

# AT-HOME SCIENCE LEARNING

#3

## SUN AND SHADOWS

### *PARENTS*

*At-Home Science Learning is all about you and your children exploring science in a fun, hands-on way using simple supplies found around your home. Use the “Parent Guide” to help support your children through the activities plus see a list of required materials needed. Print out the “At-Home Science Journal” for your child to follow along with each activity. The activities are designed to take 15 – 30 minutes. Get your whole family exploring science together!*





This project is funded by the California Collaborative for Educational Excellence in collaboration with the Office of the Fresno County Superintendent of Schools.

## FOR THE PARENT:

# #3 SUN AND SHADOWS

**Overview:** Playing with shadows outside on a sunny day is a great way to engage children in science right in their backyards! Explore what causes shadows and why the sun appears to move across the sky during the day. Children use this knowledge to build a device that uses shadows to tell time.

### Materials/Supplies:

- 
- Electronic device connected to the internet to watch videos, take videos/pictures and play games.
  - A few small toys, blank pieces of paper, chalk, paper plate, straw, and a variety of different materials such as paper towel, glass cup, plastic bowl, wax paper, foil.
  - Copy of the “Student Science Journal”, pencil.
  - Optional supplies: colored pencils or crayons, ruler.
- 

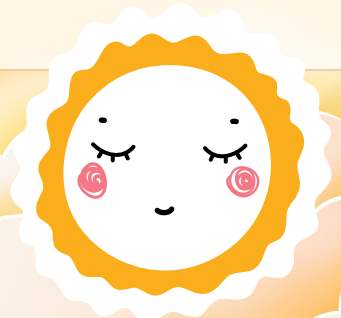
**Each of the activities is designed to take 15–30 Minutes.**

### Activity 1: Story

1. Listen to the storybook “Moonbear’s Shadow” by going to this link on your electronic device:  
[tingurl.com/book-moonbear](http://tingurl.com/book-moonbear).
2. After listening to the story, ask your child a few questions about the book and have your child answer the questions in their Science Journal – Activity 1 section.
  - a. What problem was Moonbear having with his shadow?
  - b. How did Moonbear try to solve his problem?
  - c. What do you know about shadows?

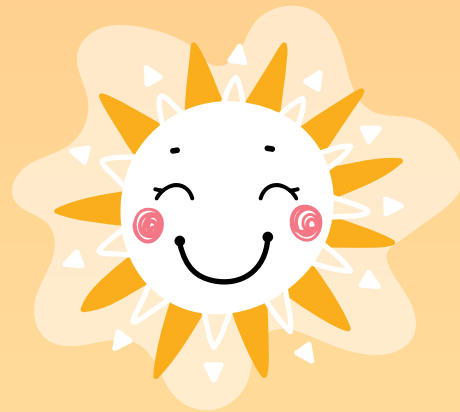
As your child shares, encourage them to use complete sentences and give them some ideas for starting if it helps. For example,

- a. The problem Moonbear was having with his shadow was...
  - b. Moonbear solved his problem by...
  - c. One fact I know about shadows is... Another fact is...
3. Now go outside and have your child find their own shadow. Give your child these different tasks:
    - a. Can you make your shadow wave?
    - b. Can you make your shadow dance?
    - c. Can you make your shadow small?
    - d. Can you make your shadow disappear?



## Activity 2: Toy Shadows

1. This activity is best done on a sunny day. Make sure you begin this activity in the later morning so that you will have a few hours of sunlight.
2. Have your child gather a few small toys, a pencil, and their Science Journal. Help your child find a sunny spot outside.
3. Help your child place the toys on the “toy spot” found in their Science Journal – Activity 1 section.
4. Tell your child to outline the shadow of their toys on the paper.
5. Leave the toys on the paper and come back a few hours later. Have your child trace the new shadow. They can use a different colored pencil or a crayon.
6. Ask your child the following questions:
  - a. Do the shadows stay the same? How do the shadows change with time?
  - b. Are the shadows larger, the same size, or smaller than the toys?As your child shares, encourage them to use complete sentences and give them some ideas for starting if it helps. For example,
  - a. As time passed, I noticed that the shadows...
  - b. Compared to the size of the toys, the shadows are...
7. Optional: Set up a cell phone to take a time-lapse video of your toys in the sun for 1 hour or longer. What did you notice?

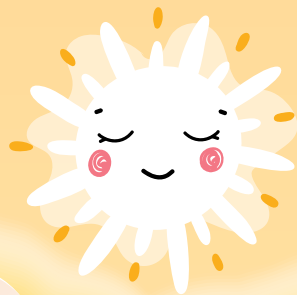


## Activity 3: My Shadow

1. On a sunny day, head outside to a sunny spot where your child can trace their shadows. You will need a piece of chalk. This activity is best started early in the day.
2. Draw two chalk Xs on the ground to mark the position of the feet where your child is standing. Then have another child or adult use the sidewalk chalk to trace the shadow of the standing child. If you have multiple children, allow each child to have their shadow traced.
3. Have your child notice where the sun is in comparison to their body and their shadow. *Warning: Looking at the sun directly can permanently damage your eyes.*
4. Bring the child back out two more times during the day. Instruct the child to stand on the two Xs while someone else traces the new shadow. And remind your child to see where the sun is now in the sky.
5. Encourage the child to record their observations in their Science Journal – Activity 2 section.
6. Now have your child record shadow data into their Science Journal – Activity 2 section. Help younger children with this data collection or partner an older child with a younger child. Data could include:
  - Shadow direction (*this can be landmarks – the shadow is pointing towards the tree or is pointing towards the house*)
  - Shadow length (*this can be comparative – longer/shorter or your child can use a specific object to measure – i.e. the shadow is 6 rulers long or 8 shoe lengths long*)
7. Ask your child questions:
  - a. Did your shadow stay the same? How do your shadows change with time?
  - b. Is what happened to your shadow similar or different from what happened to your toys' shadows?
  - c. What was happening with the sun in the sky?
  - d. Why did your shadow change and move?

As your child shares, encourage them to use complete sentences and give them some ideas for starting if it helps. For example,


- a. I observed that my shadow...
- b. What happened to my shadow is... because...



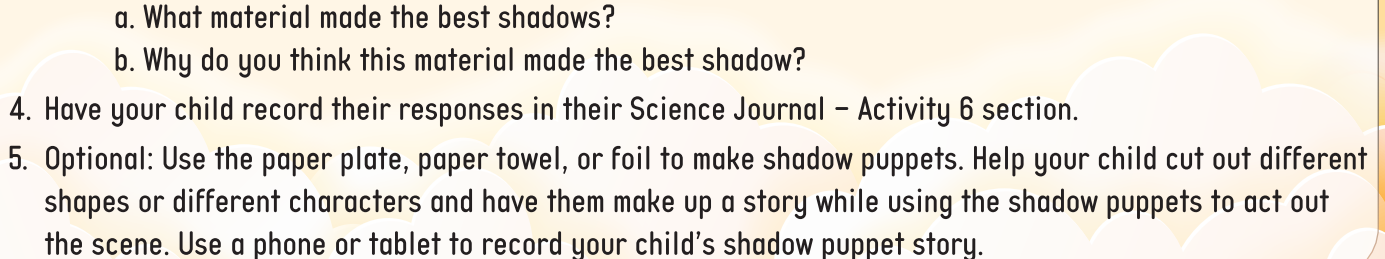
## Activity 4: Does the Sun Really Move?

1. After completing the toy shadow (Activity 2) and their own shadow (Activity 3), your child has probably noticed that the sun appears to be moving across the sky during the day which is causing the shadows to change length and direction during the day, too. To reinforce this idea, use your electronic device to watch one of the following videos:
  - a. Younger children: [tinyurl.com/video-shadows](https://tinyurl.com/video-shadows)
  - b. Older children: [tinyurl.com/video-followsun](https://tinyurl.com/video-followsun)
2. It's important for children to understand that the sun doesn't move at all. So if the sun isn't moving, why does it look like it moves across the sky every day? Use your electronic device to watch this short video explaining what is happening: [tinyurl.com/video-whatismoving](https://tinyurl.com/video-whatismoving)
3. After watching the video, have your child go to their Science Journal – Activity 4 section and record their answer to the question, “Why does the sun look like it’s moving across the sky?” If they are struggling, watch the video again and reinforce the idea that the Earth is rotating (spinning) so that’s why the sun appears to be moving in the sky.

## Activity 5: Shadow Hunt

1. Younger children will enjoy playing this online game, “Shadow Matching.” On your electronic device, go to this link [tinyurl.com/game-shadows](https://tinyurl.com/game-shadows).
  2. Now it's time for a real Shadow Hunt. This activity needs another sunny day. While the child is inside, go outside with a phone or tablet and take pictures of different shadows around your home or neighborhood. If you have older children, you can give them this task.
  3. When you have taken a variety of shadow pictures, give the electronic device with the shadow pictures to your child and encourage them to find what made each of the shadows.
  4. Direct your child to their Science Journal – Activity 5 section to answer the questions.
- 

## Activity 6: Best Shadows

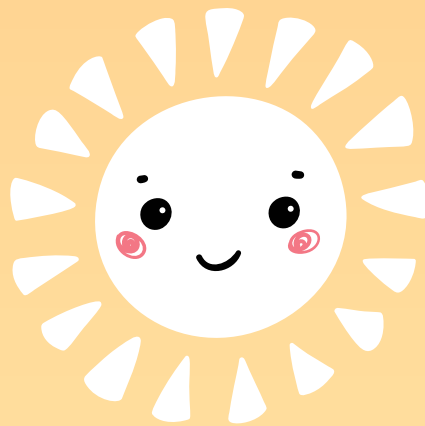
1. Gather a few different types of materials from around your home. Some items you could use: plastic wrap, wax paper, a glass cup, plastic bowl, paper plate, napkin, paper towel, and foil. Ask your child, “What materials do you think would make the best shadow and why?” Have your child record their thinking in their Science Journal – Activity 6 section.
  2. Take the materials outside and find a sunny spot. Help your child test the different materials by looking at the shadows created by each item. (If a sunny day isn't available, this activity can also be done in a dark room with a flashlight.)
  3. Ask your child these questions:
    - a. What material made the best shadows?
    - b. Why do you think this material made the best shadow?
  4. Have your child record their responses in their Science Journal – Activity 6 section.
  5. Optional: Use the paper plate, paper towel, or foil to make shadow puppets. Help your child cut out different shapes or different characters and have them make up a story while using the shadow puppets to act out the scene. Use a phone or tablet to record your child's shadow puppet story.
- 

## Activity 7: Shadow Tag

1. Shadow Tag: All you need for this activity is a sunny day and your family (and neighborhood kids if they want to join in.)
2. Set a boundary for your play area and make sure everyone knows the rules of the game. It's simple! Whoever is "IT" must tag others by only touching the other persons' shadows. If your shadow is tagged, you sit down. The last person tagged is now the next "IT."
3. Play multiple rounds until everyone has had a turn to be "IT."
4. Have your child go to their Science Journal – Activity 7 section and have them draw or write what they experienced while playing Shadow Tag.
5. Here is a fun variation of the Shadow Tag game: Everyone's IT  
To start, everyone is "IT." When you say go, everyone tries to tag someone else's shadow. If your shadow gets tagged, you are frozen. If you are frozen, hold your two arms outstretched from the shoulders and yell for "Help!" Someone who is not frozen can unfreeze you by ducking under your arms. You can now go freeze someone by tagging their shadow or unfreeze someone by ducking under their arms. Play for a specific amount of time or until everyone is frozen.

## Activity 8: Create a Sundial

1. Because the sun follows the same pattern of movement each day, you can use shadows to create a device that tells time, at least during sunlight hours.
2. You will engineer a sundial using a paper plate, a straw, a pencil or crayon, tape, and a clock/watch/phone.
3. Use the directions here at this link to create your sundial: [tinyurl.com/create-sundial](https://tinyurl.com/create-sundial).
4. Have your child draw their final sundial in their Science Journal – Activity 8 section.

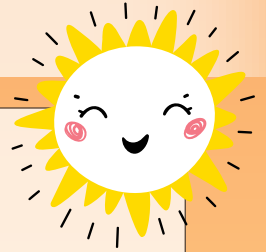


This project is funded by the California Collaborative for Educational Excellence in collaboration with the Office of the Fresno County Superintendent of Schools.

# AT-HOME SCIENCE LEARNING

## #3 SUN AND SHADOWS



NAME: \_\_\_\_\_



### Activity 1:



Listen to the book "Moonbears's Shadow."

Write  or draw  your responses to these prompts.

1. The problem Moonbear was having with his shadow was...

2. Moonbear tried to solve his problem by...

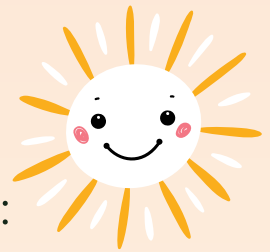
3. What do you know about shadows?

## Activity 2: Toy Shadows

**TOY SPOT**  
(place your toys here in this space)



# Activity 3: My Shadow





Draw what you observed with your shadow during the day.  
Where was the sun each time? Include the sun in your drawing:

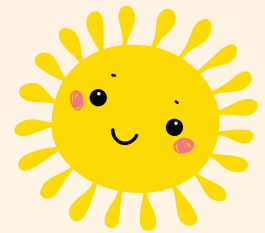
MORNING	NOON	AFTERNOON
Shadow Direction:  Shadow Length:	Shadow Direction:  Shadow Length:	Shadow Direction:  Shadow Length:

I think my shadow moved and changed during the day because...

## Activity 4: Does the sun really move?

After watching the videos, draw  or write  your response to this question: Why does the sun look like it's moving across the sky during the day?

*The sun looks like it's moving across the sky because...*



## Activity 5: My Shadow

Was it easy to find what made each of the shadows? Why or why not?

# Activity 6: Best Shadows



Gather a variety of materials to see which ones make the best shadows.

Write  or  draw the materials in the first column of the chart.

Then, make a prediction: Do you think it will make a good shadow? Yes or No

Now, test the materials and record your results.

Material Tested	Prediction: Will this material make a good shadow? Yes or No	Results: Did this material make a good shadow? Yes or No

The materials that made the best shadows were...



These materials made the best shadows because...





## Activity 7: Shadow Tag

What were some challenges while playing Shadow Tag?

## Activity 8: Create a Sundial

You can use the sun and shadows to create a device that can tell time!

Draw a picture of your final sundial design here:

