

ILLINOIS

Extension

4-H Club GO TO Resources



December 2018

Lesson Objectives:

Think like an ocean engineer and design your own model deep sea diver.

Time: 30 minutes

Equipment and supplies:

- Item to adjust buoyancy (assorted metal washers, pennies, paper clips, binder clips, Styrofoam, pieces of sponges, craft foam, marbles)
- Plastic Eggs
- Sturdy clear container at least 6 inches deep that can hold water. Clear pitchers work great.
- Water
- Towels

Preparations:

- Club members can work as small groups or as individuals based on how many youth are in your club.
- Review Lesson
- Gather Supplies

Deep Sea Diver - Engineering Challenge

Buoyancy is the ability to float. When you put an object in the water, it pushes water out of the way to make room for itself. An object floats when it weighs less than the water it displaces; an object sinks when it weighs more than the water it displaces.

Exploring buoyancy. Can you think of things that don't float on the water and don't sink to the bottom (scuba diver, submarine, fish, underwater research vehicles)? This is called "neutral buoyancy." Discuss what it means for an object to be neutrally buoyant. What are some situations where neutral buoyancy might be useful (snorkeling, using a submersible to study underwater creatures, taking measurements at different depths in the ocean)?

Design and build. Engineers will often build models before they design full scale. The models help them understand the factors that may be key to the success of the design. Today's challenge is to build a small diver (using a plastic egg) that is neutrally buoyant. In small groups or individually brainstorm what materials to use, then design and build their diver.

Test. Place the diver into a container of water and test its buoyancy. Keep redesigning until the diver "hovers" in the center of the container or water. Not floating or sinking. This is much harder than it appears.

Share. Have each group (individual) demonstrate their diver. Was it difficult to achieve neutral buoyance? Why or why not? Have each group (individual) share their strategies from testing and redesigning.

Continue exploring. Consider having the youth test their diver in salt water. They could even test whether the concentration of salt in the water makes a difference.

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Sources & Additional Lesson info:

4-H Club GO TO Resources is being offered to 4-H clubs in Boone, DeKalb and Ogle Counties as a way to enrich and enhance 4-H experiences and programming at the club level. It is the goal of the Extension staff to assist 4-H leaders and officers in providing simple hands-on activities on a monthly basis that can broaden the 4-H club experience and as a result heighten positive youth development.

Resources: based on the SciGirls “Deep Sea Diver” Activity part of pbskidsgo.org/scigirls

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