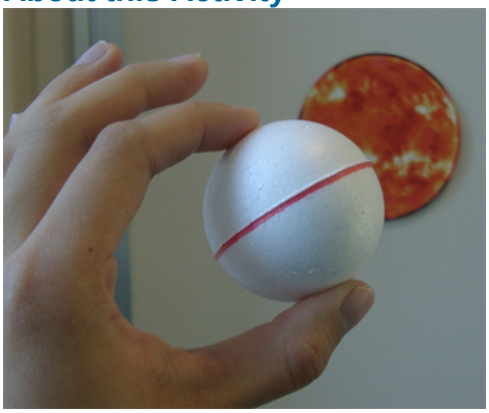

**Public Outreach**
**- Make and Take Activities**

# Eclipse: How can the little Moon hide the giant Sun?

## About this Activity



Although this activity isn't a "make and take", it offers great hands-on exploration of how distance can affect the way we perceive the size of an object. It makes a good introduction to solar eclipse as well as Sun and Moon's sizes and distances from Earth. The idea behind this activity is very simple and the activity itself is easy to do, making it accessible even for young kids.

*Left: A participant eclipsing an image of the Sun with a small styrofoam ball. Here, the image is 8.5" in diameter while the small ball is 2" in diameter.*

*Below Right: Observing the effects of distance on perceived size.*

## What You'll Need

- ping-pong balls, one for each participant
- two larger balls in different sizes (e.g. a baseball and a basketball would work well)
- (optional) image of a total solar eclipse
- (optional) scale model of Sun, Earth, and Moon

## Preparation

Little preparation is needed for this activity besides gathering the necessary materials. It is optional but very helpful, however, to have a scale model of Sun, Earth, and Moon on hand. Instructions for making such a model are available via a web-link at the end of this activity.

## To Do and Notice

**1)** Ask participants to share what they know about solar eclipses. Show an image of a total solar eclipse if you have one handy. If no one has mentioned it yet, explain that a solar eclipse happens when the Moon crosses between the Earth and the Sun, blocking the Sun's light.

**2)** Ask participants to share what they know about the Sun and the Moon. How big are they? Which one is bigger? How big are they relative to Earth?

**3)** Hold up a large ball and hand smaller balls to the participants. These balls do not need to be to scale for the Sun and the Moon (the big difference in size makes using balls at a true scale very difficult for this activity). Challenge participants to eclipse the larger ball with their smaller ones. It sometimes helps to cover one eye.

**4)** Ask participants to share what they noticed. Were they able to eclipse the large ball?

**5)** Now hold up an even larger ball and ask participants to eclipse this new ball. Were they able to do it this time? What did they have to do to eclipse the larger ball? They might tell you that they had to step further away from the larger ball, making it appear smaller, just enough to be eclipsed. They might also tell you that they had to bring the small balls closer to their eyes, making them appear bigger until they are big enough to eclipse the larger ball.

**6)** If you have a scale model, compare the size of the Sun and the Moon. Ask participants to guess how far they would need to take this model Moon before they can eclipse the model Sun.

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**(continued)**

## Activity Notes

Here's a quick way to estimate the actual distance that you would need to separate the Moon and the Sun for a scale model:

- If the model Sun is *D* inches in diameter, the model Moon's diameter is roughly (*D*÷436) inches.
- At this scale, the model Moon should be roughly (*D*x108) inches away from the model Sun. You might need to convert this distance to feet or yards to make it more understandable.

Here is an example that is not exactly to scale. However, it uses familiar objects that might help participants visualize the sizes and distance:

If the Sun is a basketball (9" to 9.5" across), the Moon would be roughly a pinprick or a dot made with a sharp pencil (1/50 of an inch). At this scale, the Sun and Moon would be about 86 feet apart. This is equivalent to having the basketball at one end of a basketball court while the pinprick is under the backboard/basket on the opposite side. (The length of a basketball court is about 92 feet, just a bit too long). If you were to try this, the small pinprick Moon should be able to eclipse the basketball Sun when you put it about 3" in front of your eye. (You would looking at the Sun and Moon from the perspective of the Earth of course, and 3" is roughly to scale for the Earth/Moon distance.)

*This activity is adapted from Eye on the Sky: lesson 12 of Our Star the Sun. See links below for the classroom version of this activity.*

## Related Websites

**Eye On The Sky: classroom version of this activity and related content**
http://imagine.gsfc.nasa.gov/docs/science/know_l1/emspectrum.html

**Eye On The Sky: Sun/Earth/Moon scale model as a classroom activity or to make ahead of time as a prop for this eclipse activity**
http://eyeonthesky.org/lessonplans/03sun_howbig.html

**Sun-Earth Day 2006 (Eclipse – In a different light): eclipse images, content, and resources**
http://sunearthday.nasa.gov/2006/index.php