

# Trench Dive



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**Do you need an idea for a scientific study?  
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**Start learning right now about how factors relating to ocean water change depending on the water's depth. Take the following brief quiz to see how much you already know about deep ocean trenches. See the bottom of page 4 to check your answers.**

1. The pressure in the deepest trench on earth is equivalent to \_\_\_\_\_ placed on top of a person.
  - a. 50 barbells
  - b. 50 elephants
  - c. 50 jumbo jets
  - d. 50 semi-trucks
2. Which famous film director traveled to the deepest part of the sea in 2012?
  - a. Stephen Spielberg
  - b. James Cameron
  - c. George Lucas
  - d. Quentin Tarantino
3. Jules Verne wrote about \_\_\_\_\_ 18 years before they were ever invented in *20,000 Leagues Under the Sea*.
  - a. lunar modules
  - b. solar sails
  - c. skywriters
  - d. electric submarines
4. If all of the gold in all of the oceans was collected, how much would it weigh?
  - a. 3,000 pounds
  - b. 40,000 tons
  - c. 50,000,000 tons
  - d. 600 billion tons
5. What is the average temperature of the oceans?
  - a. 2°C (35.6°F)
  - b. 12°C (53.6°F)
  - c. 22°C (71.6°F)
  - d. 32°C (89.6°F)

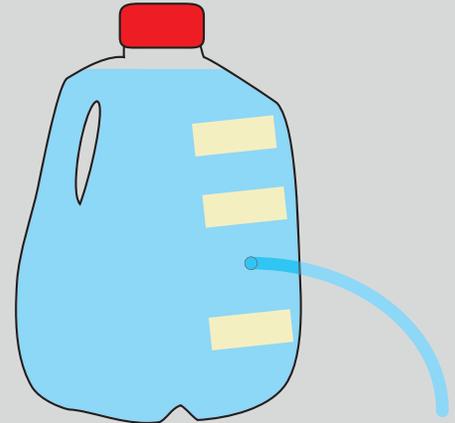


## Water Pressure

The relationship between water pressure and depth can be easily observed with a simple experiment.

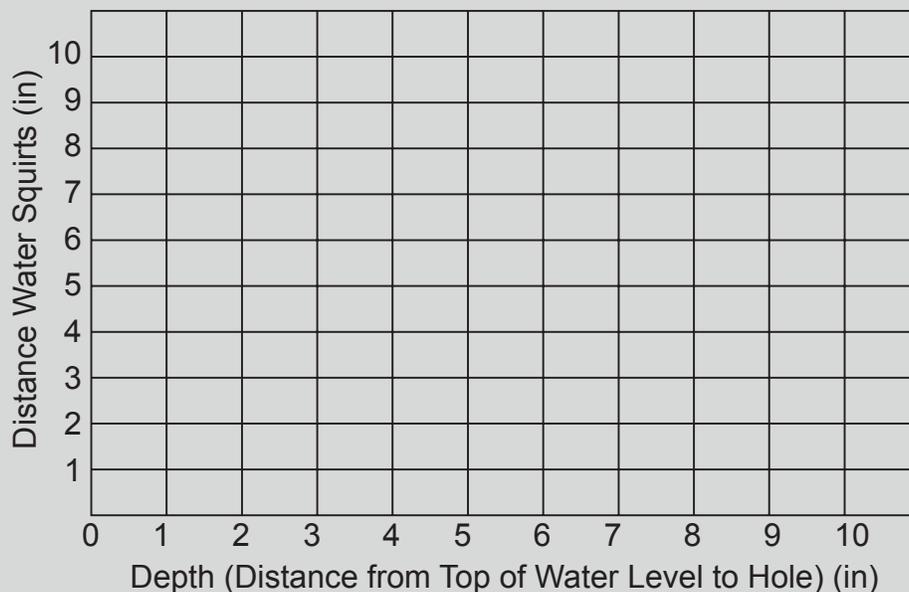
### Supplies Needed:

- an empty milk gallon
- masking tape
- water
- ruler
- safety pin (to pierce the bottle)
- a flat surface and a sink
- towels for cleanup



### Instructions:

1. Measure and mark 1 inch intervals in the milk gallon from the top.
2. Make small pinholes at each mark and place masking tape over them.
3. Fill the gallon with water and place it on a level surface where it can drain into the sink.
4. Remove the top piece of tape.
5. Measure the distance from the milk jug to the farthest point where the water squirts out.
6. Record your measurements and plot your data in the graph below.
7. Retape the opening and refill the jug to the top. Repeat steps 3-6 for each subsequent taped opening.
8. Clean up your experiment.



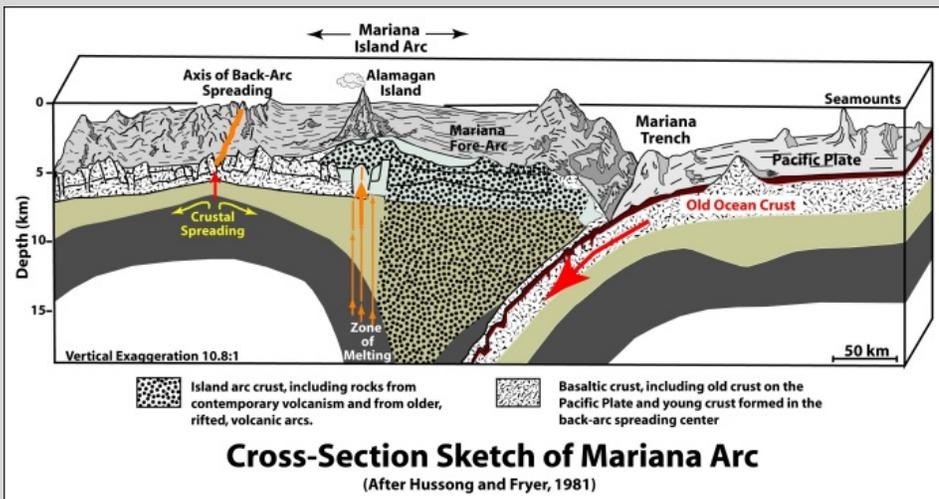
### Question:

1. How did the depth of the water affect the distance the water squirted away from the jug?

# Trench Dive

## Mariana Trench

The Mariana Trench is the deepest trench on Earth at almost 11 km (over 6.8 miles). It is deeper than Mount Everest is high and it is five times longer than the Grand Canyon! It is formed by a tectonic plate shift that occurred long ago where the Pacific Plate pushed underneath the Philippine Plate. The seabed of the Mariana Trench is over 18 million years old and is covered with an ooze secreted from the some of the largest unicellular organisms, xenophyophores.



These organisms are particularly incredible because they withstand extreme temperatures and pressures. In the Trench alone, the temperature can range from 1°C (34°F) to 300°C (572°F) and the pH can range from very low (highly acidic) to slightly above 7 (slightly basic). Moreover, the water pressure at the bottom is an incredible eight tons per square inch. Despite all of these seemingly

deadly living conditions, these organisms can outlive humans at over 100 years!

The only way humans can dive this deep is with advanced submersible technology. Only three people have been in the deepest part of the trench (and have represented Canada, U.S.A. and Switzerland). The *Trieste* was the first manned vehicle to dive to the Challenger Deep and used gasoline in a float chamber to control buoyancy. It took the vehicle five hours to reach the bottom; before they did so, at 30,000 feet the two men on board heard a crack. Later, they discovered one of the Plexiglas windows had shattered. Both men returned 3 hours and 15 minutes later, unharmed, and had even enjoyed some chocolate at the deepest part of the ocean!

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Answers: Page 2 Answers: 1) c. 2) b. 3) d. 4) c. 5) a. Page 3 Answers: 1) As depth increased, the pressure increased. This increase in pressure caused the water to squirt out farther.

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