

Triangulation, a Scientist and a Seal

Grade: 4th – 6th grade

Goal: This activity will demonstrate in layman's terms how triangulation can be used to locate an individual animal.

Objective: Students will be able to demonstrate the basics of triangulation and how it is used to locate animals, people, etc.

Materials: Clear a large open space in the classroom or take students to the gym or outside.

- Charts of Alaska
- Pencil
- Paper

Activity:

Explain to the students that they need to locate a seal that has been reported in Prince William Sound. A researcher from the Alaska SeaLife Center (ASLC) needs to take photographs of this seal for the National Marine Fisheries Service (NMFS). They are interested in recording data on seals once they have been released from the ASLC Rehabilitation department. The ASLC researcher is communicating with assistants in the field. A fisherman has reported seeing a seal with a flipper tag from the Center. Ask a student to be the seal.

Choose another student to be the first point of reference, a mountain. The "mountain" should be about 10 feet from the "seal." Lets assume that the fisherman sighted the seal close to the coastline near a mountain.

(The "assistants" may find it easier to put a symbol for the mountain on a piece of paper and discuss where the seal might be in relation to the mountain.)

- Will this information help the assistant?

Choose another student to represent the second point of reference: a salmon hatchery. Position the hatchery about 8 feet away from the seal, so that the seal, hatchery, and mountain form a triangle.

The researcher now has two points of reference for the assistants in the field. (i.e. you should see a fish hatchery to the North and a mountain to the South.)

- Are the research assistants able to narrow down the seal's location better?

Choose one more student to represent the third point of reference: a large navigational aid, like a buoy. (The navigational aid should be about 6 feet from the "seal.") Now the mountain, hatchery, and navigational aid form a triangle around the seal.

Now have the researcher ask the assistants in the field to locate all three references. (“I can see the mountain to the South, the fish hatchery to the North, and the navigational aid to the East.”) Using 3 points, the research assistants can now triangulate the position of the lost seal.

This is how Global Positioning Systems work (GPS). Instead of mountains, fish hatcheries and other points of reference, GPS uses highly accurate satellites as points of reference. Satellite tags communicate with orbiting satellites, getting signals from at least three of them to “triangulate.” This enables the receiver to display an animal’s position to within 100 meters.