

# Upthrust and flotation.

All answers to calculations should be to 2 significant figures.

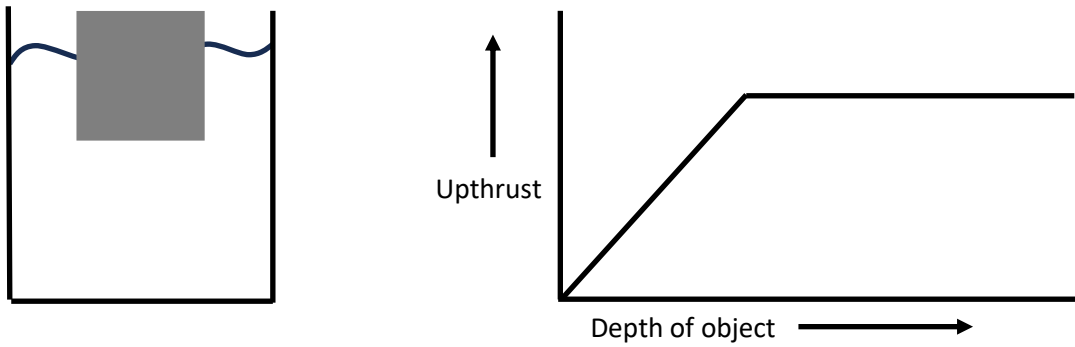
1. Define the term upthrust.

.....  
.....

2. A stone is carefully lowered into a measuring cylinder that contains some water. Explain why the level of water in the measuring cylinder rises.

.....  
.....

3. Below is an image of an object being lowered into water and a graph showing how upthrust changes with depth.



3a. Using both the image and the graph explain the changes seen in the graph line for upthrust with increasing depth of object.

.....  
.....  
.....  
.....

4. Chelsea's teacher does a demonstration where a ping pong ball of weight 0.1N is pushed under the surface of the water. State the upthrust experienced by the ping pong ball

.....

4a. Chelsea's teacher now repeats the experiment using a plastic bottle of water that contains 100g of water. Calculate the upthrust experienced by the 100g of water. Ignore the effect of the bottle

.....  
.....  
.....

4. Below is an image of a cargo ship



4a. Explain in terms of upthrust and weight why the ship is able to float when there are either no containers on board, or only a few containers

.....

.....

.....

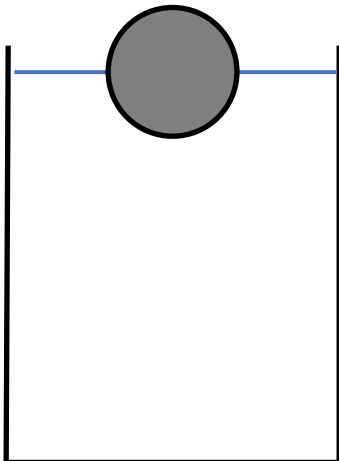
4b. When too many containers are loaded onto the ship it sinks. Explain why in terms of upthrust and weight why the ship sinks

.....

.....

.....

5. Using the diagram below answer the following questions



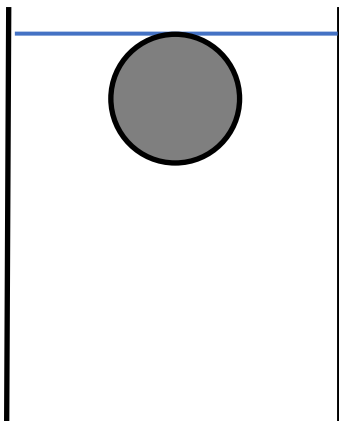
5a. Is the object or water more dense, or do they both have equal density?

.....

5b. The weight of the object in this case is ..... the weight of water that it displaces.

5c. For the object to float the upthrust is ..... to the weight of the object.

6. Using the diagram below answer the following questions

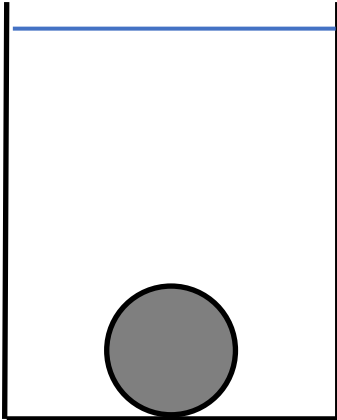


6a. Is the object or water more dense, or do they both have equal density?

.....

6b. When the object is fully immersed and floating the weight of the object is ..... the upthrust on the object

7. Use the diagram below to answer the following questions



6a. Is the object or water more dense, or do they both have equal density?  
.....

6b. The weight of the object is ..... than the weight of water displaced

6c. For the object to sink the upthrust is ..... than the weight of the object.