

## Particle Model of Light Worksheet 3: Light Intensity

1. In a pinhole camera arrangement, explain why increasing the distance from the pinhole to the viewing screen decreases the brightness of the scene reproduction.
2. Light from a tiny light bulb shining through a mask illuminates  $300 \text{ cm}^2$  of a screen placed 10 cm from the bulb. Predict the screen area that would be illuminated at distances of 20 cm, 30 cm, and 1 meter from the bulb.
3. Does the intensity of light from a pen laser or a focused flashlight beam decrease with the square of distance? Why or why not?
4. When a solar powered space probe travels from Earth orbit to an orbit twice as far from the sun, how many times larger or smaller would the solar panels need to be to receive the same quantity of light from the sun? Explain your reasoning.
5. Jupiter is five times farther from the Sun than Earth. Quantitatively compare the intensity of sunlight striking Earth to the intensity of light striking Jupiter. Explain your reasoning.
6. Venus' orbital radius is 0.7 times the earth's orbital radius. Quantitatively compare the intensity of sunlight striking Earth to the intensity of light striking Venus. Explain your reasoning.