# Chemistry 1 Pretest

Notes
- This test will give you an idea of your ability to handle the math and verbal skills and the type of thinking required for this class. You cannot fail, but if you do poorly, it will indicate you will have trouble in chemistry.
- Answer all the questions. Make your best guess if you have to.
- Don't write on the test. Write your answers on the answer sheet, and use scratch paper to work out problems.

Math

1. $3 + 2(7 - 4) =$
    A. 9
    B. 13
    C. 15
    D. 31

2. $2^4 =$
    A. 6
    B. 8
    C. 16
    D. 24

3. 0.000786 written in scientific notation is
    A. 7.86×10^{-3}
    B. 7.86×10^{-4}
    C. 7.86×10^{3}
    D. 7.86×10^{4}

4. $\dfrac{9 \text{ cm}^3}{3 \text{ cm}^2} =$
    A. 3 cm^5
    B. 3 cm^1
    C. 3 cm^{-1}
    D. 3 cm^{-5}

5. If $2a = 3b$, and $a = 6$, what does b equal?
    A. $b = 2$
    B. $b = 4$
    C. $b = 6$
    D. $b = 12$

6. Density is defined as mass per unit volume, or
    $$D = \frac{m}{v} .$$
    Solve the density equation for the variable **v**:
    A. $v = D + m$
    B. $v = \dfrac{D}{m}$
    C. $v = D \bullet m$
    D. $v = \dfrac{m}{D}$

7. The value of a fraction is less than 1 when…
    A. numerator > denominator
    B. denominator > numerator
    C. abscissa > ordinate
    D. ordinate > abscissa

8. How many small cubes are there in the illustration?

    A. 9
    B. 18
    C. 27
    D. 81
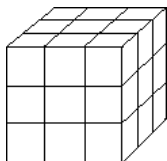
Measurement

9. Using the metric side of the ruler, measure the length of this line to the nearest 0.1 cm.
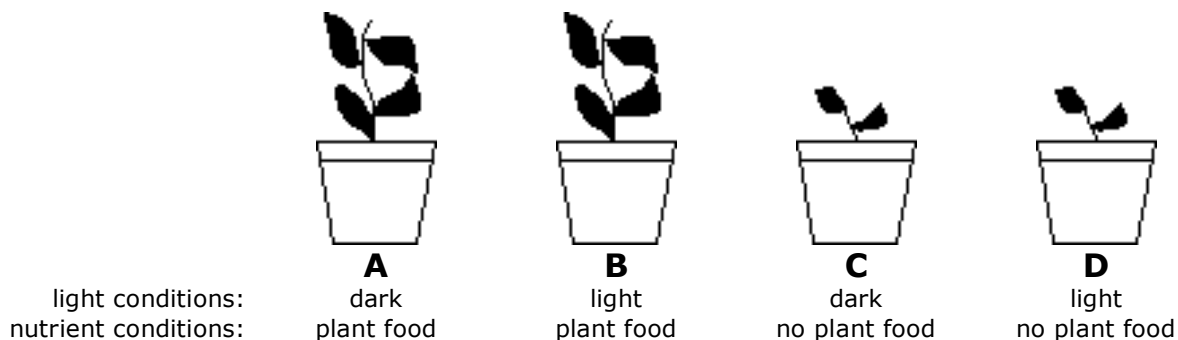
    _____

10. What is the volume of water in the graduated cylinder on your table?

Vocabulary

11. If a variable X is *directly proportional* to variable Y, it means…
    A. as Y increases, X increases.
    B. as Y increases, X decreases.
    C. there is no relationship between X and Y.

12. A *spontaneous* reaction occurs…
    A. very slowly.
    B. by giving off large amounts of heat.
    C. without any outside influence.
    D. under high pressure.

13. Which of the following is a unit of *volume*?
    A. cm
    B. lb/in^2
    C. ft^3
    D. acres

14. Which of the following is a *hypothesis*?
    A. The beaker weighs 4.65 g.
    B. When the two solutions were mixed, they turned into a solid.
    C. The liquid turned solid because there was a change in the molecular structure.
    D. The solid turned back into a liquid when it was heated.

15. An *aqueous* solution is one…
    A. that is pale blue-green in color.
    B. does not leave a solid when evaporated.
    C. contains dissolved solids.
    D. is dissolved in water.

16. ounce is to pound as centigram is to…
    A. centimeter
    B. gram
    C. milligram
    D. ounce

Abstract Reasoning

A biology student conducted an experiment to find out how light and plant food affect the growth of a particular type of plant. She grew four plants and treated them differently. After three weeks, the plants looked as shown below. Study the growing conditions and drawing and answer questions #17 and #18.

	A	**B**	**C**	**D**
light conditions:	dark	light	dark	light
nutrient conditions:	plant food	plant food	no plant food	no plant food

17. This experiment shows that…
    A. both light and plant food affect the growth of the plants.
    B. neither light nor food are factors affecting the growth of the plants.
    C. the greatest factor affecting the growth of this plant is plant food, not light.
    D. plants grow better with light, but plant food does not affect them.

18. To show the effects of plant food on the growth of these plants, you should compare…
    A. plants A and D.
    B. plants A and B.
    C. plants C and D.
    D. plants B and D.

Some chemistry students designed an experiment to see how different metals react with strong and weak acids. They have added small amounts of metal filings (copper and iron) to beakers containing different acids (concentrated and dilute sulfuric and hydrochloric acids). They have carefully recorded the experimental conditions below. Use this data to answer questions #19 and #20.

| Beaker	Metal	Acid
A	iron	dilute sulfuric
B	copper	dilute sulfuric
C	iron	concentrated sulfuric
D	copper	concentrated sulfuric
E	iron	dilute hydrochloric
F	copper	dilute hydrochloric
G	iron	concentrated hydrochloric
H	copper	concentrated hydrochloric

19. To observe the effects of how different metals react, the students should compare…
    A. A and B or E and F
    B. B and C or F and G
    C. A and D or E and H
    D. C and H or D and G

20. Which of the following would be a correct procedure for the students to follow?
    A. Compare E and H to see if the reaction rate depends on the strength of the acid.
    B. Compare A and D to see if the reaction rate depends on which metal is added to the acid.
    C. Compare A and C to see if the reaction rate depends on the strength of the acid.
    D. Compare A and H to see if the reaction rate depends on which acid is used.

When baking soda is added to vinegar, the solution produces a gas (carbon dioxide). A student is trying to see if there is a relationship between the amount of baking soda added and the amount of gas produced. He added different amounts of baking soda (0.5 g – 3.0 g in 0.5 g increments) to 25 mL of vinegar in a test tube, and collected the gas in a balloon. The data is graphed below. Use the graph to answer questions
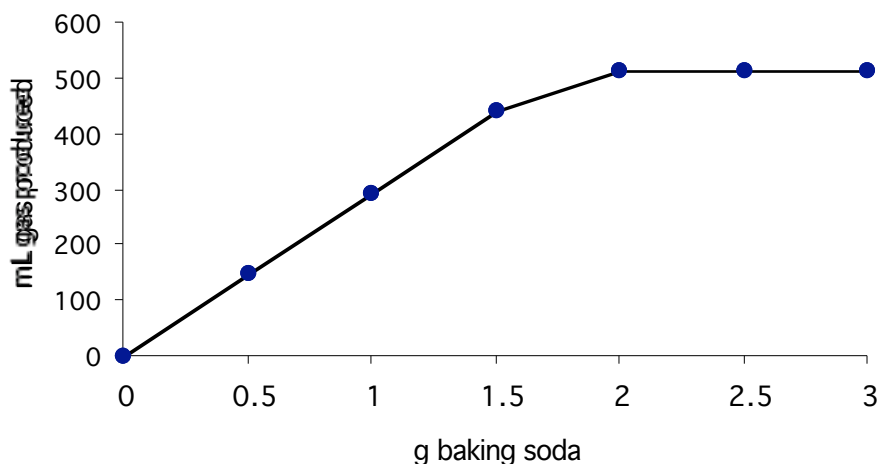
#21 and #22.

21. What is a valid conclusion to draw from this data?
    A. The amount of gas produced continues to increase as the amount of baking soda increases.
    B. Adding more baking soda than 2.0 g does not result in additional gas production.
    C. The amount of gas produced depends only on the amount of vinegar in the test tube.
    D. There is no relationship between the amount of gas produced and baking soda added.

22. What would be a valid conclusion if the student had added baking soda in the range of 0.5 - 1.5 g *only*?
    A. The amount of gas produced continues to increase as the amount of baking soda increases.
    B. Adding more baking soda than 2.0 g does not result in additional gas production.
    C. The amount of gas produced depends only on the amount of vinegar in the test tube.
    D. There is no relationship between the amount of gas produced and baking soda added.

23. If brass is 25% (by weight) copper, how many grams of copper are in 12 grams of brass?
    A. 3 g   C. 48 g
    B. 37 g   D. 300 g

24. A student used a plain piece of paper (such as this one) to cut out two figures: a circle with a diameter of 4 inches, and a square 4 inches on a side. Which figure would weigh more?
    A. the 4" circle weighs more
    B. the 4" square weighs more
    C. they weigh the same
    D. there is no way to predict

25. A biologist used a microscope to measure two different kinds of cells. Cell A was 12 micrometers in diameter, and cell B was 20 micrometers in diameter. She then took a photograph of the two cells. In the photograph, cell A measured 15 cm in diameter. What was the diameter of cell B in the photograph?
    A. 18 cm   C. 23 cm
    B. 20 cm   D. 25 cm

26. On the back of the answer sheet, construct a simple graph to represent the distance a car moving at 60 mph will travel.

name _____

Chemistry 1 Pretest

Math

    1. _____

    2. _____

    3. _____

    4. _____

    5. _____

    6. _____

    7. _____

    8. _____

Measurement

    9. _____

    10. _____

Vocabulary

    11. _____

    12. _____

    13. _____

    14. _____

    15. _____

    16. _____

Abstract reasoning

    17. _____

    18. _____

    19. _____

    20. _____

    21. _____

    22. _____

    23. _____

    24. _____

    25. _____