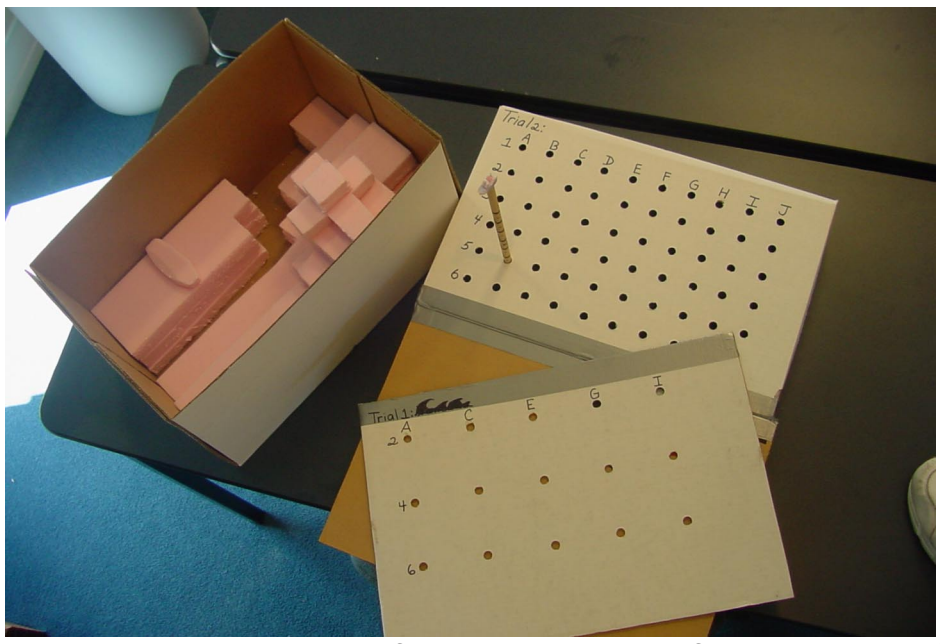
How to convert a copy paper box into a representative section of the seafloor

Materials List

- 1 copy paper box (11" x 17" x 9 1/2"deep) with cover (11 1/2" x 18")
- 1 rectangular piece of cardboard cut the same size as the box lid.
- Rigid foam sheet insulation (found at home supply stores in pink), 1 sheet of 2’x8’ will make two boxes
- one 5/16’’ hardwood dowel 12’’ long
- colored fine-line permanent marker
- serrated knife
- utility knife
- 8 sea floor templates (one pattern for each layer)
- 2 box cover templates, (Cover 1 & Cover 2, Grid Patterns)
- ruler/tape measure
- small toy boat or a piece of foam to represent the submarine
- 7/16’’ hole punch or drill bit and drill
- duct tape
- glue

Procedure for making Copy Paper Box Seafloor



Finished copy paper box representing the seafloor with two covers for sampling at different resolutions.

You may choose to design your own seafloor or use the design outlined here.

1. Cut the rigid foam sheet insulation into 8 rectangles the same size as the bottom of the inside of the cardboard copy paper box (approx. 11"x17").
2. Trace the template for seafloor Layer 1 onto a rigid foam rectangle. On the template, black represents pieces of the seafloor. The white pieces will not be needed.
3. Using a knife, cut the foam pieces to match the sea floor template.
4. Glue the pieces for Layer 1 into the copy paper box.
5. Repeat procedures 2-4 for Layers 2-8. The foam pieces will be glued onto one another to complete the box.
6. There are two covers for the box. Cover 1 allows for fewer data points than Cover 2. Results will show that Cover 2 will give a more complete picture of the seafloor, due to more data.
7. Using the Grid Pattern for Cover 1, mark, on the rectangle piece of cardboard, where the 15 holes will be cut.
8. Cut or drill the holes into the rectangle piece of cardboard.
9. Using the Grid Pattern for Cover 2, mark, on the copy paper box cover, where the 60 holes will be cut.
10. Cut or drill the holes into Cover 2.
11. Attach, using duct tape, Cover 1 (15 holes) to Cover 2 (copy paper box cover with 60 holes) making sure the holes that were cut line up with each other.

The wooden dowel represents the sonar signal that will measure the time it takes to reach the seafloor. The following are steps for creating this dowel (signal).

1. Starting a 1/4" from the bottom of the wooden dowel, draw a line every 1’’ with a fine line permanent marker.
2. Label the dowel, starting from the bottom with the following: 0.0, 0.7, 1.3, 2.0, 2.7, 3.3, 4.0, 4.7, 5.3, 6.0. These numbers represent the time it takes to reach the bottom of the seafloor and back to the surface, with each inch representing approximately 0.7 seconds (roundtrip time) which converts to approximately 500 meters.

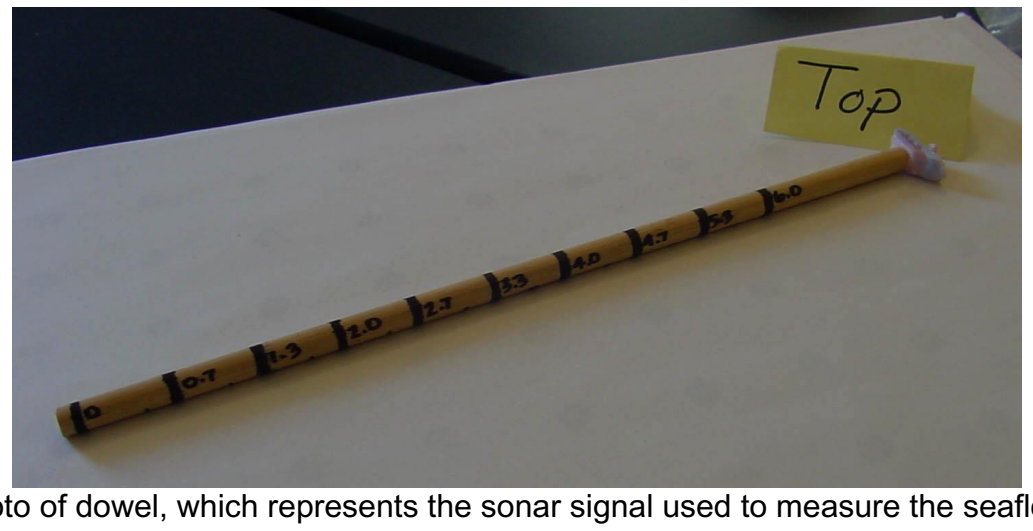


Photo of dowel, which represents the sonar signal used to measure the seafloor.