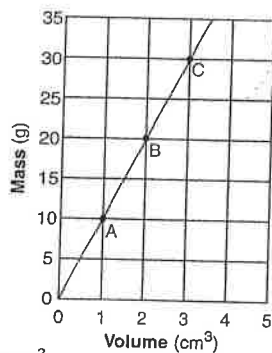


1. A rock sample has a mass of 16 grams and a volume of 8 cubic centimeters. When the rock is cut in half, what is the volume and density of each piece?

- (1) 8 cm<sup>3</sup> and 0.5 g/cm<sup>3</sup>
- (2) 8 cm<sup>3</sup> and 1.0 g/cm<sup>3</sup>
- (3) 4 cm<sup>3</sup> and 2.0 g/cm<sup>3</sup>
- (4) 4 cm<sup>3</sup> and 4.0 g/cm<sup>3</sup>

1 \_\_\_\_\_

2. The accompanying graph shows the relationship between mass and volume for three samples, *A*, *B*, and *C*, of a given material. What is the density of this material?



- (1) 1.0 g/cm<sup>3</sup>
- (2) 5.0 g/cm<sup>3</sup>
- (3) 10.0 g/cm<sup>3</sup>
- (4) 20.0 g/cm<sup>3</sup>

2 \_\_\_\_\_

Note that question 3 has only three choices.

3. As air on the surface of Earth warms, the density of the air

- (1) decreases
- (2) increases
- (3) remains the same

3 \_\_\_\_\_

4. If the mass of a spinel crystal is 9.5 grams, what is the volume of this spinel crystal?

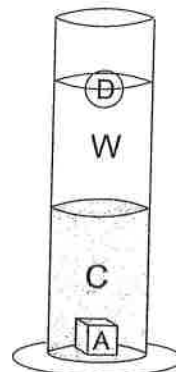
Table 1

Gemstone Mineral	Composition	Hardness	Average Density (g/cm <sup>3</sup> )
emerald	Be <sub>3</sub> Al <sub>2</sub> (Si <sub>6</sub> O <sub>18</sub> )	7.5–8	2.7
sapphire	Al <sub>2</sub> O <sub>3</sub>	9	4.0
spinel	MgAl <sub>2</sub> O <sub>4</sub>	8	3.8
zircon	ZrSiO <sub>4</sub>	7.5	4.7

- (1) 0.4 cm<sup>3</sup>
- (2) 2.5 cm<sup>3</sup>
- (3) 5.7 cm<sup>3</sup>
- (4) 36.1 cm<sup>3</sup>

4 \_\_\_\_\_

5. Liquid *W* was added to the graduated cylinder containing liquid *C*. Objects *A* and *D* were then dropped into the cylinder. Which statement is correct?

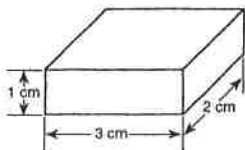


- (1) Liquid *W* is denser than liquid *C* and object *D*.
- (2) Liquid *C* is denser than liquid *W* and object *A*.
- (3) Liquid *C* is less dense than object *A*, but more dense than liquid *W* and object *D*.
- (4) Object *A* is denser than liquid *C*, but not as dense as liquid *W* and object *D*.

5 \_\_\_\_\_

## Set 2 — Density of a Substance

The diagram below represents a solid object with a density of 3 grams per cubic centimeter. What is the mass of this object?

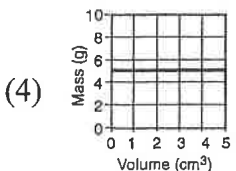
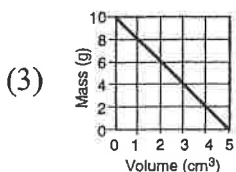
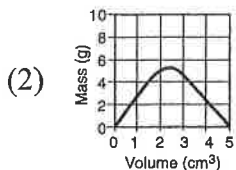
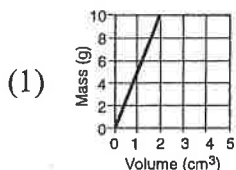


(Not drawn to scale)

- (1) 0.5 g      (3) 18 g  
 (2) 2 g        (4) 36 g

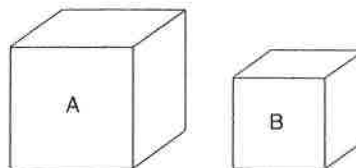
6 \_\_\_\_\_

7. Which graph best represents the relationship between mass and volume of a material that has a density of 5 grams per cubic centimeter?



7 \_\_\_\_\_

Base your answers to questions 8, 9, and 10 on the diagrams below, and your knowledge of Earth science. The diagrams represent two different solid, uniform materials cut into cubes *A* and *B*.



Mass of A = 320 g      Density of B = 3 g/cm<sup>3</sup>  
 Volume of A = 64 cm<sup>3</sup>      Volume of B = 27 cm<sup>3</sup>

(Not drawn to scale)

8. What is the density of cube *A*?

- (1) 0.2 g/cm<sup>3</sup>  
 (2) 5.0 g/cm<sup>3</sup>  
 (3) 12.8 g/cm<sup>3</sup>  
 (4) 64.0 g/cm<sup>3</sup>

8 \_\_\_\_\_

9. What is the mass of cube *B*?

- (1) 3 g              (3) 27 g  
 (2) 9 g             (4) 81 g

9 \_\_\_\_\_

Note that question 10 has only three choices.

10. Assume cube *B* was broken into many irregularly shaped pieces. Compared to the density of the entire cube, the density of one of the pieces would be

- (1) less  
 (2) greater  
 (3) the same

10 \_\_\_\_\_

11. Explain how heat would change the density of a parcel of air.

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