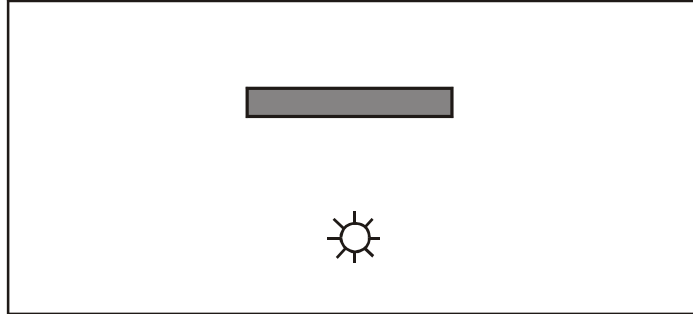
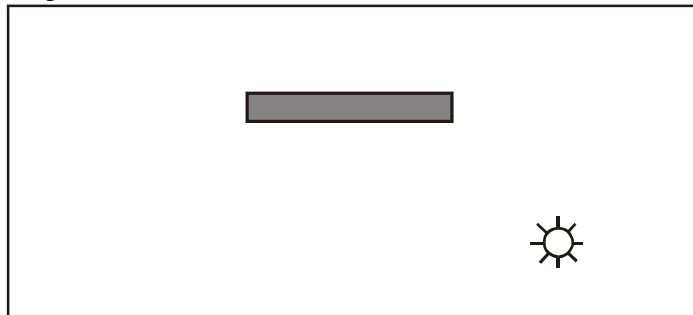


## Particle Model of Light Worksheet 1b: Shadows & Illumination

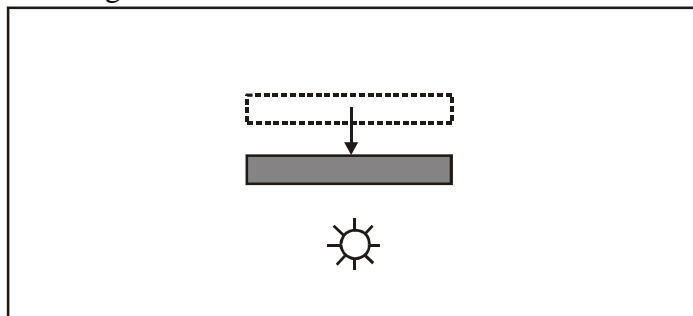
1. All of the diagrams in this section show light bulbs and cards seen from above. For each arrangement, draw a number of rays from the source and shade in the shadow cast by the card onto the tabletop.



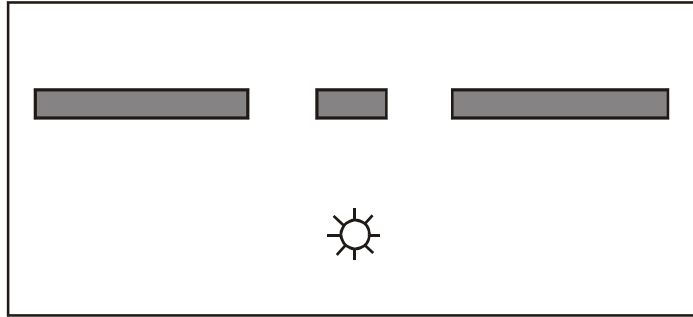
2. Draw a number of rays from the source and shade in the shadow region that results when the light bulb is moved to the right. How does the shadow move when the source is moved to the side?



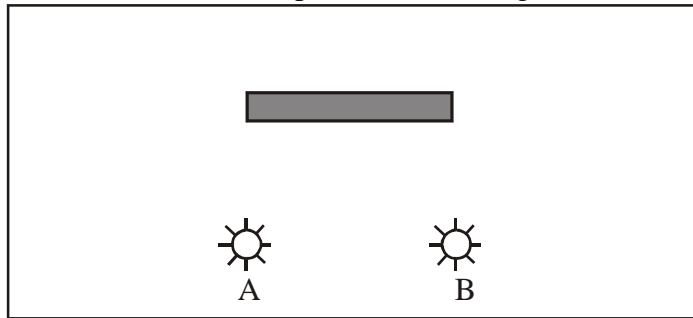
3. Draw a number of rays from the source and shade in the shadow region that results when the card is moved closer to the light bulb. What happens to the size of the shadow? What happens to the number of light rays striking the card?



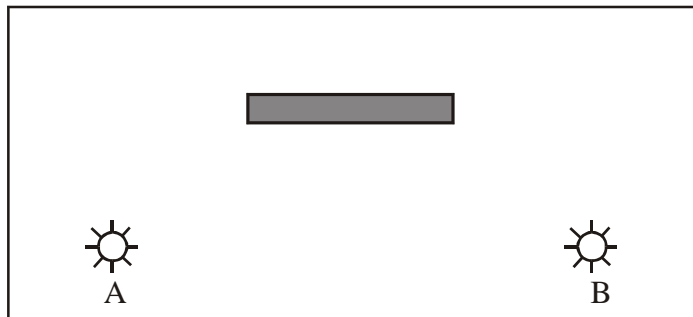
4. Draw a number of rays from the source and shade in the shadow region that results when multiple cards are used.



5. Draw a number of rays from each source and shade in the shadow region that results when two bulbs are turned on. Indicate the total and partial shadow regions. (Umbra and penumbra.)



6. Draw a number of rays from each source and shade in the shadow region that results when the two bulbs are more widely separated. Indicate the total and partial shadow regions.



7. An extended light source, like a fluorescent bulb, can be thought of as a series of point sources. Draw a number of rays from each source and determine the appearance of the shadow region.

