

Shadow Box Theater

Home Connection

Dear Family,

During the last few days, the children in our class designed scenery for a shadow box theater. They acted just like engineers! They. . .

- identified and learned about a problem
- planned ways to solve the problem
- made a prototype
- tested the prototype
- thought about their tests and made a new plan

In this exploration, your child learned how light makes shadows and how the size and shape of an object's shadow can change. Your child also learned about the engineering design process and practiced skills such as designing and making prototypes, using quantitative data to make comparisons, and making a claim supported by evidence.

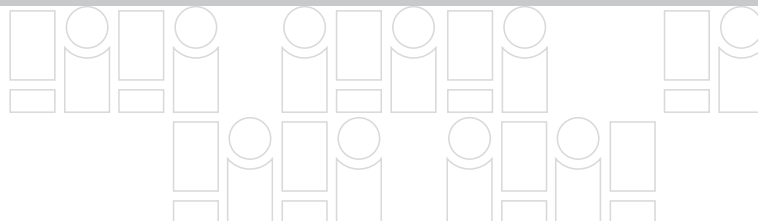
Say: *Tell me what you did in this project.* Ask prompting questions if your child needs help.

- What problem were you trying to solve?
- What did you learn about shadows?
- What did you use to make scenery for the theater?
- What did your scenery show?
- How did you make shadows of different sizes?
- How did you test your prototype?

On the back of this sheet, work with your child to extend his or her understanding of light and shadows.

This STEM project has been developed in partnership with Texas A&M University.

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Light and Shadows

Light travels in a straight line. When it hits an object, several things may happen. Ask your child to tell you what objects look like when viewed through *different* materials. Listen for details such as—

“Objects are clear and you can see colors through something that is transparent.”

“Objects look darker and fuzzy through something that is translucent.”

“You cannot see through something that is *opaque*.”

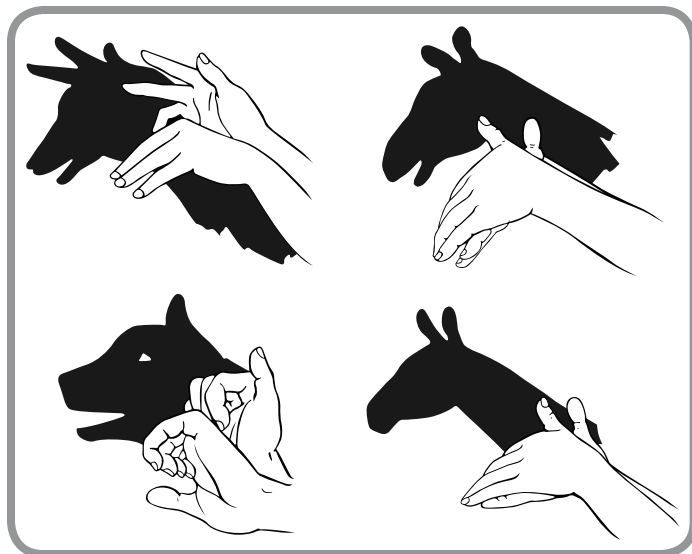
Work with your child to complete this table. Look for examples of each kind of material in your home and other places you go.

Transparent	Translucent	Opaque

Try It!

Use hand shadows to explore the size and shape of shadows.

1. Shine a bright light on a light wall.
2. Have your child hold his or her hand in front of the light so it casts a shadow on the wall.
3. Ask your child to make the shadow get bigger and smaller.
4. Ask your child to make the shadow change from fuzzy to sharp.
5. Help your child use hand shadows to make a variety of animals.



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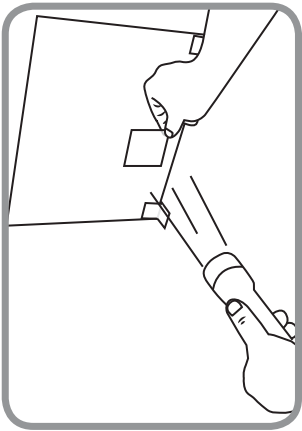
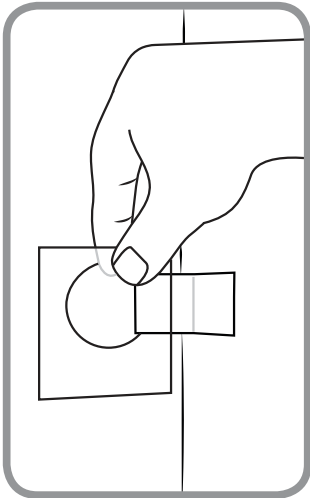
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What Can You See?

Name _____

Follow these steps.

1. Hold each material like this.
Look at the circle.
2. Hold a flashlight up to each material like this.



	Can you see the circle?		Does it make a shadow?
Green cloth	  	Green cloth	Yes
Foil	  	Foil	Yes
Clear plastic	  	Clear plastic	Yes
Yellow plastic	  	Yellow plastic	Yes
Wax paper	  	Wax paper	Yes

Explore Shadows

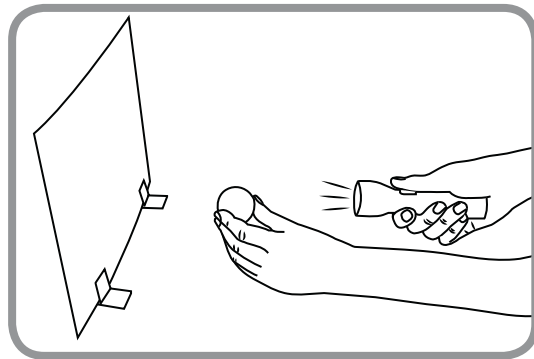
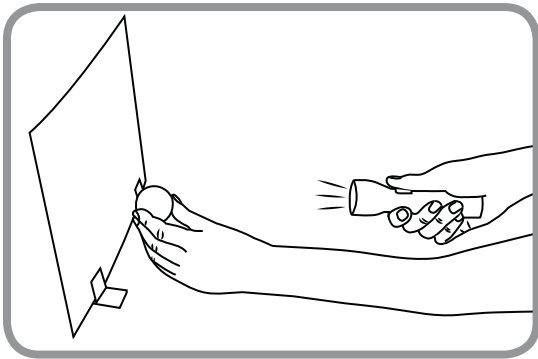
Name _____

Shadow Color

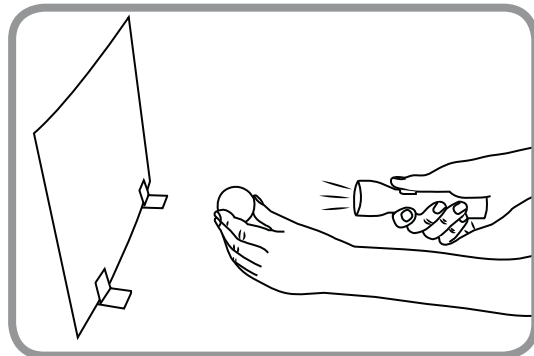
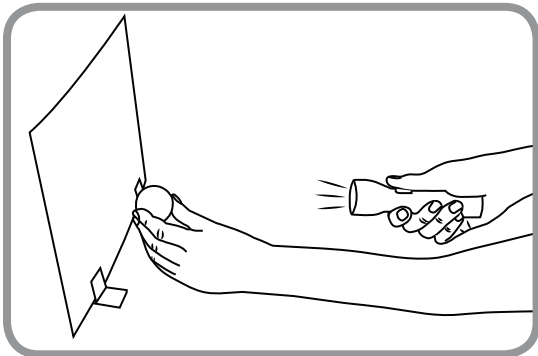
1. Does a red circle make a red shadow? Yes No
2. Does a yellow circle make a yellow shadow? Yes No
3. What is the color of a shadow? _____

Shadow Size

4. Which makes a bigger shadow?



5. Which makes a smaller shadow?



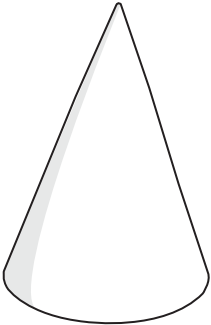
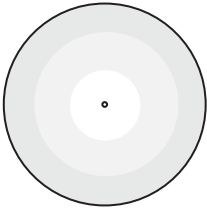
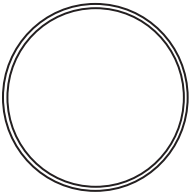
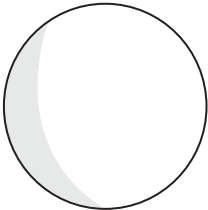
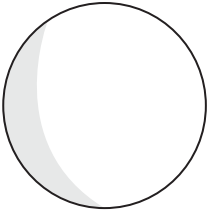
Explore Shadows

(continued)

Name _____

Shadow Shapes

Draw the shapes of the shadows you see.

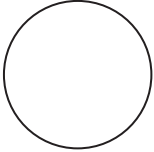
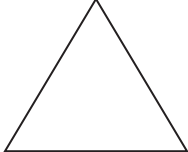
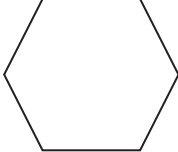
Shape, side 1	Shadow, side 1	Shape, side 2	Shadow, side 2
Cone 			
Large circle 			
Ball 			

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Make Shapes

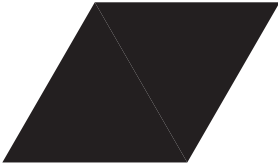
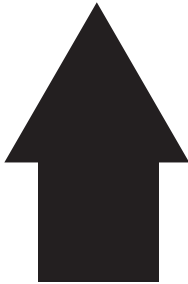
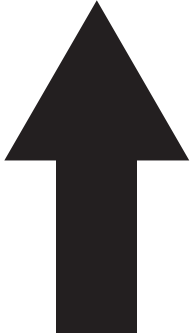
Name _____

1. Match the shape tiles to the shapes below.

				
Circle	Triangle	Hexagon	Square	Rectangle

2. Make each shape in the chart below.

Use at least 2 shape tiles. Circle the shapes you use.

3. Put shapes together to make a new shape. Have your partner guess what you made.

Scenery Plan

Name _____

- 1. Draw the four objects in your scene. Two should be the same shape and size.
- 2. Write the names of the objects.
- 3. Circle the shapes you need to make each object.

Scenery Test

Name _____

Answer these questions.

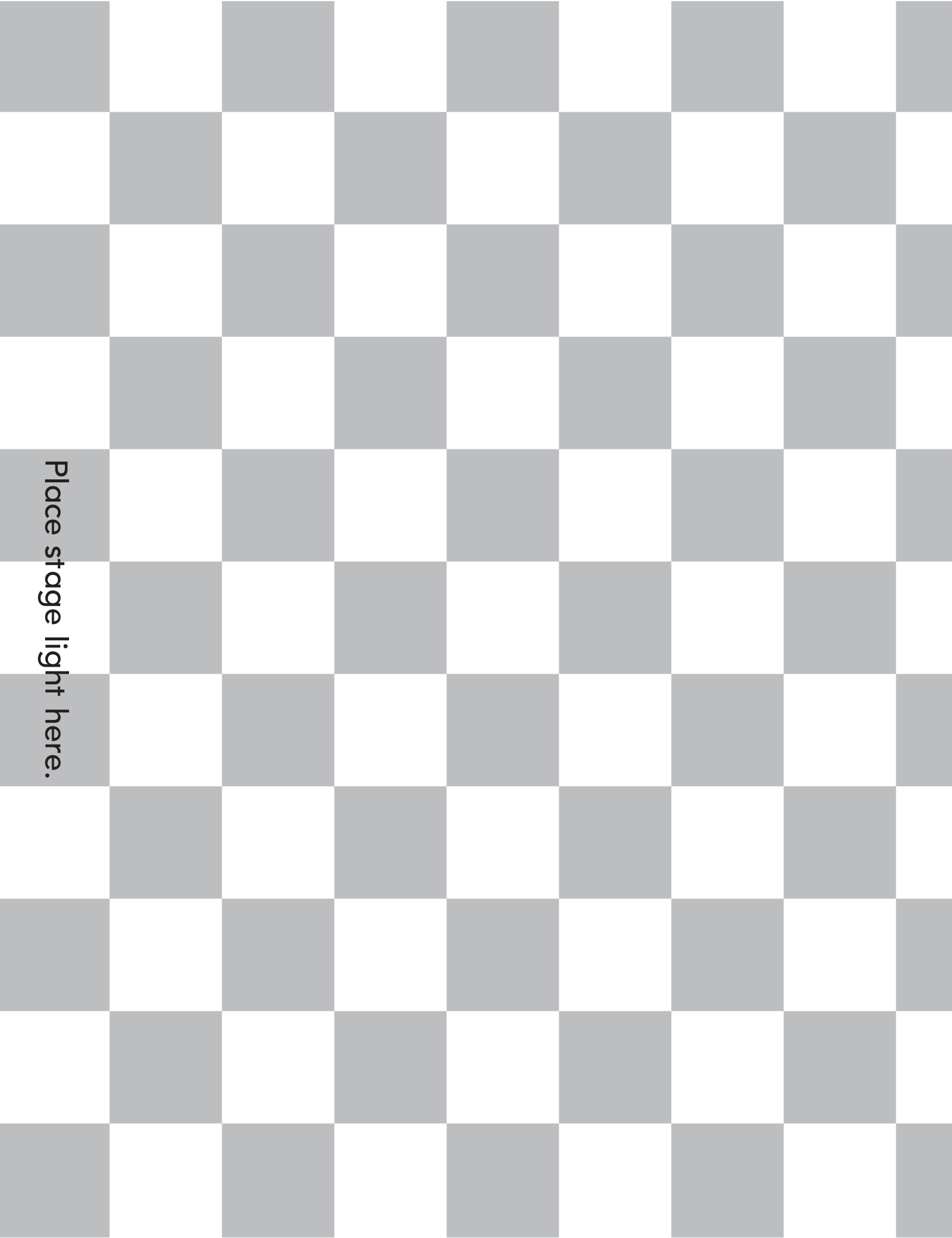
1. List your 4 objects. Count the shape tiles in each.

Name of object	Number of tiles

2. Cross out objects if their shadows did not fit on the screen.
3. Look at the objects that are the same. Use the measuring strip to measure their shadows.
4. Mark the height of each shadow. Count on to find the difference.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

5. Is one shadow at least 2 squares taller? Yes No



Place stage light here.