

Name: Key

period: _____

date: _____

ch. 1 density, conversion factors, buoyant force

test 50 points (10 ec)

ngss chemistry

For questions involving calculations, show your work in an organized / understandable manner; include conversion factor(s), equation(s) / formula(s), appropriate substitution and your answer with appropriate units.

You may use your science notebook (i.e. your notes), classwork / homework assignment, periodic table / equation sheet, and a calculator. If you don't have a calculator then state that you don't have a calculator and you will earn all of the points in the problem / question if the only the answer is missing due to a lack of a calculator.

1. Conversion factors. Solve. [15 points]

a. 45 inches = _____ feet

$$45 \text{ inch} \cdot \frac{\text{feet}}{12 \text{ inch}} = \boxed{3.75 \text{ feet}}$$

3+3pts @

b. 75 cm² = _____ m²

$$75 \text{ cm}^2$$

$$\left(\frac{\text{m}}{10^2 \text{ cm}} \right)^2 = \boxed{75 \cdot 10^{-4} \text{ m}^2}$$

c. 125 cm / second = _____ m / minute

$$125 \frac{\text{cm}}{\text{sec}}$$

$$\frac{60 \text{ sec}}{\text{min}}$$

$$\frac{\text{m}}{10^2 \text{ cm}}$$

$$= \boxed{75 \frac{\text{m}}{\text{min}}}$$

2. Density. Solve. [10 points]

a. The density of a hypothetical object is 8.5 g / mL; what is the volume of a 175 g sample of the object ?

$$175 \text{ g} \cdot \frac{\text{mL}}{8.5 \text{ g}} \approx \boxed{20.6 \text{ mL}}$$

3+2pts @

b. The density of a hypothetical object is 8.5 g / mL; what is the mass of a 125 mL sample of the object ?

$$125 \text{ mL} \cdot \frac{8.5 \text{ g}}{\text{mL}} = \boxed{1062.5 \text{ g}}$$

3. Based on the below hypothetical experimental data, [15 points]

Mass of object (grams)	Volume in graduated cylinder (mL)
0	25
5	27.4
10	30.1
15	32.0

a. Generate a data table to generate a graph to estimate the density of the object; include column title to describe the data and include appropriate units.

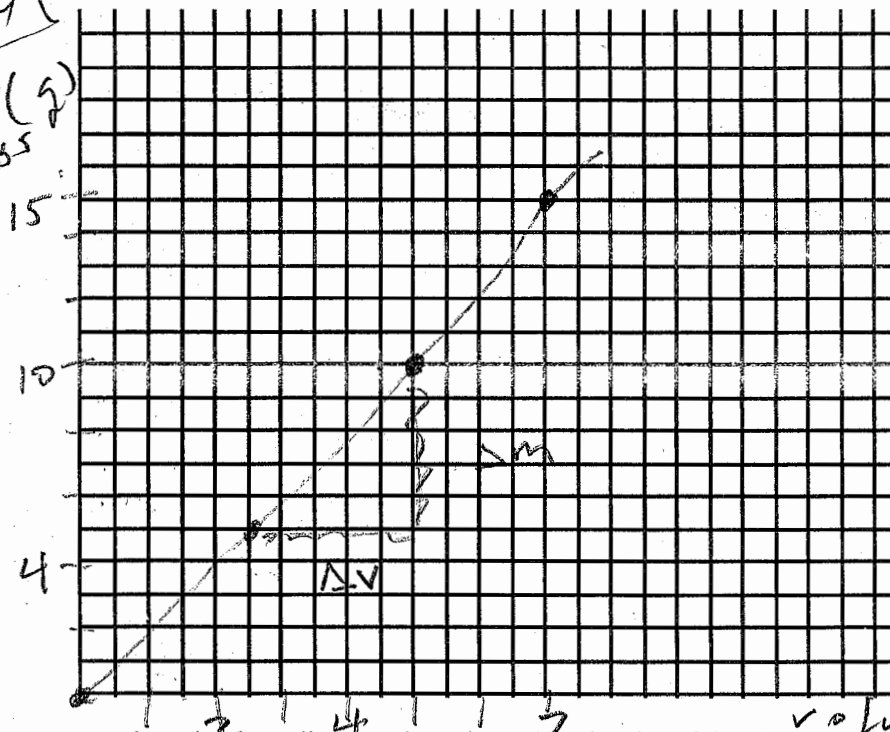
5 pts

mass	(displaced) volume
0 g	0 mL
5	2.5
10	5.1
15	7

b. Based on the preceding data table, sketch / label a graph to estimate the density of the object.

2+3 pt

mass (g)



c. Based on the preceding graph, estimate the density of the object - show your work.

3+2 pt

$$\text{density} = \text{slope} = \frac{\Delta m}{\Delta V} = \frac{10 - 5 \text{ g}}{5.1 - 2.5 \text{ mL}}$$

$$= \frac{5 \text{ g}}{2.6 \text{ mL}} \approx 1.9 \text{ g/mL}$$

4. Solve; include appropriate units in your answer. [5 points]

$$\frac{1500 \text{ mm}^3}{\text{ms}} \frac{10^3 \text{ ms}}{\text{s}} \left(\frac{\text{cm}}{10 \text{ mm}}\right)^3 \frac{\text{mL}}{\text{cm}^3} \frac{\text{L}}{10^3 \text{ mL}} = \frac{15 \text{ L}}{\text{sec}}$$

2 + 3 pt

5. What is the basis / rationale of an object to float versus sink in a fluid (on the Earth, where there is gravity)? Use the terms, density and buoyant force, in your answer. Define / describe buoyant force. Include appropriate equation(s) / formula(s). [15 points]

i) buoyant force :

$$P \rho V$$

↑ displaced vol. fluid
↑ gravity constant
density of displaced fluid

ii) float

5 pt

initially $F_b > F_g$ ← force due to gravity

iii) sink

initially $F_b < F_g$
 $F_g > F_b$

For the "group test" only, print names of group members:

_____	_____
_____	_____
_____	_____
_____	_____

Test score = 80% student test score + 20% group test score