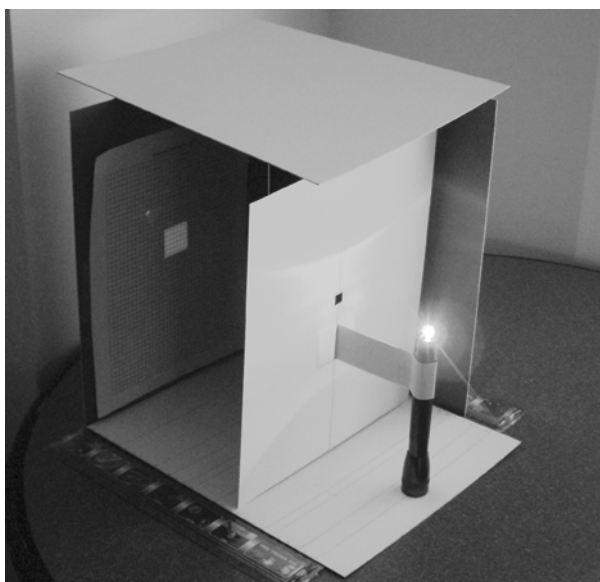


Brightness & Distance**E3:A3**

1. How does the brightness of light change with distance? What do you think?
2. Sketch a graph below with brightness on the vertical axis and distance from the light source on the horizontal axis. Include a line or curve that you think will depict the relationship between the brightness and the distance from the light source.

Now go collect data and see if your prediction was correct!



Place the white foam-board as close as is feasible to the graph paper and measure the distance from the graph paper to the light bulb. This measurement is very important so be careful and as precise as possible. Next count the number of squares on the graph paper illuminated--you will likely have to estimate fractions of squares if you have some that are not completely illuminated (this is also vitally important to getting good data, so please make your best estimate). We are going to compare every other measurement to this first one, so have a partner double check you.

Next move the light and foam-board 2cm further away from the graph paper and count/estimate squares once again. Continue doing so until you've moved so that your final distance from the graph paper is 3 times your original distance (if you started at 12 cm, take measurements until you reach 36 cm).

To calculate relative brightness, divide the number of squares illuminated in your original measurement by the number of squares illuminated in subsequent measurements. (Your relative brightness for your first measurement will be 1, and all the rest less than 1. Round to two or three decimal places.)

3. Use the space below to record your data. (A table is a good way to do this. Use three columns: "Distance (cm)," "Number of Illuminated Squares," and "Relative Brightness.")

4. Use graph paper or Logger Pro to construct a graph of your data. (Relative Brightness vs. Distance from light source.)

5. What mathematical relationship exists between brightness and distance? What evidence makes you think this is true?

