

## Shadows!

The simple relationship between light and dark. Shadows are everywhere, and we all have a shadow, well sometimes! Explore the realms of natural light during the day and artificial light at night and experiment with how shadows change.

### What are shadows?

A shadow is a dark area where light is blocked by an object. When you block the light from a light source (the sun or a flashlight) with an object, it creates a shadow behind that object. Clouds create shadows that block the sunlight and heat from the sun. The shadows from the clouds also help us to cool down from the heat of the day.

One of the largest shadows is during solar eclipse, when the moon orbits directly in front of the sun and the earth, which casts a shadow of the moon onto the earth. Check out the photo taken by the French Government Space Agency.



Shadow on of the moon onto the earth's surface during a solar eclipse, taken April 8th, 2014.

Photo Credit: CNES

As the sun moves across the sky throughout the day the direction of light changes with it. Depending on the angle of the light source cast onto an object the different the shadow will look. Using natural and artificial light test out shadow science first hand!

## Supplies:

- Sunlight
- Toys or objects around your house
- Sidewalk chalk
- Sidewalk space
- Flashlight
- Paper
- Coloring utensils

## Instructions:

### Natural Light Shadows

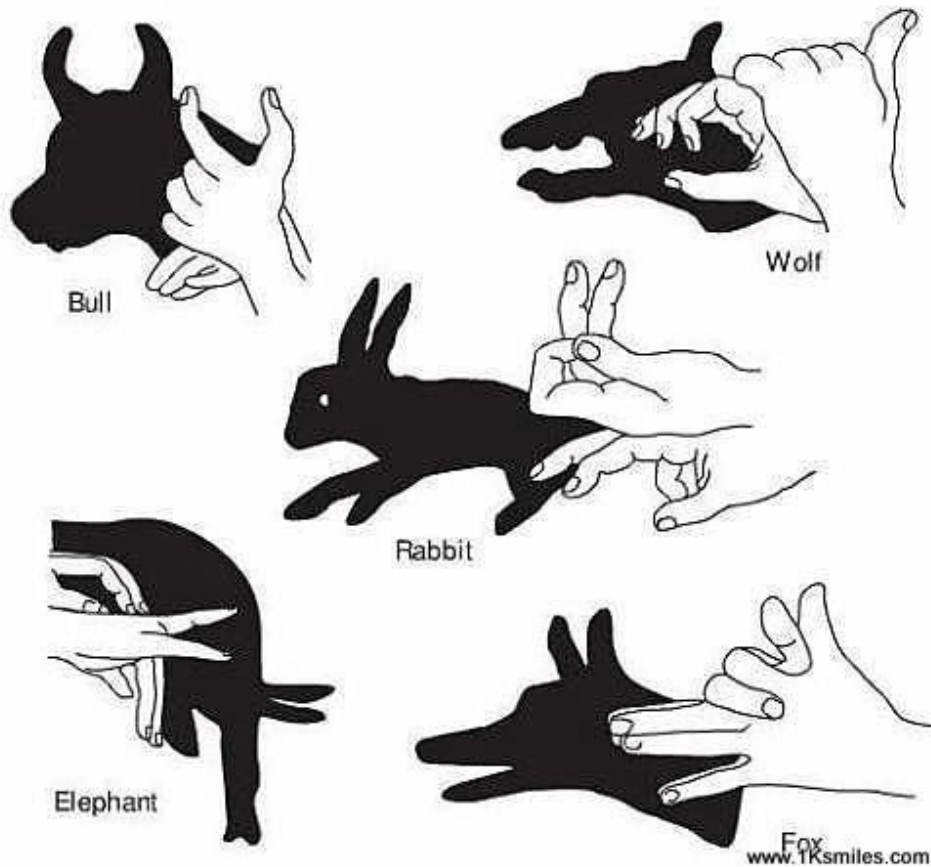
- During a sunny day, find space on the sidewalk to which you can draw with chalk or use paper and coloring utensils.
- Place a household object or a toy on the sidewalk and check out the shadow that is created. Move your object around and observe how the shadow changes.
- Find a spot where you will leave your object all day. Draw the shadow the object on your canvas. Check back every 30 minutes or hour to trace the shadow at that time without moving your object.
- At the end of the day before the sun goes down, pick up your object and see the different shadows that were created by one object over the course of the day!
- You can also experiment with the shadows of nearby trees or even family member.



### Artificial Light Shadows

- After the sun sets and there is not more sunlight, you can create your own light and shadows using a flashlight or lamp.
- Turn off indoor house lights and direct the flashlight onto a bare wall or ceiling.

- Using your hands to form different shapes, you can create different shadow images onto the wall. Test out these different hand shapes or create your own shadow puppet shows.
- Try taping a piece of paper onto the wall, and draw the silhouette of a family member.
- Discover what happens when you bring objects closer to the flashlight, what about further away? How does the shadow change?



Hand shadow puppets to try on your own! Photo Credit: elitereaders.com