

### QUIZ: ARCHIMEDES' PRINCIPLE

The data below were collected using the same methods you used in lab. Use these data to answer the following questions.

CUBE	CUBE MASS $m_1$ (g)	APPARENT MASS $m_2$ (g)	MASS WATER $m_w$ (g)	VOLUME ( $\text{cm}^3$ )	DENSITY ( $\text{g}/\text{cm}^3$ )
A	362	330			
		_____	_____	32.5	
B	90	58			
		_____	_____	33	

- How much water does cube A displace?  
 A) 32g                      B) 58 g                      C) 90 g                      D) 330 g                      E) 362 g
  - What is the volume of cube A?  
 A) 362  $\text{cm}^3$               B) 330  $\text{cm}^3$               C) 90  $\text{cm}^3$                       D) 58  $\text{cm}^3$                       E) 32  $\text{cm}^3$
  - What is the density of cube A?  
 A) 2.81  $\text{g}/\text{cm}^3$               B) 3.62  $\text{g}/\text{cm}^3$                       C) 10.3  $\text{g}/\text{cm}^3$                       D) 11.3  $\text{g}/\text{cm}^3$
  - This cube is probably made of  
 A) aluminum.              B) iron.                      C) brass.                      D) lead.
  - Calculate the density of cube B using the measured volume of displaced water. The density is closest to  
 A) 2.54 $\text{g}/\text{cm}^3$               B) 2.66 $\text{g}/\text{cm}^3$               C) 2.73 $\text{g}/\text{cm}^3$               D) 2.81 $\text{g}/\text{cm}^3$               E) 11.3 $\text{g}/\text{cm}^3$
  - This cube is probably made of  
 A) aluminum.              B) iron.                      C) brass.                      D) lead.
  - True or false: The buoyant force on cube B is less than the buoyant force on cube A.
  - True or false: A fully submerged cube of styrofoam with the same volume as cube A will have exactly the same buoyant force on it as A.
  - True or false: The buoyant force on cube A increases as you submerge it deeper under water.
  - You have a 1g piece of aluminum foil. Shape it into a bowl with a volume of 10 $\text{cm}^3$  and it will  
 A) sink.                      B) float.
  - To sink the 1g piece of foil, how small must you crumple it? The volume must be less than  
 A) 1  $\text{cm}^3$ .                      B) 10  $\text{cm}^3$ .                      C) 100  $\text{cm}^3$ .                      D) 1000  $\text{cm}^3$ .
  - The crumpled square of foil sinks while the boat floats. The buoyant force is bigger on  
 A) the crumpled square.                      C) neither. It is the same buoyant force on both.  
 B) the boat.
- The empty bean boat weighs 2 grams. Fully loaded, the bean boat weighs 70 grams.
- The buoyant force on the empty boat is  
 A) 0 g                      B) 2 g                      C) 35 g                      D) 70 g                      E) 140 g
  - The volume of the bean boat is closest to  
 A) 0  $\text{cm}^3$                       B) 2  $\text{cm}^3$                       C) 35 g                      D) 70  $\text{cm}^3$                       E) 140  $\text{cm}^3$
  - True or false: If your bathtub was big enough, you could float a battleship in it.