

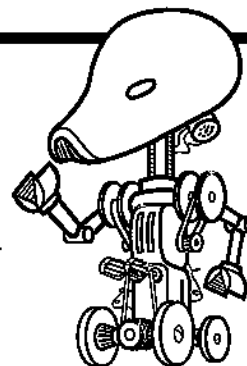
Comparing Stars

Date: _____

Team of Scientists: _____

A) _____ **B)** _____

C) _____



Equipment: 1 measuring tape, 150 cm 1 ruler, 30 cm
1 roll of masking tape 2 flashlights with batteries

A. Plan

Your group will model and compare how two stars appear to an observer on Earth.

1. Read all of the instructions on the activity sheet before you begin.
2. Choose one team member to act as an observer on Earth. The two other team members each hold a flashlight and represent stars. Team members will trade roles during the investigation.

B. Prepare

1. Have the observer stand at one end of the room. Mark his or her position on the floor with a piece of masking tape.
2. Measure a distance of 4 meters from the observer, and mark this position on the floor with a piece of masking tape.
3. Repeat Step 3 for a distance of 10 meters from the observer.

C. Predict

How will the brightness of the flashlights compare when they are the same distance from the observer? When they are at different distances from the observer?

I think _____

because _____

D. Model and Observe

1. The two "stars" stand next to each other at the 4-meter mark. The "stars" should face the "observer."

2. When the room is darkened:

Stars: Turn on the flashlights and shine them toward the observer.

Observer: Compare the brightness of the flashlights and record an observation. Compare the sizes of the circles of light and record an observation in the first box in Part E.

Hint for when you are the observer: Hold your thumb or a ruler at arm's length and look at it right next to the light. It can be easier to do this with one eye closed. You can compare the size of the light to parts of your thumb or marks on the ruler to note the size of the light.

3. Have one star move to the 10-meter mark and shine the flashlight toward the observer. The observer should compare the brightness of the two flashlights and the sizes of the circles of light and records observations of each in the second box in Part E.

4. Switch roles and repeat until all team members have acted as the observer.

F. Conclude

1. How did the two stars compare when they were the same distance from the observer?

2. How did the two stars compare when they were different distances from the observer?

3. In your model, which student represented the Sun? Which represented Earth?

4. Why does the Sun appear larger and brighter than other stars when observed from Earth?

5. Write one question you have about the Sun or other stars.

B. Plan

1. Design a scale model of the Sun and Earth that shows their relative sizes. Remember to:
 - Use your calculation to determine how large your model Sun and Earth should be. (You do not have to make the *distance* between your model Sun and Earth to scale, only their sizes compared to each other.)
 - Make sure that the size of your model makes sense for the materials you have available and the size of your classroom.
2. Decide on the materials you will use to make your model and how you will make it. Describe your design plan below in detail. Then show your teacher your plan.

Scale of the model: _____

Design plan: _____

A large rectangular area filled with a grid of small squares, intended for writing a detailed design plan. The grid consists of approximately 20 columns and 25 rows of squares.

C. Model

Obtain your teacher's approval, and then make your model.

D. Observe and Record

Describe your finished model. Tell whether it differs in any way from your original plan.

A large rectangular area of graph paper with a grid of small squares, intended for recording observations and descriptions of a model.

E. Conclude

1. What scale did you use for your model? Explain how you know it was accurate.

2. Which materials did you use to make your model? Why?

3. How is your model like and unlike the real objects it represents?

4. Suppose another group made a model Sun as tall as a typical front door, and a model Earth the size of a nickel. Explain why you think this would or would not likely be an accurate scale model.

5. Why would it be hard for you to make your model to scale for both the size of and distance between the Sun and Earth?

6. Write one question you have about the Sun and Earth.
