

## Activity #2 - Sonar Mapping

### Concept # 2

#2 Oceanographers have developed methods for mapping the ocean floor, illustrating what cannot be seen.

### Objective:

Students may use their shoe box sea floor model from Activity #1, or may use cardboard layering inside a shoebox, to simulate a section of the ocean floor. Then the students probe the ocean floor to simulate sonar echoes. They graph this data to get a visual picture of the ocean floor.

### Materials:

- corrugated cardboard
- scissors
- glue
- chop stick
- shoebox
- mapping guide grid
- pen
- tape
- stiff paper (card stock)
- data sheet
- graph sheets
- bathymetric map
- metric ruler

### Procedures:

1. Students are grouped in pairs. Each pair obtains a shoebox, cardboard, glue, and scissors.
2. Students glue layers of cardboard to the bottom of the box to create ocean floor height variations. The variations will be measured at 1cm heights so the cardboard layers must be thick enough to show height differences.
3. Students tape a mapping guide grid to the box lid labeled Rows A-G and 1-13.
4. At the intersection of each row and line a hole is poked with the tip of the scissors. The hole should be big enough for the probe (chop stick).
5. The probe is marked and labeled from one end (the bottom) every cm from 1 to 8 cm with a pen.
6. After the box has dried, the lid is put on, and students probe the ocean floor through the holes and record their findings on a data sheet.

### Graphing Alternative 1 - making a 3D paper model

7. Numbers (depths) on the data sheet are then plotted on graph sheets, one sheet for each row.
8. After plotting each row, color the area below the line connecting the data points (this represents changes in ocean floor depths).
9. Students cut out the graph above the line and discard.
10. Glue the cut out sheet onto the stiff cardstock in the order of the rows.
11. When finished, open the box and compare your model to the original ocean floor.

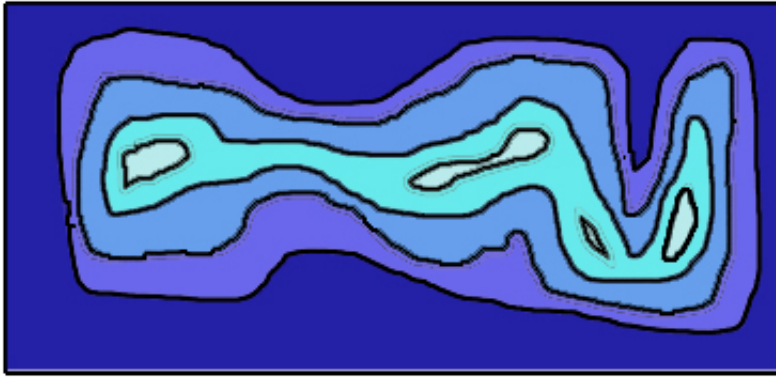
### Graphing Alternative 2 - making a contour map

7. Use the numbers on the data sheet to create a contour map (see Activity #3). Plot a contour line for each centimeter of depth. Plot the first contour line by connecting all the 1 cm soundings on the data sheet. Plot the next contour line by connecting all the 2's, and so forth.
8. Color in your depth contours by using light blue, then darker and darker shades of blue indicating deeper depths.
9. When finished, open the box and compare your model to the original ocean floor.

## Evaluation:

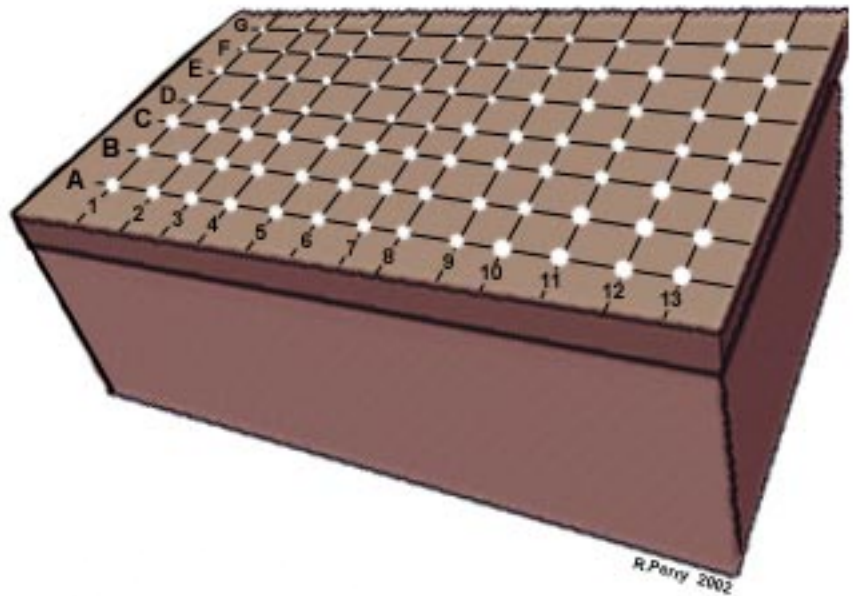
- Does the cut out model and/or contour map look like your ocean floor shoebox model? Explain.
- Were any features missed? Why?
- Do you think oceanographers have similar problems during their investigations?
- How could you have improved the accuracy of your results?

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Inside of shoebox, looking down at cardboard strips representing ocean floor contours.

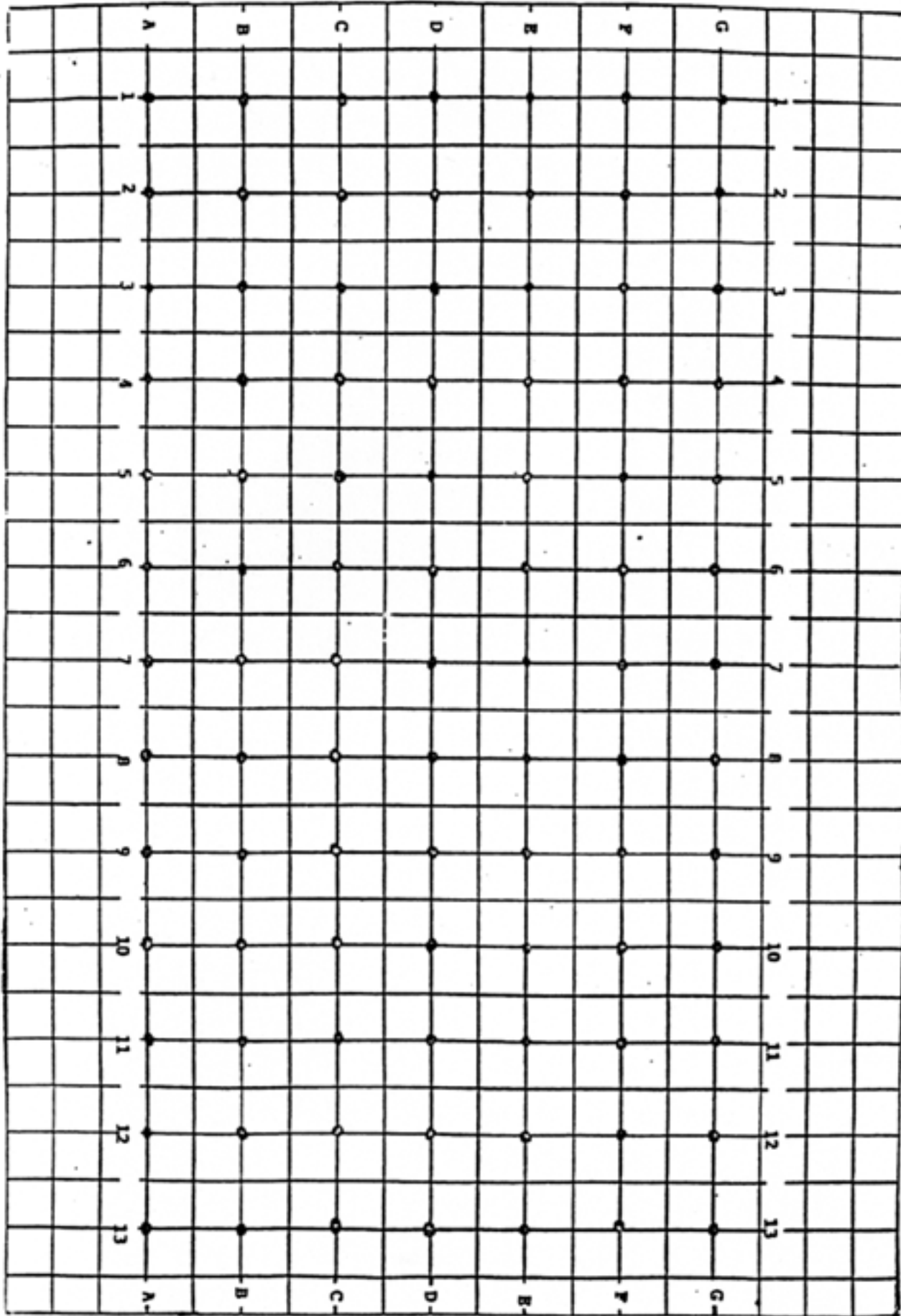
Shoebbox with mapping guide on top of lid. Ocean floor model is inside. Holes are poked at grid intersections.



Graphs of data, cut-out and glued in order of the rows.

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## Mapping Guide for Box Top



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Data Chart

	1	2	3	4	5	6	7	8	9	10	11	12	13
A													
B													
C													
D													
E													
F													
G													

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Graph Paper - One Graph per Row of Data

