

**Chapter 27: Light****Formation of Shadows****73****Shady Business****Purpose**

To investigate the nature and formation of shadows

**Required Equipment/Supplies**

bright light source  
 book or other opaque object  
 screen or wall  
 meterstick

**Discussion**

If you look carefully at a shadow, you will notice that it has a dark central region and a fuzzy and less dark band around the edge of the central region. Why do shadows have two different regions?

**Procedure**

**Step 1:** Arrange a small light source so that a solid object such as a book casts a shadow on a screen or wall. Sketch the shadow formed, noting both its regions. Sketch the relative positions of the book, light source, and shadow.

*Sketch shadow.*

**Step 2:** Move the light source away from the object while keeping the position of the object fixed. Note and sketch any changes in the shadow. Sketch the new relative position of the light source.

*Move light source.*

1. What happens to the size of the fuzzy region around the edge of the central region when the light source is moved farther away?

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Move object.

**Step 3:** Move the object closer to the light source while keeping the screen and the light source in the same position. Note and sketch any changes in the shadow. Sketch the new relative position of the object.

2. What happens to the size of the fuzzy region around the edge when the object is moved closer to the light source?

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### Analysis

3. Which relative positions of the object, light source, and screen result in a sharp distinct shadow with little or no fuzzy region around its edge?

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4. Which relative positions of the object, light source, and screen result in a large fuzzy region around a small or nonexistent central dark region?

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5. What causes the fuzzy region around the edge of a shadow?

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