

Samples Floating

1. (1) Ben wants to build his own surfboard. He is going to use foam that has a density of 12 kg/m^3 . Using Archimede's principle, what's the minimum mass of foam required to *two decimal places* if Ben has a mass of 83 kg (i.e. the foam is just at the surface of the water: remove any foam and the block will sink)?
- (2) Ben has worked out that for his surfboard to work properly, he has to have at least 45% of the block above water. Using the same requirements as above, how much foam does he need now?

Hints:

- 1m^3 of foam will displace 1m^3 of water.
 - 1kg of water can support 1kg of another object.
 - Water has a density of 1000.0 kg/m^3 .
 - Ignore the shape of the board: consider the foam to be just a solid block. However, don't forget to take the mass of the block into account!
2. (1) Ben wants to build his own surfboard. He is going to use foam that has a density of 19 kg/m^3 . Using Archimede's principle, what's the minimum mass of foam required to *two decimal places* if Ben has a mass of 106 kg (i.e. the foam is just at the surface of the water: remove any foam and the block will sink)?
 - (2) Ben has worked out that for his surfboard to work properly, he has to have at least 57% of the block above water. Using the same requirements as above, how much foam does he need now?

Hints:

- 1m^3 of foam will displace 1m^3 of water.
 - 1kg of water can support 1kg of another object.
 - Water has a density of 1000.0 kg/m^3 .
 - Ignore the shape of the board: consider the foam to be just a solid block. However, don't forget to take the mass of the block into account!
3. (1) Ben wants to build his own surfboard. He is going to use foam that has a density of 19 kg/m^3 . Using Archimede's principle, what's the minimum mass of foam required to *two decimal places* if Ben has a mass of 99 kg (i.e. the foam is just at the surface of the water: remove any foam and the block will sink)?
 - (2) Ben has worked out that for his surfboard to work properly, he has to have at least 32% of the block above water. Using the same requirements as above, how much foam does he need now?

Hints:

- 1m^3 of foam will displace 1m^3 of water.
- 1kg of water can support 1kg of another object.
- Water has a density of 1000.0 kg/m^3 .
- Ignore the shape of the board: consider the foam to be just a solid block. However, don't forget to take the mass of the block into account!