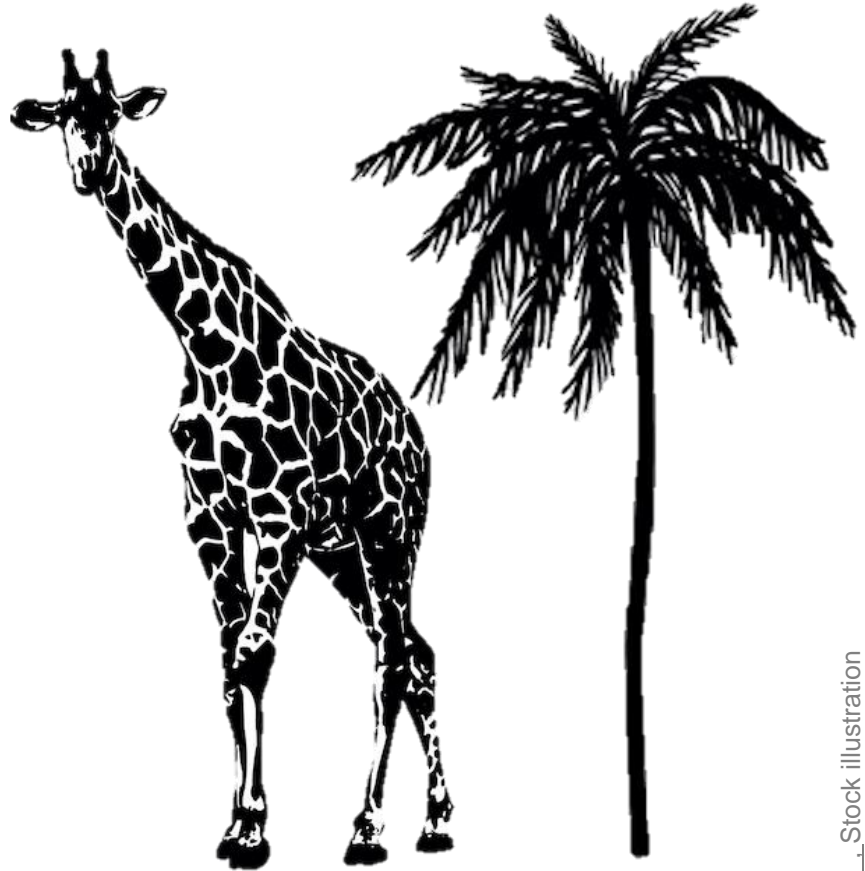


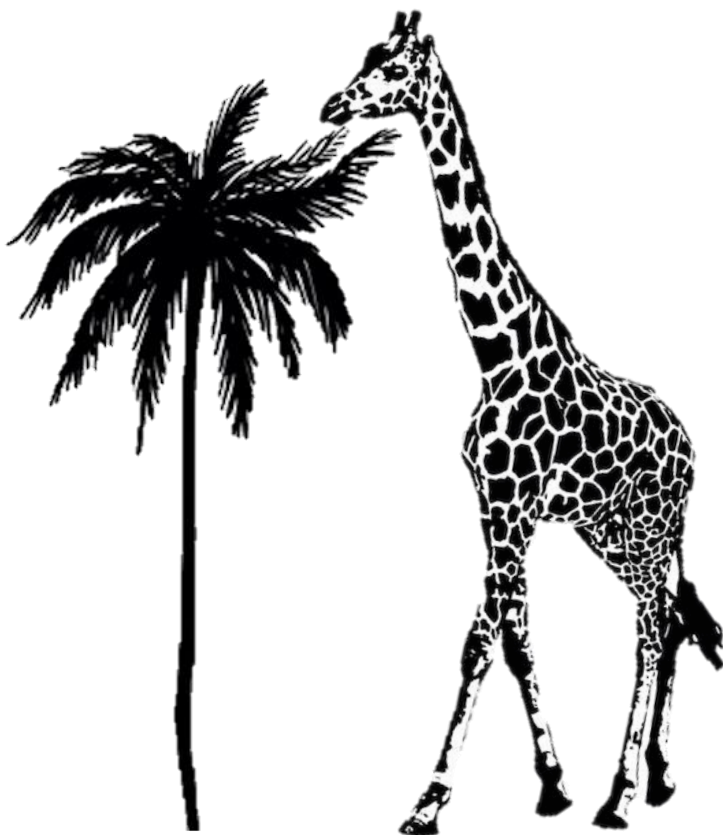
## Measuring Mammals

### 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?



George



Geoff

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



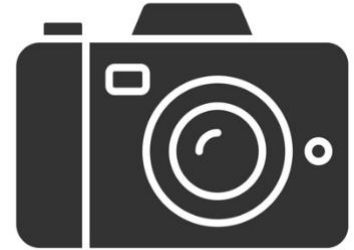
Gerry



## Measuring Mammals

### 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?



Explain how you figured it out.

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.



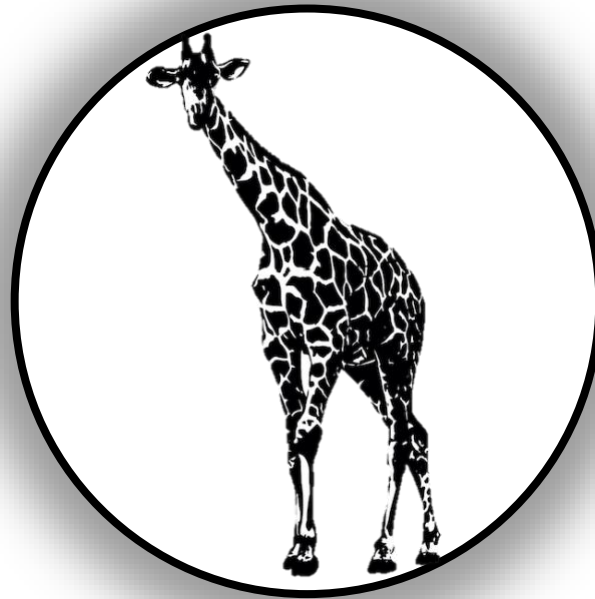
Image credits: iStock.com / PREDRAGILIEVSKI, Stock illustration ID:899760934 | and | iStock.com/Suesse, Stock illustration ID:1087462654



## Measuring Mammals

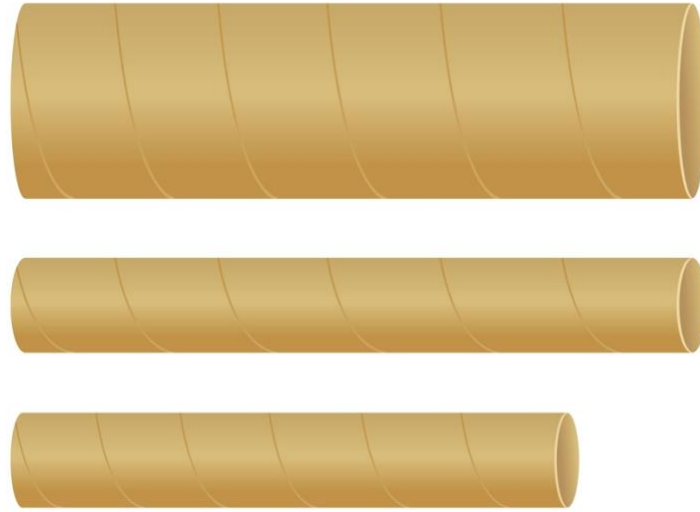
### Level C

You are a naturalist. You have heard that other naturalists are using scopes to calculate the size of animals in the wild. By viewing the 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 a relationship between the actual heights of objects that you see through the scopes and distance you stand from the object.

— Inside Problem Solving: Measuring Mammals —



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

- Choose one scope and use it to view five different objects around the room, filling the diameter of the scope with your view of the object. Record the height of each object and your distance from it. Create a graph with this data and write an equation that represents the data.
- How do the dimensions of a particular scope affect the relationship between the distance from an object and its height?
- Does this relationship hold for other sizes of scopes? How do you know?

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

## Measuring Mammals

### Level D

You have four scopes of different sizes, labeled accordingly.

#### Type A



#### Type B

Same size hole as type A but longer in length.



#### Type C

Larger size hole as type A and B but same length as type B.



#### Type D

Same size hole as type C and same length as type A.



— Inside Problem Solving: Measuring Mammals —

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. Across the river, a distance away, there is an elephant standing still. The current of the river is swift and you cannot cross it. You have in your possession a piece of paper that can be rolled into various-sized view tubes, a 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.



## Measuring Mammals

### 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.

