Summary

Did you ever notice that when you are playing outside, you are never alone? You always have your shadow with you! But what makes a shadow? Why do our shadows disappear sometimes? Today we are going to learn all about shadows and the science of optics, which is the science of light!

Overview

What is a shadow?

A shadow is the dark shape made when something blocks light. You must have a source of light in order to have shadows. Some sources of light include the sun, a lightbulb in your room, a flashlight, or a campfire that you sit around and roast marshmallows. All kinds of things are great at blocking that light and making shadows, including trees, fences, buildings - and you! This is why when it is cloudy outside, it is much harder to see our shadows! Can you think of any other sources of light?
How do shadows change?

You will notice at different times of the day shadows are different. Longer, shorter, or no shadow at all. So the size of the shadow depends on the angle of the light shining on it. We know the sun moves to different positions over the course of the day, so the length and shape of our shadows moves too.

Quick Activity

Shadow Puppets

As the adult, grab a flashlight and shine the light against the wall in a spot for the child to try out different shadow puppet shapes. Watch this shadow puppet video to inspire you and help engage your child—but encourage them to try to make their own shadows! What new animals can we create? Let them have a few minutes to try to create a new shadow shape!

Tip: Try to keep in mind that children learn in many different ways. By consciously thinking about this, you’ll be able to use different teaching techniques to best match your child.

Main Activity

Superhero Signal

This activity will help your child learn how to make a shadow with a hands-on activity, and allow them to create their own superhero signal! If you or your child is unfamiliar, take a look at this youtube clip of the Batman Signal to inspire you!

Tip: Ask your child about their superhero. What do they do, and what inspired them?

Materials and Resources

- Construction Paper
- Markers
- Scissors
- Clear tape
- Flashlight
- Resources
- Toilet paper or paper towel rolls
Steps & Directions

1. If using a paper towel roll, cut it in half.

2. Design a superhero symbol (such as your initials, a star or other shape) in the paper no larger than the circumference of the toilet roll and cut it out.

3. Put a criss cross of clear tape across the symbol and over the top of the tube. Have a teacher/volunteer assist with this part. You might also put one full piece of tape around the outside of the tube that intersects with the criss cross of tape.

4. Decorate your tube with markers, stickers, construction paper, etc.

5. Shine a flashlight through the open end of the tube and project the symbol onto the wall or ceiling - just like their favorite hero!

Reflection & Further Exploration

Closing Activities

Provide your child with the flashlight and allow them to explore turning it on and off (remind them not to shine the light into their eyes).

Talk about what they think makes it light up and what they think is inside. Have a discussion about the results they are having and even encourage different angles to see how the shadows of objects change. Have your child try shining the light through different materials—opaque, transparent, colored, etc. If you feel inclined, you can even discuss these differences below.

Advanced Exploration

1. Transparent Materials: We can clearly see through transparent materials, because light passes through transparent materials in straight lines (ex: glass)

2. Translucent Materials: We cannot see clearly through translucent materials. Translucent materials let some light pass through them by scattering light in all directions (ex: tissue paper)

3. Opaque Materials: We cannot see anything through opaque materials, because they do not let light pass through them, instead they block the light. (ex: wood)