9D Science
Harris

Name: _____
Date: _____

PRACTICE QUESTIONS: Significant Figures

1. How many significant figures are in each of the following numbers?

(a)	1837	4	(b)	3.1415×10^4	5
(c)	6005	4	(d)	0.08206	4
(e)	0.000014	2	(f)	149356	6
(g)	8.7300	5	(h)	0.007430	4
(i)	302400.00	8	(j)	20000	1
(k)	60	1	(l)	60.0	3

2. When numbers are multiplied or divided, the answer must be reported to the correct number of significant figures. The value used in the calculation with the fewest significant figures, represents the number of significant figures allowed in the answer to the calculation.

(a)	(5.5m)(4.22 m)	=	$23.21\ m^2$	$= 23\ m^2$
(b)	(0.0167 km)(8.525 km)	=	$0.142367\ km^2$	$= 0.142\ km^2$
(c)	2.6 kg / 9.42 m^3	=	$0.2760\ kg/m^3$	$= 0.28\ kg/m^3$
(d)	0.632 m / 3.8 s	=	0.1663 m/s	= 0.17 m/s
(e)	(8.95)(9.162) / (4.25)(6.3)	=	3.06255	= 3.1
(f)	0.0045 mm^2 / 0.90 mm	=	0.005 mm	= 0.0050 mm

3. Round each of the following numbers to four significant figures:

(a)	6.16782	6.168	(b)	6.19648	6.196
(c)	213.25	213.2	(d)	17.16300	17.16
(e)	90210	90210	(f)	1200.53	1201
(g)	0.0022475	0.002248	(h)	14.16300	14.16
(i)	0.02315	0.02315	(j)	152.00	152.0

PRACTICE QUESTIONS: Units and Unit Conversions

4. How many mL are in 1 cm^3? 1 mL
How many mL are in 1L? 1000 mL
How many mL are in 1 m^3? 10^6 mL (1000 000 mL)

How many g are in 1 kg? 1000 g
How many mg are in 1g? 1000 mg
How many mg are in 1 kg? 1000 000 mg

5. Convert the following:

(a)	8.9 mL =	8.9 cm^3	(b)	0.452 L =	452 mL
(c)	19.5 L =	19500 mL	(d)	300 mL =	0.3 L
(e)	0.0008 m^3 =	800 mL	(f)	0.042 m^3 =	42 000 cm^3
(g)	25000 mL =	0.025 m^3	(h)	7800 mL =	0.0078 m^3
(h)	2505 mg =	2.505 g	(i)	0.0067 g =	6.7 mg
(j)	2.5 kg =	2500 g	(k)	32000 mg =	0.032 kg
(l)	0.00089 kg =	890 mg	(m)	7896 g =	7.896 kg

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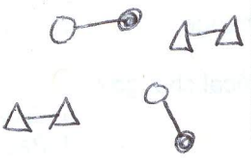
PRACTICE QUESTIONS: Classifying Matter

6. Classify the following substances as ELEMENT (E), COMPOUND (C), SOLUTION (S) or HETEROGENEOUS MIXTURE (H)

(a)	black coffee	S	(b)	milk	H
(c)	gold	E	(d)	silver jewelry	S
(e)	carbon dioxide	C	(f)	carbon monoxide	C
(g)	copper	E	(h)	oxygen	E
(i)	air	S	(j)	bread	H
(k)	paint	H	(l)	sugar	C
(m)	tap water	S	(n)	salad	H
(o)	neon gas	E	(p)	pure water	C

7. Complete the required diagrams in the boxes below:

A mixture of two types of atoms	A molecule made from two types of atoms	A mixture of molecules	A mixture of atoms and molecules
			

8. Match each term on the left with the descriptor on the right. Each Descriptor may be used only once:

E	Compound	A.	an element that is dull and brittle
B	Element	B.	contains only one type of atom
C	Pure Substance	C.	made up of only one type of particle
F	Metal	D.	contains two or more different types of particles
D	Mixture	E.	will have two or more different atoms joined together (* not bonded together, in this case)
A	Non-metal	F.	an element that conducts electricity

PRACTICE QUESTIONS: Describing Matter

9. Distinguish between a metal and non-metal. Use as many properties as possible to in your description of each (hint: see vocabulary list for describing matter)

Metals – shiny, silver, conductive, solid, malleable, ductile

Non-metals – dull, vary in colour, non-conductive, may be solids, liquids or gases, non-malleable, non-ductile, brittle.

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PRACTICE QUESTIONS: Physical and Chemical Properties and Changes

10. Which of the following is an example of physical change?
a. Mixing baking soda and vinegar together, and this causes bubbles and foam.
b. A glass cup falls from the counter and shatters on the ground.
c. Lighting a piece of paper on fire and the paper burns up and leaves ashes.
d. Baking a birthday cake for your mother.

11. Which of the following is an example of chemical change?
a. Filling up a balloon with hot air. b. Taking a glass of water and freezing it by placing it in the freezer.
c. A plant collecting sunlight and turning it into food. d. Your dog ripping up your homework.

12. Which change can be easily be reversed?
a. Chemical Change b. Physical Change
c. Both a physical and chemical change d. Neither a physical or chemical change

13. When a new substance is formed with different properties than the original substance it is called a
a. Chemical change b. Physical change
c. Freezing d. boiling

14. If the chemical properties of a substance remain unchanged and the appearance or shape of an substance changes it is called a
a. Chemical change b. Physical change
c. Both a physical and chemical change d. Neither a physical or chemical change

15. Which is an example of a physical change?
a. Metal rusting b. Silver tarnishing
c. Water boiling d. Paper burning

16. What characteristic best describes what happen during a physical change?
a. Composition changes b. Composition stays the same
c. Form stays the same d. Mass is lost

17. Which is an example of chemical change?
a. Water freezes b. Wood is cut
c. Bread is baked d. Wire is bent

18. Which is not a clue that could indicate a chemical change?
a. Change in color b. Change in shape
c. Change in energy d. Change in odor

19. What property stays the same during physical and chemical changes?
a. Density b. Shape
c. Mass d. Arrangement of particle

ANSWERS
10. B 11. C 12. B 13. A 14. B 15. C 16. B 17. C 18. B 19. C

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PRACTICE QUESTIONS: Density

20. Fill-in-the-blanks:

In order to determine density, it is necessary to measure the mass and volume of a substance. The higher the number is, the more dense it is. This means that it will sink in a substance of lower density. The lower the number is the less dense it is. This means that it will float in a substance of higher density. A common unit for density is g/mL (or others).

FOR THE DENSITY PROBLEMS BELOW, SHOW YOUR FULL SOLUTION USING THE G.R.A.S.P. METHOD. ANSWERS SHOULD BE ROUNDED TO THE CORRECT NUMBER OF SIGNIFICANT FIGURES. USE A SEPARATE SHEET OF PAPER TO COMPLETE THE PROBLEMS.

* Only answers shown below *
* Answers rounded for purpose of showing correct number of significant figures.

21. A piece of iron has a volume of 12 m^3 and a mass of 94 800 kg. What is the density of the iron? $d = 7900\ kg/m^3$

22. A large container is found to hold 0.050 m^3 of water. If the container is filled with water, it will hold 50.0 kg of water. What is the density of water? $1000\ kg/m^3$ $d = 1.0 \times 10^3\ kg/m^3$

23. A rectangular block has dimensions 3.2 cm, 1.62 cm and 4.0 cm. If the block has a mass of 56.0 g, what is the density of the block? $V = 20.736\ cm^3$ $d = 2.7\ g/cm^3$

24. A cylindrical oil storage tank has a diameter of 4.0 m and a height of 5.0 m. It is filled with oil. The total mass of the oil is 58 000 kg. What is the density of the oil? $V = 62.83\ m^3$ $d = 923.1\ kg/m^3 = 920\ kg/m^3$

25. A pine board has dimensions 200 cm (2 m) by 5.0 cm (0.05 m) by 2.0 m (200 cm). The mass of this piece of pine is 1.04 kg. Calculate the density of this piece of pine. $V = 200000\ cm^3 = 0.2\ m^3$ $d = 5.2\ kg/m^3 = 5\ kg/m^3$

26. An empty container has a mass of 22.6 g. If we add 0.02 L of alcohol to the container, the new mass of the filled container is 38.4 g. Calculate the density of alcohol. 20 mL $m_{alcohol} = 38.4\ g - 22.6\ g = 15.8\ g$ $d = 0.790\ g/mL = 0.8\ g/mL$

27. Find the mass of 75 mL of liquid whose density is 0.7 g/mL. $m = 52.5\ g = 50\ g$

28. What is the volume of an object whose mass is 42.7 g and whose density is 2.1 g/cm^3? $V = 20.3\ cm^3 = 2.0 \times 10^1\ cm^3$

29. A stone is placed at the bottom of an empty graduated cylinder. When 35 mL of water is added, the water level reaches the 50 mL mark. IF the density of the stone is 3 g/cm^3, what is the mass of the stone? $V_{stone} = 50\ mL - 35\ mL = 15\ mL$ or $15\ cm^3$ $m = 45\ g = 40\ g$

PRACTICE QUESTIONS: Density

30. On separate pieces of graph paper, plot the following data. Remember that mass is plotted on the y-axis (vertical) and volume is plotted on the x-axis (horizontal). For each graph, draw a ruled line of best-fit, and show a complete slope calculation in order to determine density. Follow all graphing rules.

Substance A

V (mL)	0.0	0.9	2.4	3.9	5.5	6.8	8.6	10.2	11.4
m (g)	0.0	6.4	16.8	16.7	45.8	58.3	66.2	87.3	91.2

Substance B

V (mL)	0	20	40	60	80	100	120	140
m (g)	0	11	23	36	46	58	69	81

Substance C

V (mL)	0	5	10	15	20	25	30	35	40	45	50
M (g)	0	22	45	63	79	102	123	148	158	177	205