



HOT AIR BALLOONS

Make a Cartesian Diver

In order to fly a hot air balloon, the pilot needs to be able to adjust the density (heaviness) of the air within the balloon (envelope) relative to the density of the air around it. To go up, the air inside the balloon needs to be less dense (lighter) than the air outside the balloon. To come down, the air in the balloon needs to be more dense (heavier) than the air outside. This principle of density can be seen in the following Cartesian Diver activity. In order to make the link to hot air balloon flight it may be useful to think of the water as air, the straw as the balloon envelope and the Plasticine as the basket.

What you will need:

- large plastic drink bottle with screw top seal
- plastic tie or piece of string
- Plasticine
- bendy' straw
- scissors
- water
- bowl

What to do:

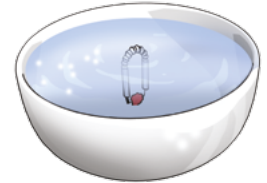
1. Bend the straw in two and use scissors to cut the long end to the same length as the short end.
2. Thread a plastic 'tie' (such as that used to seal a plastic bag), or a piece of string, through the straw with enough length hanging from each end of the straw to allow a small piece of Plasticine to be attached.
3. Roll a small piece of Plasticine into a ball and attach both ends of the tie/string to it. The Plasticine must be able to fit through the top of the water bottle.





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4. To test if the Diver will float near the top of the bottle, place it into a bowl of water. If the diver sinks to the bottom remove some of the Plasticine and try again until it floats near the surface.



5. Fill the drink bottle to the very top with water and insert your Cartesian Diver.



6. Tightly secure the bottle top so that no water can escape when the bottle is squeezed.

7. Holding the bottle in both hands, squeeze and release the sides of the bottle and observe the behaviour of your Cartesian Diver.



Think about it and talk about it

- Hot air balloon pilots use heat to change the density of the air in the balloons. What is being used in the activity?
- This activity demonstrates Archimedes Principle. Research to find the definition of his principle and further real life examples of it.