Robogals Science Challenge

Minor Challenge Set #2
STEM Field: Physics
Level: Junior
Challenge Name: Does It Float?
Project Cost: 0-20 USD
Materials Required:

- 1 large clear container, bowl, or cup
- 2 oranges
- 1 egg
- Salt
- Pen/ pencil and paper

Safety:

- Adult assistance required to peel the orange

Duration:

- This challenge takes approximately 1 hour to finish, however, the time guideline is an estimation only, and students and mentors can complete the tasks around their schedules.

Introduction:

How do objects float on water? Have you ever tossed a rock into a lake or river, or seen a ship or boat float on water? A little rock is definitely not as heavy as a ship, but why would a rock sink and the huge ship float on top of water?

In this project, we will conduct an experiment to see if different pieces of fruits or vegetables will sink or float in water. At the end of the

project, we will do some investigation of a scientific concept called **buoyancy**.

Instructions:

1) Fill the container almost full with water.
2) Carefully place one orange into the container. Record your observation of what happens to the orange.
3) With adult assistance, remove the peel on the second orange. Carefully place the peeled orange into the container. Record your observation of what happens.

So, what happened?

An orange with peel is heavier than an orange without peel. However, the peel is filled with tiny air pockets. These pockets of air help increase the **buoyancy** of the orange. This means the orange becomes less dense than the water, so the orange with the peel floats in the water. You can think of these air pockets as tiny floatation devices for the orange.

4) Let's explore the concept of buoyancy from another angle. First, write your prediction for these two questions:

   Question 1: Will an egg float in a container of water?
   Question 2: Will an egg float in a container of water mixed with salt?

5) Carefully place the egg into the container with water. Record your observation of what happens to the egg.
6) Add some salt to the container of water and mix well. Carefully place the egg into the container. Does the egg float or sink? Add more salt to the water and test the mixture by adding the egg back into the container. Keep adding salt until the egg floats.

Reflection Questions:

- Are there any improvements you would make to this challenge?

- From your experiment, which items floated, and which items sank?
- Why do you think the egg floats in salt water, and not normal water?
- From your research, can you explain what buoyancy means?
- This concept of buoyancy can be found in real world applications such as ships, or boats floating on water. Can you think of 2 more applications of buoyancy?
- (Extension) From what you have learned about buoyancy, can you explain why ships float on water? They are enormous, but what keeps them afloat? (Hint: the air inside a ship).

Submission Guidelines:

- Submit a photo of the experiment setup. Include a short summary that addresses the reflection questions.

> Note: Remember, if you want to upload pictures of your Minor Challenge that also include you, please check if it is OK with your parent or guardian first.

- The submission form is on the Minor Challenges page: https://sciencechallenge.org.au/index.php/minor-challenges/
  Fill out the details and make sure you upload your submission.

Learn More! Resources:

- This video provides an explanation of buoyancy and why something float or sink: https://www.youtube.com/watch?v=nMlXU97E-uQ

Bibliography:

- Cool Science Experiments Headquarters. 2022. *Why Does the Heavier Orange Float Science Experiment*. [online] Available at: <https://coolscienceexperimentshq.com/why-does-the-heavier-orange-float/> [Accessed 8 February 2022].