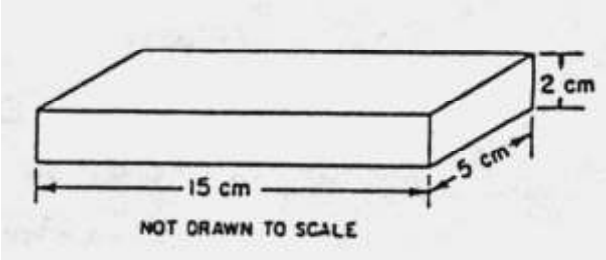
Date _____

Determining Mass, Volume, and Density

1. A rock has a mass of 150.0 grams and a volume of 40.0 milliliters. What is the density of the rock?
   (1) 3.75 g/ml
   (2) 6.00 g/ml
   (3) 15.0 g/ml
   (4) 40.0 g/ml

2. The diagram below represents a rectangular object with a mass of 450 grams. What is the density of the object?



   1 1 gram per cubic centimeter
   2 2 grams per cubic centimeter
   (3) 3 grams per cubic centimeter
   (4) 4 grams per cubic centimeter

3. A pebble has a mass of 35 grams and a volume of 14 cubic centimeters. What is its density?
   (1) 0.4 g/cm^3
   (2) 2.5 g/cm^3
   (3) 490 g/cm^3
   (4) 4.0 g/cm^3

To solve questions **4 through 6**, manipulate the density formula or use the density triangle.

4. The mineral quartz has a density of 2.7 g/cm^3. If a student had a piece of quartz that has a volume of 2 cm^3, what would the mass of the sample be? Show your work.

m = D x V
m = (2.7)(2)
m = 5.4 grams

or

$D = \frac{m}{V}$ $2.7 = \frac{m}{2}$ m = (2.7)(2) **V = 5.4 g**

5.. A sample of sphalerite has a mass of 176.0 grams. What is the volume of the sample? Show your work.

V = m / D
V = 176 / 4
V = 44 cm^3

or

$D = \frac{m}{V}$ $4 = \frac{176}{V}$ $4V = 176$ $\frac{4V}{4} = \frac{176}{4}$ **V = 44cm^3**

Mineral Property	Mineral			
	Smithsonite	Sphalerite	Willemite	Zincite
Composition	$ZnCO_3$	ZnS	Zn_2SiO_4	ZnO
Hardness	4–4.5	3.5–4	5.5	4
Density (g/cm^3)	4.4	4.0	4.0	5.6
Color	white, gray, green, blue, yellow	brown, yellow, red, green, black	white, yellow, green, reddish brown, black	deep red to orange yellow
Streak	white	white to yellow to brown	white	orange yellow

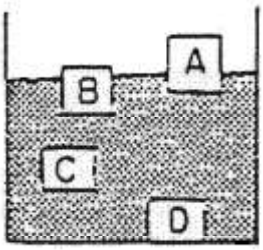
6. The mass of a sample of liquid water is 42 grams. What is the volume of the water? Show your work.
   Hint: Use page 1 of the *Earth Science Reference Tables* to find the density of liquid water.

V = m / D
V = 42 / 1.0
V = 42 mL

or

$D = \frac{m}{V}$ $1 = \frac{42}{V}$ $V = 42$ **V = 42 mL**

Use the diagram below to answer questions 7-8.



Substances A, B, C, and D are at rest in a container of liquid as shown by the diagram.

7. Which choice lists the substances in order of lowest to highest density?

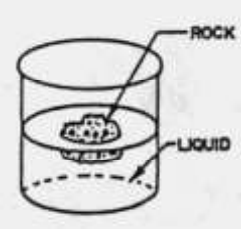
(1) A, B, C, D
(2) A, D, C, B
(3) D, C, B, A
(4) C, B, A, D

8. Which substance has the same density as the liquid?

(1) A
(2) B
(3) C
(4) D

9. The diagram below shows a glass jar containing a clear liquid and a floating rock. Which conclusion about the relative density of the rock and the liquid is true?

(1) The rock is less dense than the liquid.
(2) The rock is more dense than the liquid.
(3) The rock and the liquid have the same density.



10. The diagram below represents the mass and volume of a mineral sample being measured. These measurements were used to determine the density of the mineral sample.

What is the density of this mineral sample?

(1) 6 g/mL
(2) 24 g/mL
(3) 34 g/mL
(4) 60 g/mL