CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

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Project Number

35405

Project Title

Experimental Theory of Using Bubbles as a Sustainable Source of Air Underwater

Abstract

Objectives/Goals

The purpose of this experiment is to find how much air is in a water bubble and if this is enough to supply a human. The hypothesis is if size and pressure of bubbles at 0.3 to 3.6 meters are predicted to assume the bubble's volume of air, then the results will show that the amount of air in bubbles will be enough to sustain a human being because of the amount of dissolved air in water. This study is important because current ocean exploration and recreational snorkeling is limited to the amount of air a human can hold.

Methods/Materials

Finding bubble diameter at 0.3 and 0.6 meters, predictions were made for each 0.3-meter progressive change up to 3.6 meters. Taking those numbers, the formulas for surface tension and volume were used to find the liters of air within each bubble and how many bubbles were needed per breath at each depth.

Results

With each depth, bubble diameter dropped 39.5%. At 0.3 and 0.6 meters, air sustainability with bubbles was most sufficient, needing only 21 and 30 bubbles respectively.

Conclusions/Discussion

Through measurement of bubbles from 0.3 to 3.6 meters, it was determined that bubbles are a sustainable source of air for humans underwater.

Summary Statement

Calculating the number of bubbles needed per breath at different depths underwater to sustain a human.

Help Received