Module 6: The Sun

Topic 1 Application: Making a Pinhole Viewer and Observing the Sun

Before you being the scientific investigation below, make sure to download the Creating and Using a Pinhole Viewer Scientific Investigation Report. As you complete this scientific investigation, fill in any needed information on the report template. If you need more information about each section of the report, please visit the Developmental Module.

This scientific investigation is available below or in a printable version.

Introduction

Now that you have learned about the parts of the sun you need to construct a device and go outside and observe this magnificent object! But be careful, staring directly into the sun can cause serious damage to your vision! You are going to create a viewer to help aid in your observations! This activity will have two parts. In the first part you will construct a pinhole viewer. This pinhole viewer will allow you observe the sun. In the second part you will use the pinhole viewer!

In this scientific investigation you will create your own pinhole viewer and use this viewer to observe the sun.

Objectives

In this scientific investigation, you will:

- create a pinhole viewer using one of two listed methods.
- demonstrate the use of the pinhole viewer by observing the sun on a sunny day.

Hypothesis

Using the Procedure and Data Collection section below, read through the procedural information for this scientific investigation. Based on your understanding of the procedure, develop you own hypothesis which describe your expected results. Record these hypotheses in the Hypothesis section of your Creating and Using a Pinhole Viewer Scientific Investigation Report

Equipment and Materials

Paper Method	Box Method
• 2 pieces of white paper • 1 pin or thumbtack	• 1 cardboard box • Aluminum foil • 1 pin or thumbtack • Tape • Scissors

Procedure and Data Collection

You will notice that there are two options in creating your pinhole viewer. You may either create a pinhole viewer out of paper, or create a viewer out of a box. It is your choice but you do not need to create both so follow either set of instructions.

Paper Method

1. With the pin, punch a hole in the center of one of your pieces of paper.
2. Go outside, hold the paper up and aim the hole at the Sun. (Remember, do not look at the sun!)
3. Now, find the image of the Sun that comes through the hole.
4. Adjust your pieces of paper until you can view a clear dot on the piece of paper. What you are seeing is not just a dot of light coming through the hole, but an actual image of the Sun.
5. Record a video (or take pictures) of the set-up, and use of the pinhole viewer. This can be completed using camera, phone, or other video/picture taking device.
6. Make observations on the Creating and Using a Pinhole Viewer Scientific Investigation Report.

Box Method

1. With the scissors, cut a hole in one end of the box.
2. Cover the newly created hole with aluminum foil. You may have to tape the foil in place.
3. Make a tiny hole in the foil using a pin.
4. Go outside and aim the box toward the sun. Make sure the side with the foil and hole is facing the sun.
5. Record a video (or take pictures) of the set-up, and use of the pinhole viewer. This can be completed using camera, phone, or other video/picture taking device.
6. The sun should appear as a tiny dot opposite the aluminum foil. Make observations on the Creating and Using a Pinhole Viewer Scientific Investigation Report

Data

Use the black space provided on the Creating and Using a Pinhole Viewer Scientific Investigation Report to make any important observations. This is a great area to make a sketch of your experimental set-up, and what the sun looks like through the pinhole viewer.

Data Analysis

In the Data Analysis section of your Creating and Using a Pinhole Viewer Scientific Investigation Report, provide responses to the following questions:

- Why did you choose the either paper method or box method to complete your pinhole viewer?
- Describe the appearance of the sun when using the pinhole viewer?
- Why was the sun inverted on the pinhole viewer?
- What do you think would happen if you made the pinhole larger?
- What could you do to make your viewer more effective?

Conclusion

Using the Conclusion section of your Creating and Using a Pinhole Viewer Scientific Investigation Report, compose a three to four sentences describing your overall conclusion based on your data. Were your hypotheses true or false, and how do you know? Use the observations and notes that you collected from your investigation to form your conclusion. Make sure that you include your information that you gained from data analysis to support your conclusion.

Experimental Sources of Error

On your Creating and Using a Pinhole Viewer Scientific Investigation Report, provide reasons to the following questions: Are there any sources of error? If so, what are they, and what could be done to minimize error?

Once you have constructed your pinhole viewer and documented its use, please submit your Creating and Using a Pinhole Viewer Scientific Investigation Report along with your video/pictures to the dropbox.