

## Lab Activity One: Sun Projections

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**PURPOSE:** Investigate the sun's rays through holes with various shapes. Describe the shapes of projections observed on the ground.

**Background:** Walk around your neighborhood when the sun is shining through the tree leaves, and look carefully at the shapes projected on the ground. Are you surprised by the occurrence of a specific shape?

If you really look, you will realize that some are circular or oval, while others will show the irregular outline of the opening marked by leaves (photo to the left). I hope you agree that observing circular/oval projections would be puzzling, since they don't match the openings between leaves which have irregular shapes. How about watching the projections of sun during a solar eclipse (photo to the right)



To investigate these observations, you may want to form a hypothesis like the one below and try the simple experiment that follows. Then get into some discussion and possible conclusions.

**HYPOTHESIS:** Predict the shape of the sun's projections on the ground through holes of different shapes. Try to give a reason why?

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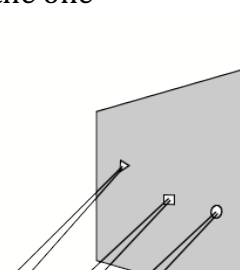
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### EXPERIMENT

**MATERIALS:** Sun, a cardboard (6 "x 9"), a sharp pencil, sharp cutting device




### PROCEDURE:

1. Use a sharp pencil to pierce a circular hole (1cm wide) through the board. Using a sharp cutting device, cut a triangle and square with comparable sizes to the circle.



2. Project the sunbeam through the holes on the ground. Do this from various heights  $h$ , the distance between cardboard and ground.
3. Take a photo of the observed shapes projected by the holes at various heights  $h$ .

**RESULTS:** Draw the projections from the holes for various heights from the ground, to describe what you observe. The height is your manipulated variable and the shape of holes is the responding variable.

<b>Height from Ground</b>			
$h = 10 \text{ cm}$			
$h = 30 \text{ cm}$			
$h = 50 \text{ cm}$			
$h = 70 \text{ cm}$			

I hope you enjoyed the experiment! Were you surprised by the results \_\_\_\_\_  
 Explain \_\_\_\_\_

**DISCUSSION**

How did the shapes change as the height changed? \_\_\_\_\_  
 \_\_\_\_\_

Name one other variable that may have affected the shapes as well ?  
 \_\_\_\_\_. That is your lurking variable.

**CONCLUSION:** In 2 full sentences, explain if the results supported your hypothesis and what you concluded.

\_\_\_\_\_  
 \_\_\_\_\_

If you want to investigate this experiment further, what would you change?

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To receive the answers to the questions, contact us through [www.Lightlabetc.com](http://www.Lightlabetc.com)

Michael Faraday [“The book of nature which we have to read is written by the finger of God.”](#)