



Activity | “PING” YOUR WAY THROUGH THE DERELICT BOAT MAZE

In the past, ship captains had a difficult time navigating through **turbid estuarine** waters with low visibility, as they couldn’t spot submerged marine debris. Today, instruments such as fish finders and depth recorders use **sonar** to reveal structures, as well as schools of fish, on the bottom. Technical instruments with even greater resolution, such as **side scan sonar**, allow state and federal agencies to locate additional submerged structures.

Sonar is similar to echolocation in dolphins, as a pulse of sound is emitted from the transmission side of the instrument. The sound wave moves through the water and “pings” as it reflects off underwater structures. The reflected waves return to the **sonar’s** receiver. Based on the speed of sound, a location for the submerged vessel can be determined and, using GIS coordinates, marked on a chart.

PROCEDURE

1. Mark off boundaries for this activity. One half of a basketball court or a portion of your classroom will be sufficient. This space represents an estuary littered with submerged marine debris hazards. There is a dock at one side of the court (*start*) and another dock at the other side (*finish*).
2. One student represents the *navigating boat*, and the remaining students represent *underwater hazards* such as sunken oil rigs, abandoned recreational boats, fragmented commercial boats, old docks, etc.
3. Rules:
 - a. Navigating boat: Eyes shut. No running. Walk slowly with hands in front. Listen carefully to your surroundings.
 - b. Underwater hazards: Eyes open. Once spot is chosen, no moving. Must reply to all emitted “pings” with “pong”.
 - c. All students are quiet except for “ping” and “pong.”
4. The start: Navigating boat stands with eyes closed while the underwater hazards select a spot within the designated boundaries.
5. With eyes shut, the navigating boat moves about the course without bumping into any underwater hazards.
6. While moving, the navigating boat calls “ping.” All underwater hazards within arms length of the navigating boat, must reply “pong.”
7. To avoid bumping into an underwater hazard, the navigating boat must turn and continue moving. (Note: During the course, the instructor may need to guide the navigating boat within the boundaries.)
8. Should an underwater hazard be bumped by the navigating boat, then the navigating boat sinks and becomes an underwater hazard.
9. Another student becomes the navigating boat and tries his or her skill at navigating the course.
10. The course is successfully completed when the navigating boat travels from *start* dock to *finish* dock without bumping into any underwater hazards.

PURPOSE

To simulate **sonar** technology in marine navigation course.

OBJECTIVES

The students will:

- ▶ Work as a team to complete the simulated course
- ▶ Investigate technological advances that assist with underwater **derelict** vessel mapping projects.

MATERIALS

- ▶ Classroom or basketball court

OBSERVATIONS

1. As the navigating boat, how did your listening skills help?
2. As an underwater hazard, how did you feel when the navigating boat was nearby?

CONCLUSION

1. If you owned a boat, how would you feel to have it damaged by a sunken vessel or marine debris?
2. How did captains navigate marine debris hazards in shallow waters before **sonar** technology?