

Unit 1 Study Guide --- ANSWER KEY

- Define scientific method: **a procedure for collecting, testing, and communicating information**
- Define hypothesis: **a suggested answer to the question, an educated guess**
- Define experiment: **a scientific test so see what will happen**
- Define dependent variable: **the variable that you do NOT control. (on a graph is usually on the Y axis)**
- Define independent variable: **the variable that I control. (on a graph is usually on the X axis)**
- Define control: **the part of the experiment where everything is left the same.**
- Define observation: **information collected with any of your 5 senses**
- Define density: **the ratio of mass per unit volume ($D = m/v$)**
- Define accuracy: **the measure of how close your data is to the ACTUAL or true value.**
- Define precision: **a measure of how close your data (measurements) are to each other.**
- Why do scientists use SI units of measurement? **So that measurements can be understood internationally (around the world).**

- List (in the correct order) the steps of the scientific method.

1. make an observation	4. test hypothesis (experiment)
2. ask a question	5. analyze data/form a conclusion
3. form a hypothesis	6. develop a theory

- What mnemonic device is used to remember the metric system?

K H Da B d c m
g, m, L

- What is the sentence (mnemonic) that will help you remember the METRIC prefixes in order?

King Henry Died By Drinking Chocolate Milk

- Fill in the table below describing the metric system:

	Kilo	Hecto	Deca	Base	Deci	Centi	Milli
Abbreviation	K	H	Da	g, m, L	d	c	m
Meaning in powers of 10	10^3	10^2	10^1	10^0	10^{-1}	10^{-2}	10^{-3}

Convert the following:

- 25L to 25000 mL
- 2.3 km to 230,000 cm
- 0.045 g to 45 mg
- 0.35 kg to 350 g
- 300 mL to 0.300 L

- 25 cm to 0.25 m
- 56784 mm to 0.056784 km
- 15 g to 0.015 kg
- 3.452 kL to 3452 L
- 47 m to 47000 mm

Scientific Notation:

Convert the following to scientific notation:

- 0.005 5×10^{-3}
- 5,050 5.05×10^3
- 0.0008 8×10^{-4}

- 1,000 1×10^3

- 0.025 2.5×10^{-2}
- 0.0025 2.5×10^{-3}
- 500 5×10^2
- 5,000 5×10^3

Convert the following to standard notation:

- 34) 1.5×10^3 1,500
 35) 3.75×10^{-2} 0.0375
 36) 2.2×10^5 220,000
 37) 3.35×10^{-1} 0.335

- 38) 1.2×10^{-4} 0.00012
 39) 1×10^4 10,000
 40) 1×10^{-1} 0.1
 41) 4×10^6 4,000,000

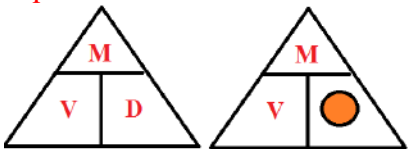
Density: Solve the following density problems using the density formula given below:

$$\text{Density Equation: Density} = \frac{\text{Mass}}{\text{Volume}} \text{ or } D = \frac{M}{V}$$

42) What is the density of carbon dioxide gas if 0.196 g occupies a volume of 100 mL?

Given M= 0.196 g V= 100 mL D = ??	Equation $D = \frac{M}{V}$	$D = \frac{0.196 \text{ g}}{100 \text{ mL}} = 0.00196 \frac{\text{g}}{\text{ml}}$
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43) An irregular shaped stone was lowered into a graduated cylinder holding a volume of water equal to 10 mL. The height of the water rose to 17 mL. If the mass of the stone was 25 g, what is the stone's density?

Given D = ? M= 25 g V= 17 – 10 mL = 7 mL	Equation 	$D = \frac{25 \text{ g}}{7 \text{ mL}} = 3.57 \text{ g / mL}$
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44) A 10 cm³ sample of copper has a mass of 89.6 g. What is the density of copper?

Given M= 89.6 g V= 10 cm ³ D = ??	Equation $D = \frac{M}{V}$	$D = \frac{(89.6 \text{ g})}{(10 \text{ cm}^3)} = 8.96 \frac{\text{g}}{\text{cm}^3}$
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45) A sample of iron has the dimensions 2 cm x 3 cm x 2 cm. If the mass of this rectangular-shaped object is 94 g, what is the density of iron?

Given M=94 g L= 2 cm W= 3 cm H= 2 cm D = ??	Equation $D = \frac{M}{V}$ $V = L \times W \times H$	$V = 2 \text{ cm} \times 3 \text{ cm} \times 2 \text{ cm} = 12 \text{ cm}^3$ $D = \frac{94 \text{ g}}{12 \text{ cm}^3} = 7.83 \frac{\text{g}}{\text{cm}^3}$
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Safety

- 46) What MUST you wear when working with chemicals, heat or glassware? Goggles
- 47) What 2 safety equipments/items are available in a science classroom? Apron, goggles, Fire extinguisher, fire blanket, eye wash station, safety shower
- 48) What are the three (3) situations in which you must wear safety goggles? When using HEAT, CHEMICALS or GLASSWARE.
- 49) Correct the following safety rules:
- Eating and drinking is **NOT** permitted in the laboratory. **(CAN'T EAT IN A LAB)**
 - It is **NOT** safe to look into a container that is being heated.

- c. If you do not understand a direction you should just guess at **ASK A TEACHER** what to do.
- d. Unauthorized experiments are **NOT** safe to do.

Graphs

50. What type of data is graphed with a line graph?

Numerical vs. Numerical; frequently something vs. time (distance vs. time, speed vs. time)

51. What type of data is graphed with a bar graph? Numerical vs. NON-numerical (Number of a particular item)

52. What type of data is graphed with a circle graph?

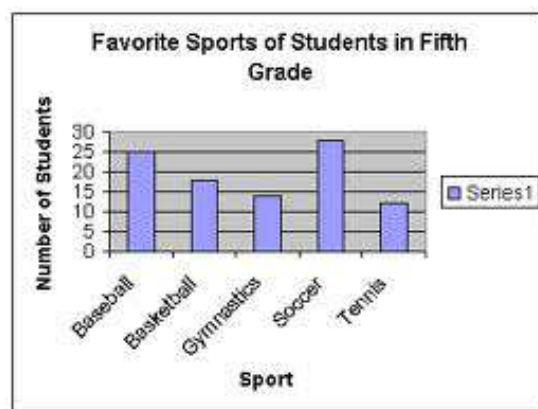
%, or Parts of a Whole

53. On the “Favorite Sports” graph what is the dependent variable? The number of students (you can’t control it).

54. On the “Favorite Sports” graph what is the independent variable? Sports (types of sports).

55. On the “Favorite Sports” graph what is the favorite sport?

Soccer

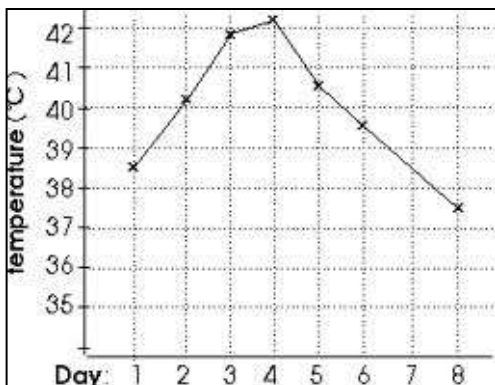
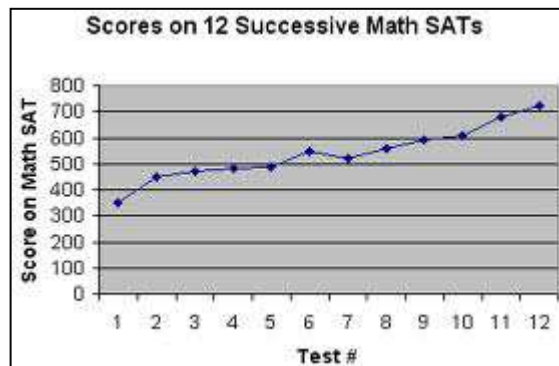


56. On the “Scores on Math SAT” graph below, what two tests have the closest scores?

4 and 5 OR 9 and 10

57. On the “Scores on Math SAT” graph below, what test has a score of 600?

Test 9



58. On the “Temperature vs. Day” graph above what is the dependent variable?

The temperature; I can’t control the weather.

59. On the “Temperature vs. Day” graph above what is the independent variable?

The day you measure the temperature, I pick the day.