



# Shadow Sizes



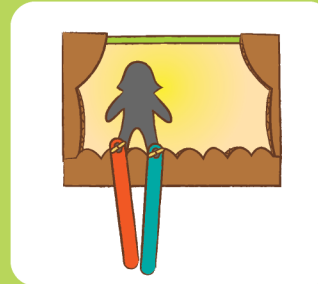
When your puppet blocks light from your flashlight, it creates a shadow.

If the puppet is far from the flashlight, less light is blocked and the shadow becomes smaller.

If you move the puppet closer to the flashlight, more light is blocked and the shadow becomes larger.

Try experimenting with making shadows larger and smaller!

## explore more!

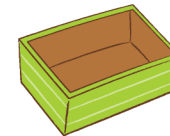


### shadow puppet theater

Use your Kiwi Crate to create a shadow theater. Then put on a show with your shadow puppets.

messiness      communicating      caring      creating  
grownup involvement

### what you'll need



box



shadow puppet



clear tape



scissors

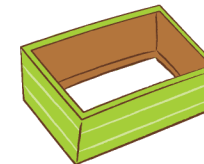


flashlight



wax paper or white paper

1



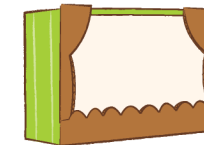
Have a grownup assistant cut a rectangle out of the bottom of the box.

2



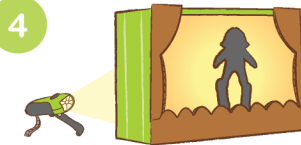
Cut the wax paper so it fits inside the box. Tape the wax paper down.

3



If you'd like, use the extra cardboard to add curtains or other decorations.

4

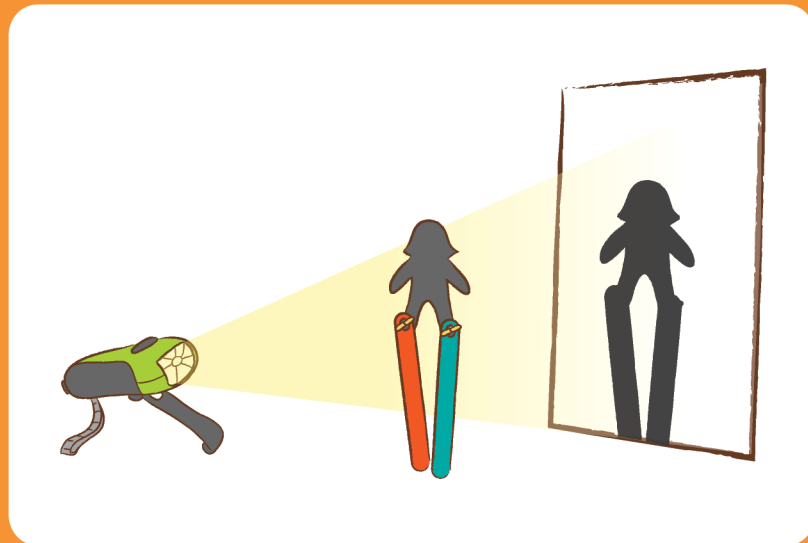


Set up your flashlight, and put on a show!

...check out more at [kiwicrate.com/shadowlight](http://kiwicrate.com/shadowlight)



# light & shadows



Did you know that light always travels in straight lines? It's true! But what happens when light runs into something?

Well, the answer depends on what it runs into. Opaque materials (such as your shadow puppet or your hand) stop the light. Transparent materials (such as glass or water) let the light go through. Reflective materials (such as mirrors or shiny foil) make light bounce back.

Try exploring with different materials in your house. See how they interact with light!

## light & shadows

### what you'll need



flashlight



clear plastic cup



shadow puppet



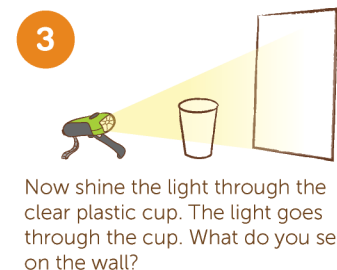
small mirror



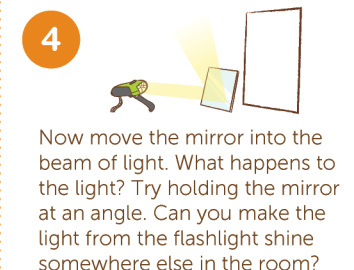
Set up your flashlight so it shines on a white wall.



Move your puppet into the beam of light. The light stops when it hits the puppet. What does the shadow look like?



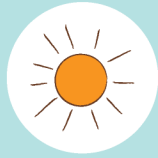
Now shine the light through the clear plastic cup. The light goes through the cup. What do you see on the wall?



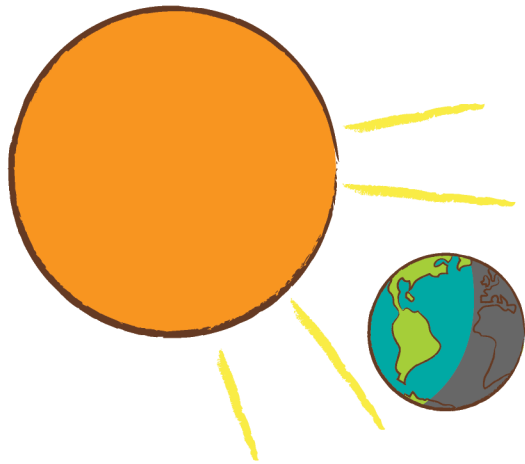
Now move the mirror into the beam of light. What happens to the light? Try holding the mirror at an angle. Can you make the light from the flashlight shine somewhere else in the room?

5 Here are some ideas for other materials you can test out. Can you figure out which of these are opaque? Transparent? Reflective?

- Plastic wrap
- Aluminum foil
- Plastic disc from your kaleidoscope
- Rubber ball
- Stuffed toy
- Mirror paper from your kaleidoscope



# Sun Shadow



Have you ever watched how shadows change at different times of day? Before there were clocks, people used shadows to tell time.

As the earth spins, it looks like the sun is moving across the sky.

In the morning, when the sun is low in the sky, shadows are long. At noon the sun is right overhead, and shadows are very short. And in the evening, the sun is low, and shadows are long again.

## sun shadow

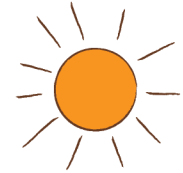
### what you'll need



sidewalk chalk

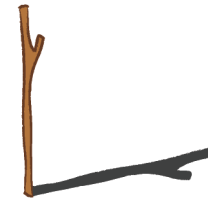


stick or post



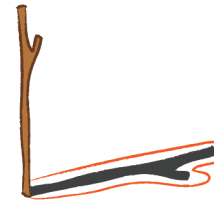
a sunny day

1



Stand up your stick in a clear, non-shady space. Make sure you don't move the stick while working on your experiment!

2



Using sidewalk chalk, trace the shadow your stick makes at morning, noon, and evening. How does the shadow change?

3



You can try the same experiment with your own shadow. Ask a friend or your grownup assistant to trace your shadow at different times of day. What kind of shadow shapes can you make?

# keep exploring shadow and light

Create a stage for your shadow puppets, and use these Shadow & Light experiment cards to keep exploring!



## shadow sizes

### what you'll need



your hands



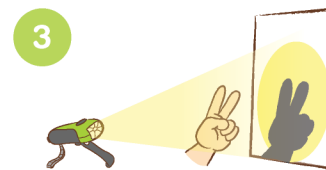
flashlight



Set up your flashlight so it shines on a white wall.



Hold two fingers up so it makes a shadow. Does the shadow look like a rabbit with long ears?



Now move your hand very close to the wall. Does the rabbit shadow get smaller?



Try moving your hand very close to the flashlight. What happens to the rabbit?



Can you make a bird shadow with your hands? What other shadow shapes can you create? Keep experimenting with shadows!