Title: Floating eggs
Subject Area: Physics
Key Stage 3
NC link: Sc1/2, Sc3/1a

Learning Objective:

- Pupils learn about the forces and density of objects and why objects sink and float.
- Children look at the composition of eggs and how the air sack enlarges as the egg is exposed to the outside world.
- Children design objects to help the buoyancy of the eggs.

Resources:

- A fresh egg, a stale egg, a container full of water.
- Photocopies of Floating and sinking eggs sheet, one per child.
- Paper, elastic bands, straws, blue tack, glue, scissors for the production of 'buoyancy aids' for the eggs.
- Fresh eggs either one per person or one per pair.
- Torch to illuminate inside of eggs to see changes in air sac.

Starter

Demonstrate how eggs can sink or float by placing a fresh egg and a stale egg in a container full of water. Encourage the children to draw in the positions of the eggs on their sheet and to fill in the densities (density of water is 1). Explain why it is that the stale egg has less density (the porous shell has allowed air inside the air sack within the egg, so making the egg stale). Discuss the rest of the sheet.

Main Teaching Activity:

Consider the following statements (true or false)

- Spreading the weight of the object over the water surface helps it to float
- An object designed to have lots of air spaces in it will float.

Challenge the children to make an 'attachment to their fresh egg to make it float for say 30 seconds at least. Set a time limit and test all the eggs at the end of the time. Discuss attempts and designs.

Plenary

Consider the following statements (true or false)

An object sinks when the downward force is less than the upwards force, Heavy objects cannot float in water, density is the property of the object which determines whether it floats or sinks, an object with a density greater than water will float.

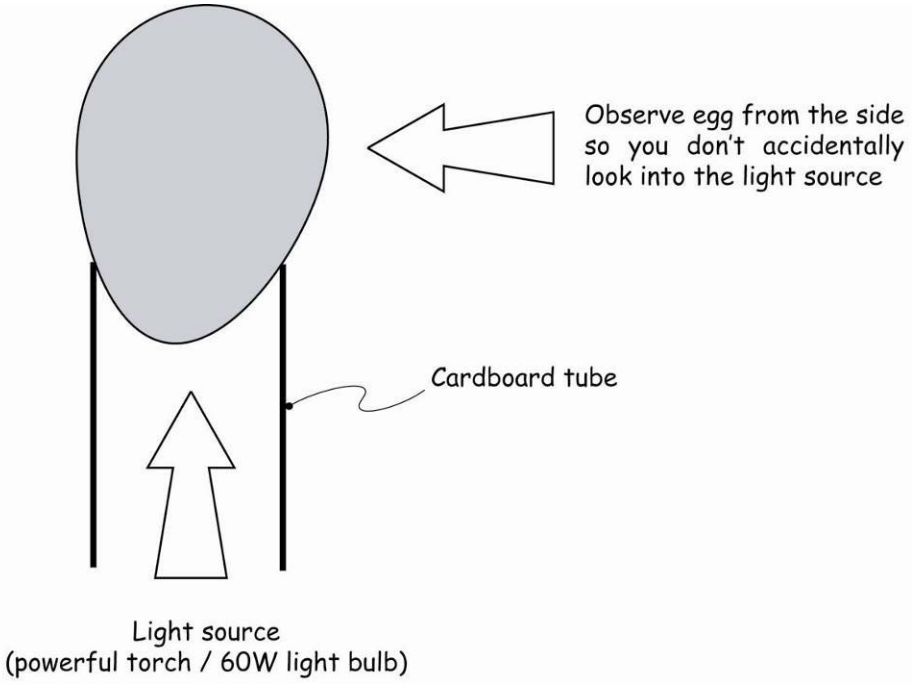
Differentiation

Consider which other liquids an egg would float in. If appropriate measure the density of the eggs, density = mass in g / volume in cm^3.

Special Notes:

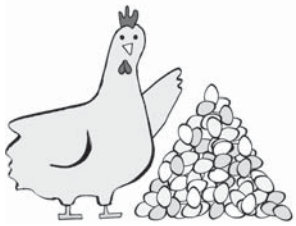
- All densities on the sheet are relative to the density of water
- The shell is porous to gas not liquid

To show the difference between the size of the air sac in a fresh egg compared to a stale egg you can 'candle' the eggs.



Pointing a light source at an egg in this way will effectively enable you to see inside the egg.

Floating & Sinking eggs

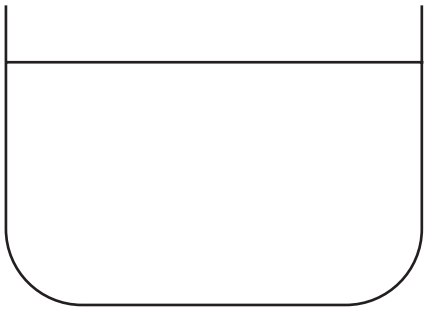


Omlet
the art of keeping chickens

When a fresh egg is placed in the water it sinks.
It is more dense than the water.

When a stale egg is placed in water it floats.
It is less dense than the water.

Fresh Egg

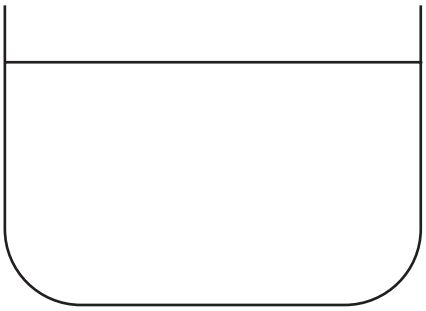


fresh egg: density =

water: density =

does the egg float?.....

Rotten Egg

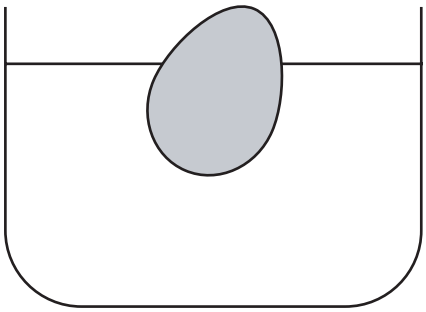


rotten egg: density =

water: density =

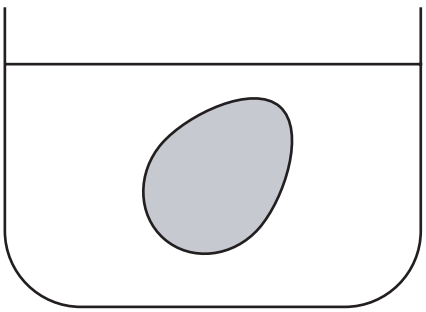
does the egg float?.....

How much an object floats or sinks will depend on the differences between the densities of the object and the liquid.



5 week old egg (density = 0.9)

Water (density = 1)



3 week old egg (density = 1.2)

Water (density = 1)