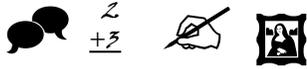


ACTIVITY: Match the pressure of the deep, make a graph on a cup

GRADE LEVEL(S): 3 to 6th



20 minutes

Experience ocean pressure

DISCIPLINES: Science, physics, math

OBJECTIVES: Students will be able to:

- describe the changes in pressure at different ocean depths
- discuss how much pressure is on an object at certain depths



MATERIALS: Styrofoam cups (8 ounce)
 *Deep-sea artifact Cup
 Construction or color paper (Turquoise, blue, gray, & black)
 Glue dots
Feeling the Pressure Fun Sheet

Paper (scratch/recycled)
 Pencils
 Calculators (older students)
 Liter bottle of water
 Gallon bottle of water



Decorated graph cup

TEACHER'S NOTES:

1. *If you do not have a cup that's been to the deep sea, print the attached photograph comparing a regular size cup to one that's been to the deep.
2. For Part 1, each group can share a cup rather than each student. Each student will need a cup for Part 2. The decorated graph/cup can then be used for our *Say it With Hagfish* activity.
3. Print one copy of the funsheet per class, per team, per student, it's up to you.

WHAT TO DO:

Preparation: Pre-cut the 1" paper squares (approximately 50 per cup) for Part 2

Part 1:

1. Tell students, *Imagine yourself swimming in a pool? Can you feel the water? Now dive deep down into the sea. Could you feel the weight of the water? What words come to mind?*
 Ask, *Do you think water is heavy? Do you notice it when you swim?*
 Pass around a liter bottle of water. Ask, *Did that change your mind, is water heavy?*
 Pass around a gallon bottle of water. Ask, *After feeling the weight, did you change your mind about it being heavy or not?*
2. *Give each team a cup. Show students the deep-sea cup (photo or real thing) but do not explain why the cup is smaller. Give students 5 minutes to compress (shrink) their cup without breaking or crushing it. If time available, allow teams to show their cup and explain their strategy.

3. Ask, *Did anyone have any luck? How do you think this cup got to this size?*

Explain that the smaller cup has been to the deep sea, then ask, *What does that have to do with its size?*

Answer: The weight of the ocean -- the water -- has pushed out all the air in the Styrofoam.

When scientists talk about the pressure in the ocean, they're referring to the weight of the water pressing down. To help them visualize it, you might use the example of cotton candy or a piece of bread. If you grab a handful and squeeze, you compact it in a similar way. Compare and contrast the deep-sea cup to the ones they tried to compress.

Be sure they notice that it's compressed evenly on all sides, top and bottom. Ask, *What does that tell you?* Explain the pressure is felt evenly on all sides.

Part 2:

1. Tell students they're going to figure out how much weight it took to shrink a cup to the size in the photo. Have students glue the **1-inch squares** on the cup by sticking a glue dot onto the paper then sticking it onto the cup. Remind students that because the pressure is felt on all sides, evenly, be sure to cover the inside and bottom of the cup, too.
2. When finished, have students count the number of squares on their cup. Tell students, at 3000 feet down, the cup felt **1300 pounds of pressure per square inch**. That means each paper square on the cup had 1300 pounds pushing on it. How much is that? **That's like a large camel standing on each square.**

Ask them how they can figure out how much pressure the entire cup felt. How many camels? How many pounds?

Teacher's Note: Vary the math depending on the grade level. Individuals, groups, or the entire class can figure out the answers.

GO DEEPER:

- ⌘
+⌘
- Other fun figures...at 3000 feet, a fish, the cup, a submersible has...
- 6.4 million gallons of water above it
 - 53,376,000 lb of water
 - Or...what else? How many cars, elephants, airplanes, kid your age...



Allow students time to add thoughts to journal about what they discovered and questions they now have about living in the ocean



Have students interpret what they've learned in art form. For example, they can draw a cup with camels balancing all over it or draw a submersible with themselves in side, camels smashing in on all sides, or whatever comes to mind.

Feeling the Pressure Fun Sheet

The cup on the right felt the pressure of a deep-sea dive, traveling down almost 5000 feet (1,500 m).



Observations:

Number of squares:

How much pressure?