

# Experiment 17: Shadows

## Required Equipment from Basic Optics System (2 systems needed)

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2 Benches

2 Light Sources

1 Screen

## Purpose

The purpose of this experiment is to show the umbra (darker part) and the penumbra (lighter part) of the shadow.

## Set Up

1. Place the two optics benches beside each other.
2. Put one light source on each bench with the point source (circular hole) facing the other end of the bench.
3. Place the screen on one of the benches at the opposite end to the light sources.

## Procedure

1. Plug in only one of the light sources.
2. Hold a pencil about 5 cm away from the screen so its shadow is cast on the screen. Now turn the light source around so the crossed-arrow illuminates the pencil and screen. How does the shadow change?
3. Rotate the light source back to the point-source position. Plug in the second light source. Make a sketch of the shadow of the pencil. Label the umbra and the penumbra.
4. Move the pencil away and toward the screen. How does the shadow change?
5. Block the light from each point source in succession to determine which part of the shadow is caused by each light source. Indicate your observation on your sketch.