



# Session 1: Shadow Time

A shadow can be a striking visual image. Girls will experiment with hand shadows to see how changing the distance and light angle change the image. They will use the sun to tell time and explore shadows cast in the solar system by making sketches of the Moon on different days of the week.

Activity	Type	Time
Light and Shadow	Group	10 minutes
Shadows and the Sun	Group	10 minutes
"Sunsational" Sundials	Individual	20 minutes
Planning a Moon Watch	Group	5 minutes

## light and shadow

### What to Do

1. Ask the girls what they think they will need to make a shadow.
2. Turn out the lights in the room. Shine a light against a blackboard or blank wall and ask a volunteer to make a shadow on the wall.
3. Encourage discussion by asking the group to consider the following questions:
  - What causes a shadow?
  - Does the shadow change if the girls' hands are closer or farther from the light source? Why?
  - How does the shadow change if the girls keep their hands in one place and tilt the flashlight up and down so the light shines at an angle?

### Materials

- blank wall or blackboard
- flashlight



4. Ask for volunteers who know how to make animal-shaped shadows. Have fun with shadows you can make with one hand, with two hands, and some you make with a partner like those illustrated.
5. Share some shadows that you've found on the Internet and have fun trying to create them. Encourage the girls to make up their own shadows too.

### Whys and Hows

We hardly ever notice our shadows, but as long as we are near a light source (the Sun, headlights of a car, lights in our home) there are shadows around us. By playing with hand shadows, the girls can get a sense of the behavior of light when the light source is held closer and then farther away, as well as when the light hits a surface directly or at an angle.

### Other Ideas to Explore

1. Use light and shadow to make individual silhouettes of the girls. Have them sit close to a wall or blackboard and shine a light on their profile. Have them outline each other on the blackboard or use dark construction paper so that the silhouette can be cut out and pasted to a piece of paper with a contrasting color.

### Helpful Hints

1. Depending on the age of the girls, they may or may not be familiar with hand shadows. Have them try a few easy ones and then experiment.
2. Have each Brownie Girl Scout share her animal silhouette if the group is small. Divide larger groups into smaller ones in which girls try to guess the shadows that each girl makes. Or have one group choose an animal and have the other group try to make it.

2. If your troop meets on a sunny day, go outside. Have the girls observe the position of their shadows at the beginning and end of the meeting to examine how they change with time. Ask the girls to use chalk to trace each other's shadows on the sidewalk. Girls may also trace their shadows on large pieces of paper if the sidewalk drawings are not possible.
3. Play a round of shadow tag. The person who is "it" tries to tag another troop member's shadow.
4. Sometimes shadows are scary. Show girls that any object may appear large if light hits an object from a certain angle and casts a large shadow. Even a small apple can appear really large if the shadow is large. Have fun with small toys, a teddy bear or a plastic bug. Reassure girls that their eyes can play tricks on them and the objects aren't scary at all.