

8A20.37 Umbra and Penumbra

To model the two components of the shadow the moon casts on the earth during a solar eclipse.

DESCRIPTION: A basketball is held at varying distances from an overhead projector and the shadow of the ball is projected onto the wall for the students to see. When the ball is held very close to the projector, the umbra is very large and the penumbra very small. When the ball is moved away from the projector, the umbra shrinks and the penumbra grows.

SUGGESTED TECHNIQUE

1. Turn on the overhead projector.
2. Hold the basketball a few inches away from the projector's light source. Note the relative sizes of the umbra and penumbra.
3. Gradually move the basketball away from the overhead projector. Note how the relative sizes of the umbra and penumbra change.

TECHNICAL DETAILS

LOCATION OF APPARATUS

EQUIPMENT	LOCATION
Overhead Projector	Classroom (or Above General Use C)
Basketball	Mechanics A

LOCATION OF COMMON ACCESSORIES

SETUP INSTRUCTIONS

Setup Time ~20 min

1. Position the projector such that the image is projected onto a clean background.
2. Provide the basketball. Note: a smaller ball can be substituted if the instructor prefers.

ADDITIONAL RESOURCES