

Graphing Calculator Lab

Using Vectors

Biologists use animal radio tags to locate study animals in the field and to transmit information such as body temperature or heart rate about wild or captive animals. This allows for study of the species, tracking of herds, and other scientific study. You can use a data collection device to simulate an animal tracking study.

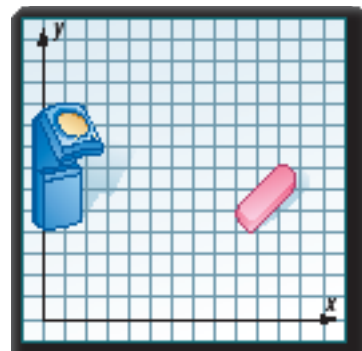


SET UP the Lab

- Tape a large piece of paper to the floor. Draw a 1-meter by 1-meter square on the paper. Label the sides of the square as a coordinate system with gridlines 10 centimeters apart.
- Attach the motion sensor to the data collection device.

ACTIVITY

- Step 1** Place an object in the square to represent an animal. Mark its position on the paper.
- Step 2** Position the motion detector on the y-axis aligned with the object, as shown. Use the data collection device to measure the distance to the object. This is the x-coordinate of the object's position.
- Step 3** Repeat Step 2, placing the motion detector on the x-axis. Use the device to find the y-coordinate of the object's position.
- Step 4** Reposition the object and find its coordinates 4 more times. Each time, mark the position on the paper. Then connect consecutive positions with a vector.
- Step 5** Use the graphing calculator to create a line graph of the data.



KEYSTROKES: **Zoom** 7

ANALYZE THE RESULTS

1. Compare and contrast the calculator graph and the paper model.
2. Examine the graph to determine between which two positions the animal moved the most and the least.
3. Find the magnitude and direction of each vector. Do the results verify your answer to Exercise 2? Explain.
4. **RESEARCH** Research radio tag studies. What types of animals are tracked in this way? What kind of information is gathered?