

Activity 2

Materials

Each group of students will need:

- watch with second hand or a stopwatch
- metric tape measure (30 m or more works best)
- calculator (helpful but not essential)
- safety glasses or goggles

Time

50 minutes or less

to the star Sirius from Earth is approximately 81,365 trillion km. But, this distance is only a little less than 9 ly (8.6 ly), a much more manageable number.

The light year is also important because it tells us about the time lag involved in communicating over the large distances involved in astronomy. If we sent a television or radio signal (both of which travel at the speed of light) to Sirius, it would be almost nine years before it arrived there. In the same way, if Sirius were to somehow stop shining right now, we would not find out about it for almost nine more years, when the last light the star produced finally reached Earth. How old would you be then?

Procedure

1. Find a long distance that you can use either inside or outside the school. This could be a long hallway, a large room such as the cafeteria, a parking lot, or a football field. You will not need a distance longer than a football field.
2. Starting at one end of the space you have chosen, walk heel-to-toe for exactly one minute. Mark where you stop.
3. Use the tape measure to measure how far you walked, rounding to the nearest meter. Record this distance in the data table (BLM 2.1).
4. Repeat steps 2 and 3 three more times.
5. Calculate the average of the four measurements and record it in the data table (BLM 2.1).
6. The average you calculated is the distance you can walk heel-to-toe in one minute. We will call this distance a "student minute."

Questions and Conclusions

1. Compare the length of your student minute to the calculations made by other students. Are all the student minutes the same? How are they similar?
2. How are student minutes similar to a light year? How are they dissimilar?
3. How many meters are in 3 student minutes? Use the length of your student minute.
4. How many of your student minutes are there in 5,000 m?
5. Listening to the radio one morning at 6:30, you hear that school has been canceled because of damage done in some parts of town by a windstorm. You start to climb back into bed and sleep the day away, but then you remember that your best friend lives in a part of town that was heavily damaged and has no telephone or electricity. Your friend leaves for school every morning at 7:00 and lives 900 m away from you. The only way you can get the news to your friend is to go to your friend's house and deliver the message. If you are only allowed to walk heel-to-toe, can you make it to the house in time based on your own student minute? Explain.

What Can I Do?

To get a sense of how big a trillion is, imagine counting a trillion. See how many coins you can count in a minute, and then calculate how long it would take to count a trillion of them.