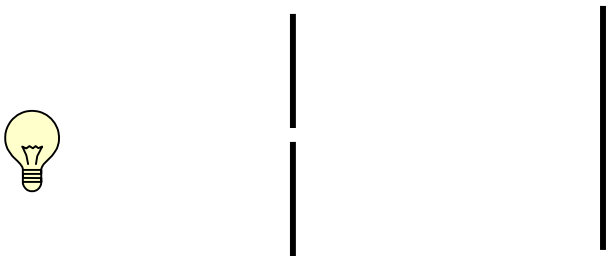
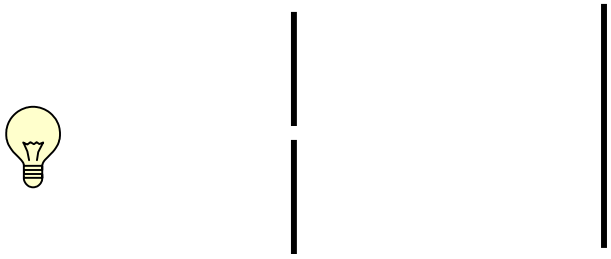
Name _____

WS2: Follow-up for the Pinhole Camera

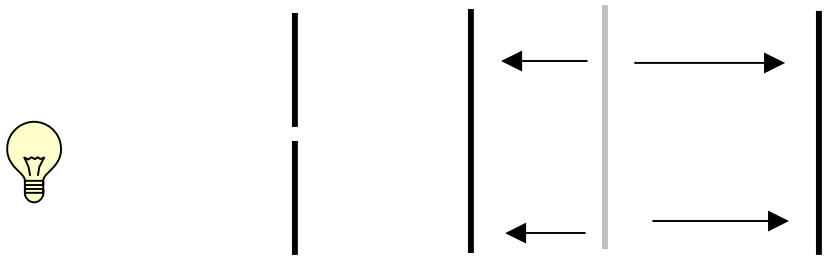
1. These pictures represent the light source, foil with a pinhole in it and the tape-viewing screen. The PVC tubes have not been drawn to make the pictures less cluttered. Draw at least ten (10) rays from one point on the bulb's surface. Do any of the rays reach the viewing screen?



2. Now draw two rays (one from the top of the bulb, the other from the bottom of the bulb) that travel through the pinhole and reach the screen. Draw several eyes that would be able to see the light that reaches the screen. Explain in words how an inverted reproduction of the bulb is formed on the screen.

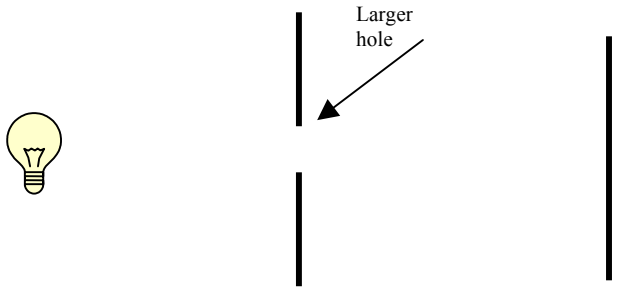


3. Draw a ray diagram and explain in words how the reproduction of the bulb on the screen changes when the screen is moved closer or farther from the pinhole.

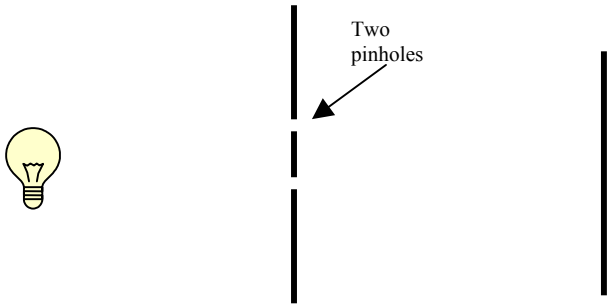


4. What would the eye "see" if the screen were removed? Draw a ray diagram to support your answer.

5. From one point on the bulb, draw two rays that go through the pinhole (one at the top of the hole, the other at the bottom of the hole). Explain in words how increasing the size of the hole affects the brightness and sharpness of the bulb reproduction on the screen.



6. Draw rays from the top and bottom of the bulb that travel through each pinhole and reach the screen. Explain how multiple pinholes affect the reproductions of the bulb that are formed on the screen.



7. In a pinhole camera arrangement, explain why increasing the distance from the pinhole to the viewing screen decreases the brightness of the reproduction.

8. For our math friends: To safely observe a solar eclipse a pinhole camera might be used. Assume the diameter of the sun is 1.39×10^{9} m and the distance to the sun to be 1.49×10^{11} m. If the distance between the pinhole and the viewing screen is 0.50 m, what is the diameter of the reproduction of the sun? Show your reasoning.