

Density Worksheet

1. Explain how you would find the following.

Volume of water	Volume of regular solid	Volume of irregular solid	Mass of liquid	Mass of regular solid	Mass of irregular solid
Put in graduated cylinder & check meniscus	measure l/w/h with ruler $l \times w \times h$	water displacement - graduated cylinder or overflow can	weigh empty cylinder weigh cylinder with liquid - subtract	place on balance	place on balance (in weigh boat)

2. An eraser had a mass of 6g and a volume of 4cm³. What is the density of the eraser?

$$d = \frac{m}{V} = \frac{6}{4} = 1.5 \text{ g/cm}^3$$

3. A paper's length is 3cm, its width is 3.5cm and its height is 2.3cm. Its mass is 4.5g. What is its density?

$$V = 3 \times 3.5 \times 2.3 = 24.15$$

$$4.5 / 24.15 = 0.1869 \text{ g/cm}^3$$

4. 40mL of water was put in an empty beaker weighing 50g. The beaker and water together weighed 90g. What was the density of the water?

$$90 - 50 = 40$$

$$40\text{g} / 40\text{mL} = 1\text{g/mL}$$

5. Keys were put into a beaker with 40mL of water. When the keys were put in the water rose to 44mL. The mass of the keys was 2.1g. What was the density of the keys?

$$44 - 40 = 4\text{mL}$$

$$\frac{2.1\text{g}}{4\text{mL}} = 0.525\text{g/mL}$$

6. 15mL of juice was put into a graduated cylinder weighing 45g. The cylinder and juice weighed 47g together. What was the density of the juice?

$$47 - 45$$

$$\frac{2}{15} = 0.13\text{g/mL}$$

7. A stone was put into 10mL of water. The water rose 4mL with the stone. The stone weighs 3.4g. What is the stone's density?

$$\frac{3.4}{4} = 0.85\text{g/mL}$$

8. A pen was put into 33mL of water, the water rose to 35.5mL with the pen. The pen's mass was 1.2g. What is its density?

$$35.5 - 33 = 2.5$$

$$\frac{1.2\text{g}}{2.5} = 0.48\text{g/mL}$$

9. Use the table to determine the density of a rock.

Mass	Volume of water in cylinder	Volume of water + rock
15 g	100 mL	103 mL

$$103 - 100 = 3\text{mL}$$

$$\frac{15}{3} = 5\text{g/mL}$$

10. Use the table to determine the density of apple juice.

Volume	Mass of graduated cylinder	Mass of graduated cylinder + juice
30 mL	35 g	69 g

$$\frac{69 - 35}{30} = 1.13 \text{ g/mL}$$

11. In a lab the following information was given:

Liquid	Mass	Shape	Volume
1	223 g	Cylindrical	82 mL
2	223 g	Cubic	25 mL
3	113 g	Round	25 mL
4	38 g	Cubic	14 mL

$$2.7 \text{ g/mL}$$

$$8.92 \text{ g/mL}$$

$$4.52 \text{ g/mL}$$

$$2.7 \text{ g/mL}$$

Which 2 substances are the same and how do you know? 1 & 4 = same densities

12. You have an unknown liquid you think is vinegar. You know the density of vinegar is 1.5 g/mL. You also know the mass of the unknown is 5.5 g and its volume is 2 mL. Explain if your unknown liquid is vinegar.

$$5.5 / 2 = 2.75 \text{ g/mL}$$

No - density is not that of vinegar

13. Walking on a beach three friends found something shiny in the water. Bob was sure it was a piece of gold. Jack was sure it was something called fool's gold. Fool's gold looks like gold but it is worthless. Carol was sure it was a piece of copper. They decided to perform tests to determine who was correct. They found the mass of the solid to be 17 g. They put the piece of solid in 10 mL of water. The water rose to 13 mL with the solid. Bob knew the density of gold was 17 g/cm³, Jack knew the density of fool's gold was 13 g/cm³ and Carol knew the density of copper was 3 g/cm³. Which person was right?

$$\frac{17 \text{ g}}{3} = 5.67$$

- A) Bob was right
B) Carol was right
C) Jack was right
D) No one was right

14. Five different lab groups are asked to find the density of water. They are each told to use a different amount of water. Explain the procedure used to find the density and determine if all the groups should come up with the same density.

Mass cylinder + add water - mass cylinder with water = final - initial = mass
Measure water in graduated cylinder = volume
 $\frac{m}{V} = d$
all groups should be equal (1 g/mL)

15. You find a transparent mineral and you think it might be a piece of quartz. You know the density of quartz is 2.4 g/cm³. You find the objects mass, which is 4.3g and its volume, which is 2.2 cm³. Answer the following questions:

$$\frac{4.3 \text{ g}}{2.2 \text{ cm}^3} = 1.95$$

1. How did you find the mass of the object? place on balance
2. How did you find the volume of the object? 1 x w x h or water displacement
3. Is the object you found a piece of quartz? no

16. Explain if a rectangular and a cubed piece of iron will have the same density.

yes 1 x w x h = V

$$m/V = d = \text{equal}$$