CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

Ankur Mathur

Project Number

35013

Project Title

The Inverse Square Law: Twinkle, Twinkle, Little Star

Abstract

Objectives/Goals

In this experiment, I wanted to see how the intensity of the light decreases as the distance of the object where the light is falling on, increases from the light source. I proved the formula that states that the light intensity is inversely proportional to the square of the distance from the light source.

Methods/Materials

The materials I used were a ruler, scissors, batteries, cardboard, black paper, tape, and a Mini Maglite Flashlight. For this experiment, I shined a flashlight through a 1cm square hole. The light that filters through the hole falls on a piece of graph paper. I counted the number of squares illuminated by the light. Then, I moved the graph paper at double and triple distances from the light source. I started with a 1cm hole, I then used a different paper with a 2cm hole using the same flashlight. I wanted to observe if the amount of light passing through the big or small holes effect the experiment or is intensity still inversely proportional to the distance squared.

Results

In my experiment I found out that the area illuminated is proportional to the square of the distance from the light source.

Conclusions/Discussion

In the end of the experiment, I found out that the intensity of the light is always inversely proportional to the square of the distance , and how much it's decreasing or increasing depends only on the distance of the object from the light source.For example, in my experiment,the area illuminated was 4cm square then the intensity was 1/4 per cm squared. This is happening because the formula for intensity is I=p/a. Intensity is equal to power over area. Power is the voltage of the bulb which is constant;the area is the area of the sphere because light goes out in all directions. The area of a sphere is 4/3πr^2, where 4/3π are constants. Therefore, the intensity depends only on r^2. Or we can say Intensity=1/r^2.

Summary Statement

My project "the inverse square law" says how the distance of object from the light source increases, then intensity decreases.For example, if the distance is doubled, then intensity falls 1/4, the distance tripled, intensity falls1/9

Help Received

My mom helped in making the room dark while taking pictures, and in collecting materials.