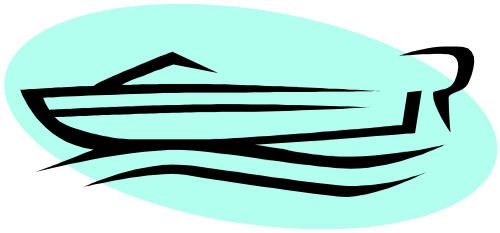
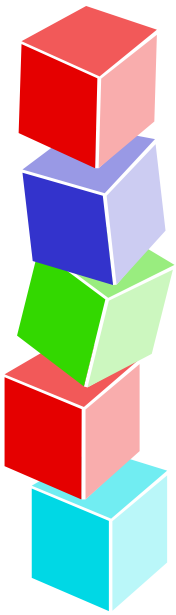
Buoyancy Study Guide



1. What is buoyant force?
2. How do you find the buoyant force on an object?
3. What determines whether an object will float or sink?
4. What is density?
5. How is density calculated?
6. How can density tell you what an unknown substance is?
7. A 500g ball has a volume of 250 ml. What is its density?
8. What is the volume of a piece of metal with a mass of 622g and a density of 19.3 g/ml?
9. M = 50g, V = 455ml, D = ?
10. M = ?, V = 76ml, D = 14.2g/ml
11. How does density determine whether an object will float or sink?
12. What is Archimedes' principal?
13. How do hot air balloons demonstrate the physics of buoyancy?
14. Why does a block of metal sink and a boat of metal float?
15. Will a rubber ducky that has a mass of 20 grams and a volume of 23.4 ml sink or float? How do you know?
16. What are two ways you might be able to take something that does not float and make it float?
17. Sliver has a density of 10.5 g/cm3 and gold has a density of 19.3 g/cm3. Which would have a greater mass, 7 cm3 of silver of 3 cm3 of gold?
18. Describe two ways to find the volume of an object.
19. What is displacement?
20. Name something that is neutrally buoyant.
21. If the water displaced (pushed out of the way) weighs LESS than the boat, the boat will _____
22. The fact that a heavy steel cargo ship can carry a large load without sinking illustrates _____ principle.
23. One half a tennis ball floats _____ in the water than a whole tennis ball.



24. What is the density of carbon dioxide gas if 0.25 g occupies a volume of 100 mL?

25. A block of rock salt has a mass of 9.5 g and a density of 2.4 g/cm^3. Calculate its volume.

26. A 2.0 cm^3 piece of chocolate has a density of 1.15 g/cm^3. Calculate its mass.

27. A 21 g rock was placed into a graduated cylinder holding a volume of vinegar equal to 9.0 mL. The height of the vinegar rose to 17.0 mL. What is the density of the rock?

28. A block of wood 3.0 cm on each side has a mass of 16 g. What is the density of this block? (remember the volume of a cube is side x side x side)

29. A lounge chair has a mass of 2500 g and a volume of 3200 cm^3. Calculate the density. If you were to throw the chair in the pool, would it sink or float? Assume that the density of the pool water is 1 g/cm^3.

30. Draw a picture of a boat on the water. Label the forces acting on the boat.

31. Draw the best design for a foil barge.

32. Which would have more buoyant force: a completely submerged brick made of styrofoam or the same size brick made of stone? Why?

33. A graduated cylinder contains 25 mL of water. An object placed in the cylinder causes the water level to rise to 43 mL. What is the volume of the object?

34. How do submarines and fish control buoyancy in water?

35. Explain why life jackets keep you afloat (include mass, volume, and density in your answer).

36. What measurements and what calculations would you need to make in order to determine the density of a rectangular wooden block?

37. A student announced that she had made a sample of a new material that had a density of 0.85 g/cm^3. From the information given, are you able to determine how large of a sample she had made? Explain!

38. If an object with a density of 10 g/cm^3 is cut into two equal pieces, what is the density of each piece? Why?

39. A rectangular object is 10 centimeters long, 5 centimeter high, and 20 centimeters wide. Its mass is 800 grams. What is the objects volume in cm^3? What is the objects density in g/cm^3? Will the objects float or sink in water?

40. Solid iron has a density of 7.9 g/cm^3. Liquid mercury has a density of 13.6 g/cm^3. Will iron float or sink in mercury? Explain.