

MATH EXTENSION—PROBLEM OF THE WEEK

Investigation 1: Sun and Earth

A girl made a Sun tracker and measured the shadows on a day in late December. The table shows the data she collected.

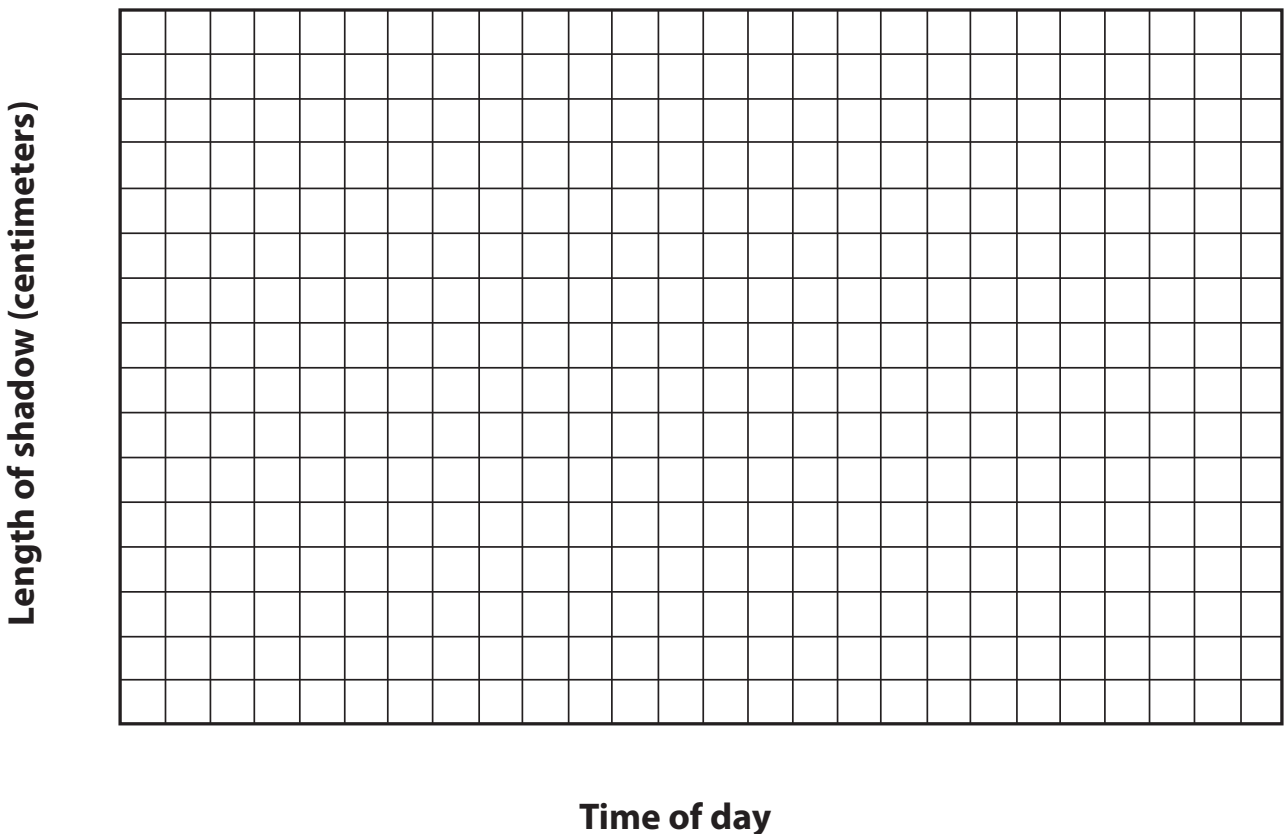
Time	Shadow length (cm)
9:30 a.m.	13.0
11:45 a.m.	8.0
12:30 p.m.	7.5
1:00 p.m.	8.2
1:45 p.m.	10.0
2:15 p.m.	12.0
3:30 p.m.	14.4

Create a graph, using her shadow measurements.

Use your graph to answer the questions below. Use the back of this sheet for your answers.

1. If the girl measures the shadow at 10:00 a.m., what would its length be? How do you know?
2. If she measures the shadow at 5:00 p.m., what would its length be? How do you know?
3. What problems, if any, do you see with her measurements?
4. A boy also set up a Sun tracker on the same day and measured a shadow 10 centimeters (cm) long at 12:00 noon. Could his measurement be correct? Why or why not?

Graph of the Shadow Data

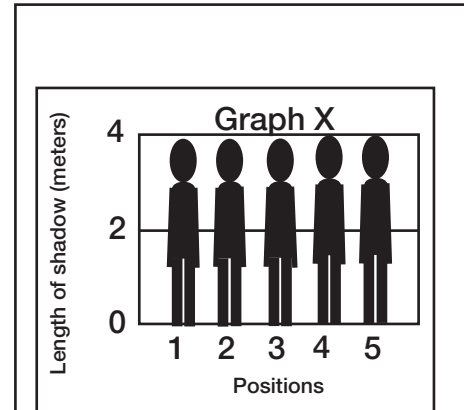
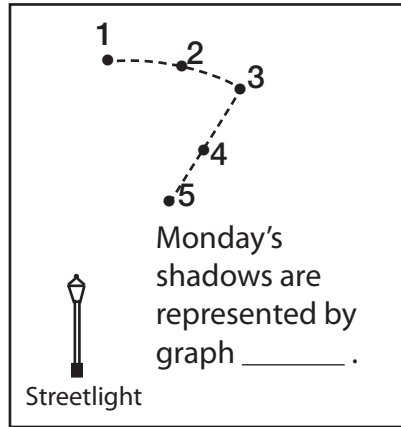


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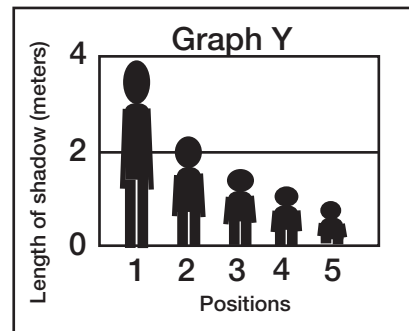
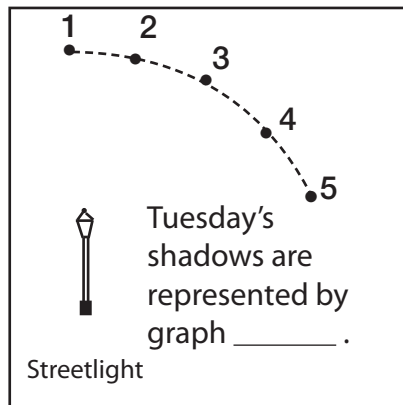
Shadow Graphs

Read the three stories and look at the pictures. Figure out which graph (X, Y, Z) goes with each story. Write the letter of the graph on the line in the picture.

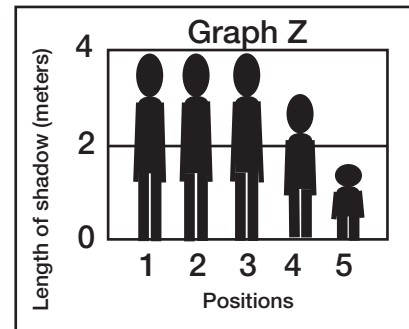
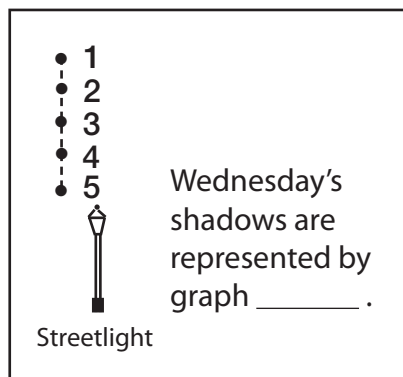
1. Monday night you are standing near a streetlight at position 1. Your friend measures the length of your shadow. It is 4 meters (m) long. You then walk to positions 2, 3, 4, and 5. At each position, your friend measures the length of your shadow.



2. Tuesday night you begin from the same place near the streetlight and walk a different path. Your friend measures the length of your shadow at each of the five positions.



3. Wednesday night you start from the same spot but walk in another direction. Again, your friend records the length of your shadow at five positions.

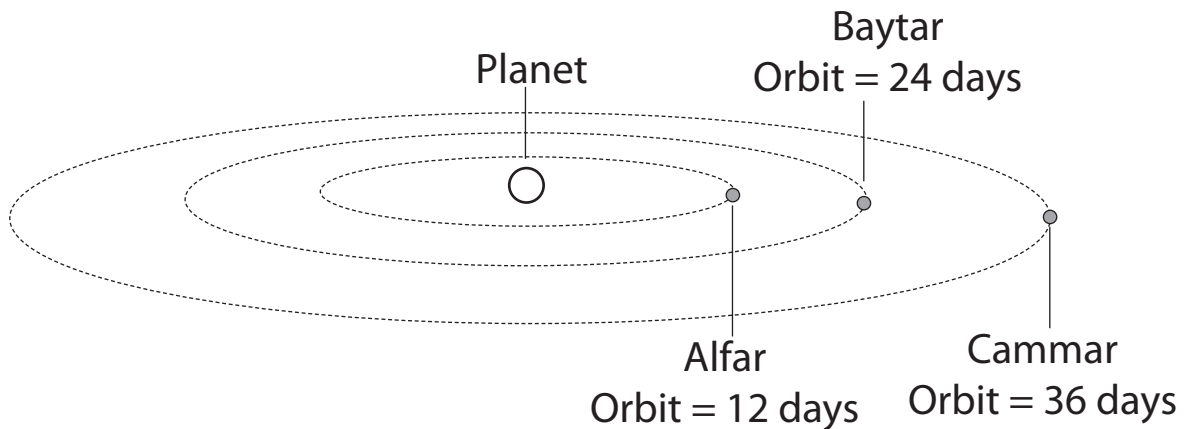


Your friend makes a bar graph of the shadow lengths for each night's walk. Those graphs are shown here on the far right. Match each graph with the path walked each day. Explain your answers on a separate page in your notebook.

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Investigation 2: Earth's Moon

In a make-believe planetary system, three moons orbit a planet. The closest moon is Alfar, the middle moon is Baytar, and the moon farthest from the planet is Cammar.



One day the people on the planet noticed that all three moons were lined up.

1. How many months will it be until the three moons line up again?

2. How many orbits will Cammar make before they line up again?

3. How many orbits will Alfar and Baytar make?

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Investigation 3: Solar System

A student, who is 10, is curious about how old she would be on other planets in the solar system. She knows that on Earth a year equals 365 days. But other planets have longer or shorter years. How can she figure out how old she would be on these planets?

Planet	Orbit in Earth days
Mercury	88
Venus	225
Mars	687
Jupiter	4,333
Saturn	10,759
Uranus	30,685
Neptune	60,189

1. How many Earth days old is the student?
2. How many Mercury years old is the student?
3. How many Mars years old is the student?
4. On which planets is the student less than a year old?
5. On which planets is the student older than she is on Earth?
6. How old would you be today on each of the planets?

