investigation Notes.pdf
- Waves and Inventors- Parent Guide.pdf

Materials

- Flashlights
- Tissue paper
- Plastic wrap
- Foil
- Cardboard
- Construction paper
- Computer paper
- Mirror
- Sunglasses (Check with a local business or university to see if they have promotional glasses they would donate.)

Engage

Teacher's Note

This lesson is part 2 of 3 in the Wave Inventions series. You can find part 1, Sound, here and part 3, Inventors, here. You can also find a Parent Guide for the unit attached with this lesson.

As a class, try out and discuss the following challenge: How can we make this room completely dark?

Students will suggest things such as: close the doors, turn the lights off, turn off/cover monitors or equipment lights.

Students will also suggest covering windows. Cover windows by using the blinds, paper, sheer curtains, or something that still lets a little light through.

Ask students if the room is completely dark. Why isn't it dark?

Responses might include:

- There is still light coming through the window.
- There are holes in the paper/curtain/blinds.
- The light is too bright outside.
- Cover the window with ____ instead.

Explore

Using the Four Corners strategy, ask students to predict which type of material (tissue paper, plastic wrap, foil, or construction paper) they think will be best to make the room completely dark.

1. Place the different materials in four corners around the room.
2. Ask students to go to the corner that contains the material that they think will make the room most completely dark.
3. Once students are in the corner they have chosen, ask them to have a conversation with others in that corner about why they made this prediction about the material and why the other materials might not work as well.

Four Corners Management

Place the name and sample of each material in a highly visible place, in a corner or area of the room that is easy for students to get to. This will cue the students where to go each time, and will give them space to get there safely. Cue students for movement by saying, “When I say “go” I want you to use your walking feet and go to the corner that you think will [insert questions here]. Think about it. Okay, go.” Give the students 10-15 seconds to think about their answers and then 10-15 seconds to get to the appropriate area of the room.

After the Four Corners activity, ask students to return to their seats. Explain that in their table groups (3-5 students), they will now create an investigation to figure out which material would work best to make the room completely dark. Students will use the Investigation Notes handout to design and conduct an investigation, trying out the different materials (tissue paper, plastic wrap, foil, construction paper) to find which one best prevents the light from shining. To set up their investigation, ask students to find a way to shine light on the different materials. Tell students they will need to make observations. Review the process for how to make observations safely. Ask students what they might expect to see in their observations. Tell students to wait to fill out the “Type of Material” column on the notes page.

Explain

After completing the investigation, students will repeat the Four Corners strategy, answering the same question "What material will be best to make the room completely dark?" Use the Think-Pair-Share strategy for students to explain why they chose that material.

Add to the students' descriptions and discussions using words such as reflective, opaque, transparent, and beams of light. Students will go back to the Investigation Notes handout and check which type of material each one is, based off the vocabulary above.

Extend

Take the students outside (sunny day preferred) and have them complete a compare and contrast activity of what the world looks like with and without sunglasses. Why would people wear sunglasses? What kind of material would be used to make sunglasses? What do sunglasses do to the light?

Safety Note

Warn students to not look at the sun. Another option would be to use a brightly lit room for this activity.

Evaluate

Using the Four Corners activity again, ask students to choose the best material (tissue paper, plastic wrap, foil, construction paper) for the following situations:

- What material can we use to cover the window so no one can see in but allow some light to get through?
- What material can we use to make out shapes/shadows but not see details when the light shines through?
- What material can we use to cut out puppets and make a shadow play?

After each rotation, ask students to talk in their groups about why they chose their area. Then, ask a few students to share their thoughts with the class.

Resources

- K20 Center. (n.d.). Four corners. Strategies. Retrieved from https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f5064550
- K20 Center. (n.d.). Think-pair-share. Strategies. Retrieved from https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f5064b49