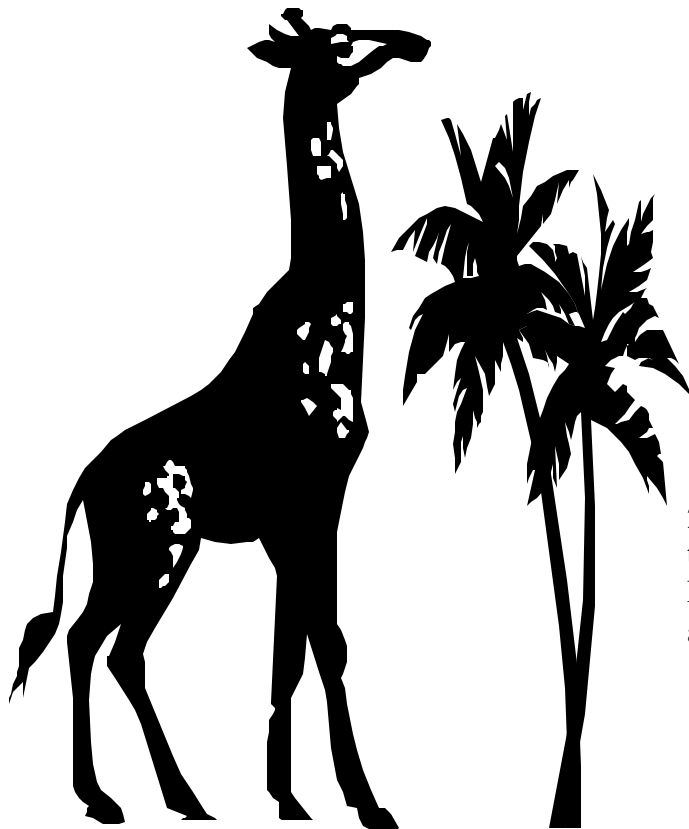


Problem of the Month Measuring Mammals



Level A:

1. Examine the two giraffes named George and Geoff. Determine which giraffe is taller than the other. Explain the difference in the size of the giraffes. How did you determine your answer?

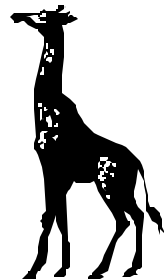


Geoff



George

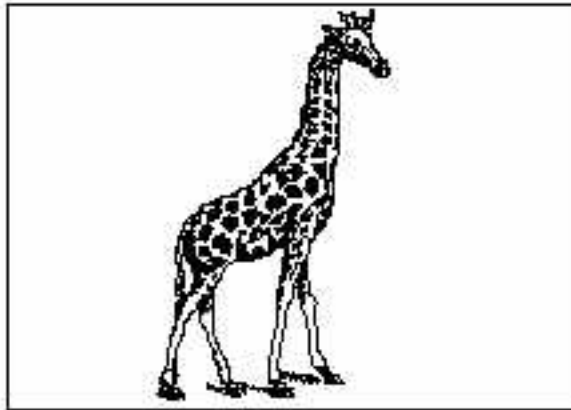
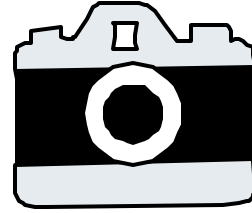
2. This is young Gerry. How much taller is George than Gerry? Explain how you found your answer.



Gerry

Level B:

1. You used your camera to take a picture of a giraffe at the zoo. Below is the picture of the giraffe you photographed. The camera shop makes pictures into posters 12 times the size of the picture. How tall will the giraffe be in the poster?



2. Suppose an elephant stands 32 inches tall in another poster that the camera shop made for you. How tall was the elephant in the original photograph?

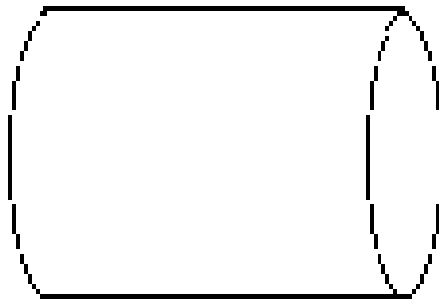
Explain your answer.

Level C:

You are a naturalist. You have heard that other naturalists are using scopes to calculate the size of animals in the wild. By viewing animals through a scope, the height of an animal can be found.



You know that scopes come in different sizes. You think that by using the scopes along with mathematics you can determine the actual heights of objects that you see through the scopes.

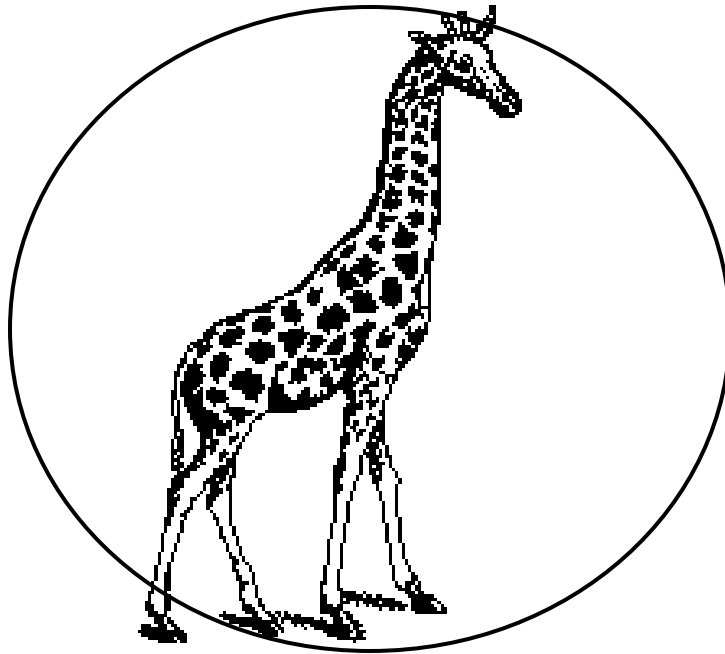


Experiment with various size scopes to determine what you can see at different distances with different scopes.

- How does the size of a particular scope affect the animal's image?
- Is the size of the image you see affected by how far away you are from an object?
- How does the distance from an object compare to the height of the image?
- Describe a type of experiment that you could conduct to answer these questions.

Select a particular size scope that you have used in your experiment. Suppose you were 60 ft. away from a giraffe and the animal's image exactly filled the viewer. How tall is the giraffe?

Describe using mathematics the relationship between the distance a viewer is from an object and the height of the object for the scope you used. Explain how that relates to the size of the scope.



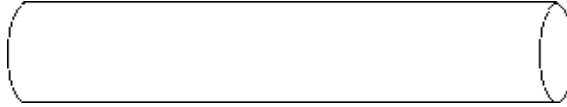
Level D

You have four different size scopes labeled accordingly.

Type A



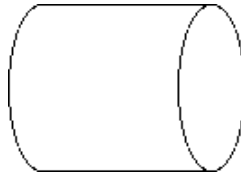
Type B: Same size hole as A but longer.



Type C: Larger hole than A and B, but same length as B



Type D: Same size hole as C and same length as A



You are standing fifty feet away from an animal. Looking through scope TYPE A, the animal's image fills the scope's opening exactly.

- Explain what you need to do to look through a TYPE B scope and see the full image of the same animal fill the opening of that view tube.
- Explain what you need to do to look through a TYPE D scope and see the full image of the same animal fill the opening of that view tube.
- Suppose TYPE C scope is 3 times as long in length as TYPE A, and the diameter of the opening of TYPE C is twice the diameter of TYPE A. Exactly where would you need to stand to see the full image of the same animal fill the opening of that TYPE C scope?
- You are a tourist on safari on an African plain. There is an elephant standing still a distance away across the river. The current of the river is swift and you can not cross it. You have in your possession a piece of paper that can be rolled into various size view tubes, a short measuring tape, a pen and calculator. You would like to determine the height of the elephant. Explain to another tourist how you were able to accurately determine the elephant's height.

Level E:

You are out in the wild. You have a short measuring stick with metric calibrations. You see a giraffe in the distance. You hold the measuring stick up, like a painter might with a brush. Your arm is extended in front of you and you sight the animal and determine a height measure on the calibrated stick. You move back ten feet and make a similar sighting with a new measurement. The giraffe has not moved.

Explain how you could determine the actual height of the animal. Explain the relationship between the measurements. Write an algebraic formula for calculating the height of an object given the process described. Explain why it works.



Problem of the Month

Measuring Mammals



Primary Version Level A

Materials: A picture of giraffes for each student. Long strips of paper.

Discussion on the rug: (Teacher shows the giraffes) “What do we call these animals? Who can read the names of these animals? Which animal do you think is taller? How would you know for sure?”

In small groups: (Each group has a paper of giraffes titled “Who Is Taller?” Paper strips are on a material table that students might select to use.)

(Teacher asks the following questions. Only go on to the next question if students have success)

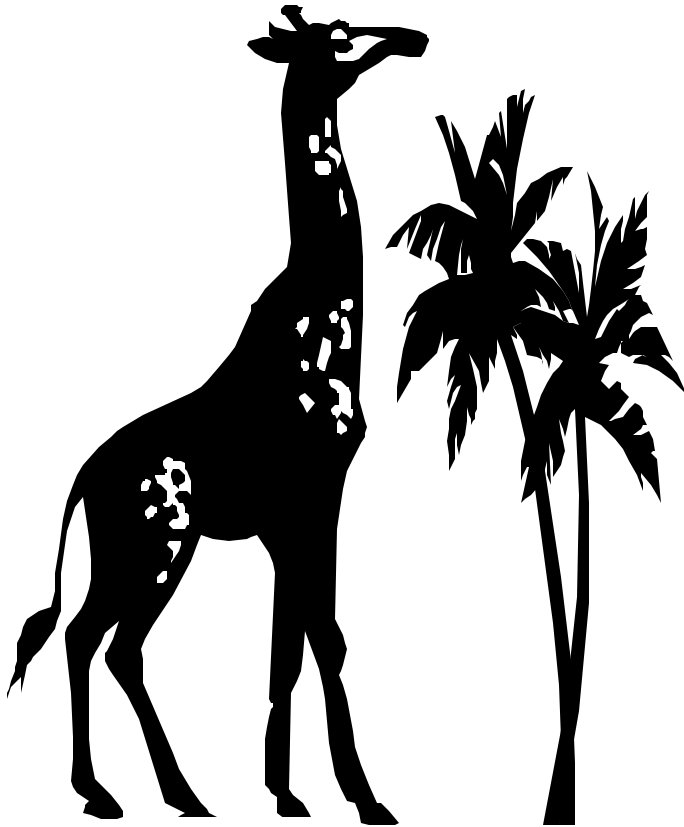
1. Which giraffe is taller? How can you check to know for sure?
2. Gerry is a young giraffe. How much taller is George than Gerry? How do you know? Show how you figured it out.

(At the end of the investigation have students either draw a picture to represent their solution or dictate a response to this summary question.)

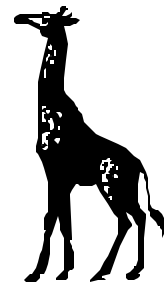
Who Is Taller?



George



Geoff



Gerry