

Activity: Diameter of Sun



Name	_____
Date	_____
Period	_____ Table _____

Measuring the Diameter of the Sun

Introduction

Even though stars may be very far away from us it is possible to find out how big they are. For the lab today we will use the closest star to us, the sun. (It's also the only one we can see during class hours) We will be using a simple formula to calculate the diameter of the sun. For this formula we will need to know the average distance from the earth to the sun. This distance is called one **AU** or astronomical unit, and is equal to 1.5×10^8 km (150,000,000 km)

Problem

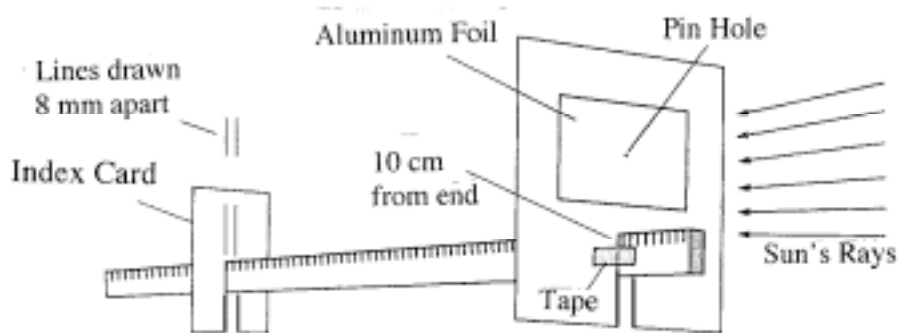
What is the diameter of the sun and how can we find it?

Materials

- | | |
|-----------------------|------------|
| meter stick | ruler |
| 2 "3 x 5" index cards | tape |
| aluminum foil | pin |
| scissors | calculator |

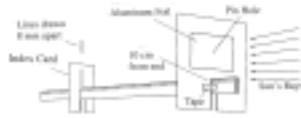
Procedures

1. Look at the diagram below. Cut two slits (about 4 cm deep) in the short side of each 3 x 5 index card. The slits should be cut at the center of the short side leaving about 1 cm gap.
2. About 3 cm above the slit that you cut in one index card, cut out a 2 cm square hole. Tape a piece of aluminum foil over the cutout hole. In the center of the foil make a single **SMALL** hole with the pin.
3. Place this card on the meter stick at a distance of **10 cm from the end**, check to be sure that the card is at right angles to the ruler and tape it in place.
4. Using the second card, draw 2 vertical lines exactly 8 mm apart, directly above the slit. This card will slide freely as you move it along the meter stick.



5. Take the completed equipment outside into the sunlight. Point the aluminum foil end toward the sun.
6. Move the meter stick until the first card's shadow covers the second card.
7. Move the second card along the meter stick until the image of the sun **exactly** fills the space between the two parallel lines on it. For best results the two cards must be perpendicular to the meter stick.
8. Determine the distance between the two cards to the closest millimeter. Record the distance in the data table.

Activity: Diameter of Sun



Name _____
Date _____
Period _____ Table _____

Observations

Distance between the two cards	Diameter of image on second card.
_____ cm	_____ cm

Conclusions

- Use the formula below to calculate the diameter of the sun.

$$\frac{\text{diameter of the sun (km)}}{\text{distance to the sun (km)}} = \frac{\text{diameter of the sun's image (cm)}}{\text{distance (in cm) between the two cards}}$$

Diameter of the sun is _____ km

- Collect data from all other groups and enter it in the table below along with the data from your group.

Group #	Calculated diameter of the sun (km)

- Using the above table, cross out the largest and the smallest diameter. Add the remaining diameters and divide the total number used.

The diameter of the sun as an average of class data is _____ km.