Key

Unit 1 Test Review

Scientific Method

SpongeBob and his Bikini Bottom pals have continued doing a little research to solve some problems. Read the description for each experiment and answer the questions. Krusty Krabs Breath Mints Mr. Krabs created a secret ingredient for a breath mint that he thinks will "cure" the bad breath people get from eating crabby patties at the Krusty Krab. He asked 100 customers with a history of bad breath to try his new breath mint. He had fifty customers (Group A) eat a breath mint after they finished eating a crabby patty. The other fifty (Group B) also received a breath mint after they finished the sandwich, however, it was just a regular breath mint and did not have the secret ingredient. Both groups were told that they were getting the breath mint that would cure their bad breath. Two hours after eating the crabby patties, thirty customers in Group A and ten customers in Group B reported having better breath than they normally had after eating crabby patties.

1. Write a hypothesis for this experiment. The secret ingredient will cure bad breath.
2. Which people are in the control group? Group B
3. What is the independent variable? Breath mints w/the secret ingredient
4. What is the dependent variable? People's breath
5. What should Mr. Krabs' conclusion be? Secret ingredient cures bad breath
6. Why do you think 10 people in group B reported fresher breath? The placebo effect

Significant Figures Worksheet

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

1,200 x 10^3 1200 1200.

1) 5.40 3
2) 210 2
3) 801.5 4
4) 1,000 1
5) 101.0100 7
6) 1.2×10^3 2
7) 0.00120 3
8) 0.0102 3
9) 9.010×10^{-6} 4
10) 2,370.0 5

Significant Figure Calculations

Solve the following mathematical problems such that the answers have the correct number of significant figures:

11) 334.540 grams + 198.9916 grams = 533.532 g
12) 34 grams / 10.1 mL = 3.4 g/mL
13) 2610000. joules / 0.0034 seconds = 770 000 000 J/s

76 76 1058
770000000

14) 0.0610 m – 0.18 m = ____ -0.12 m

15) 349.0 cm + 1.10 cm + 100. cm = 450cm

16) 252 meters / 910 seconds = .28 m/s

17) 248.01010 kilograms + 84.097 kilograms = 332.107kg

28) 44 m/s x 20 s = 900 m

880

Algebra – Solving Problems

Solve the following problems and write your answer in the correct significant figures.

4.00x = 80.00
x = 20.0

x = 20.0

22) 4.00x + 124.00 = 204.00

(.761)(20.0) = V_B(33.5)
.4543 = V_B

V_B = .454

23) $V_AT_A = V_BT_B$ V_A 0.761 T_A = 20.0 T_B = 33.5

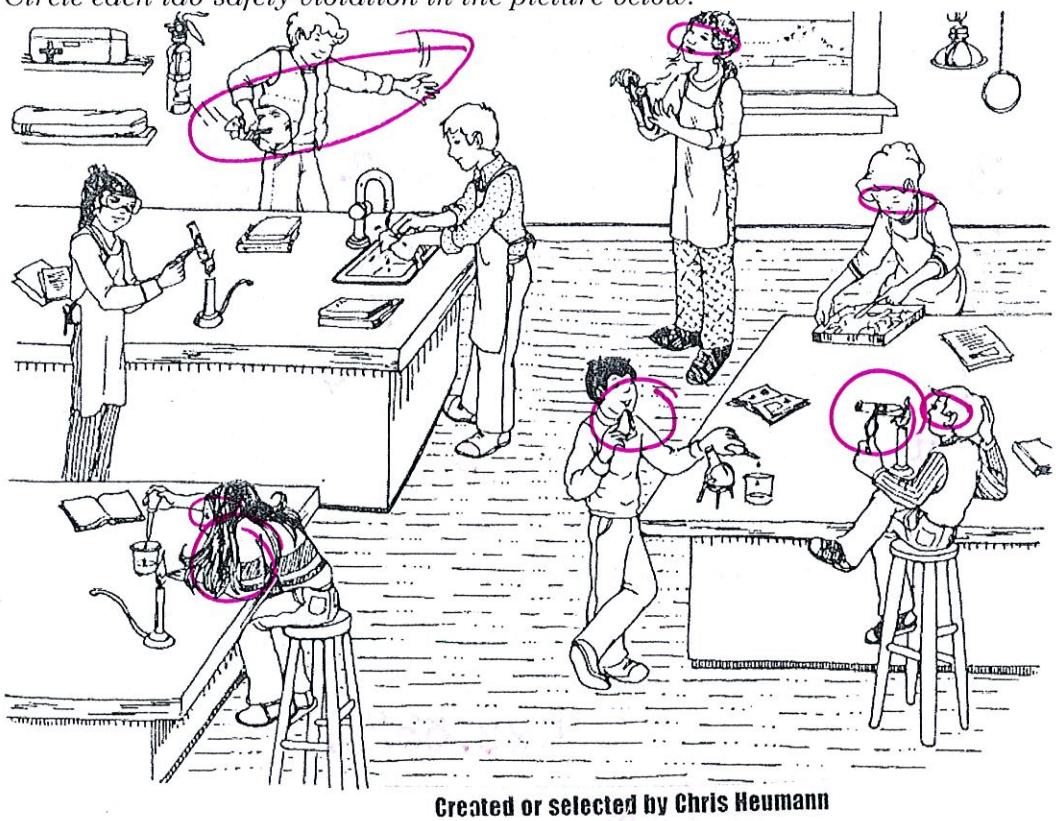
C = -273

24) F = 1.8(C) + 32 F = -459.4

-459.4 = 1.8(C) + 32
-491.4 = 1.8(C)
-273 = C

Lab Safety

Circle each lab safety violation in the picture below.



Created or selected by Chris Heumann

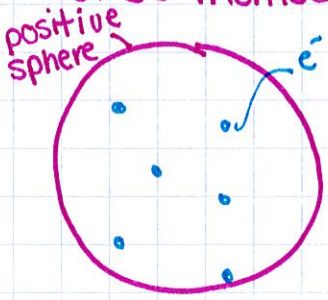
No goggles

Atomic Theory

(1) A. Democritus - 1ST to develop the idea of an atom as being the smallest particle of a substance.

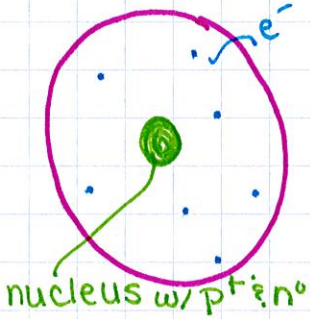
B. John Dalton - Dalton's Atomic Theory
1) All things are made of tiny, indivisible particles called atoms.
2) All atoms of an element are identical. Atoms of one element are different from atoms of another element.
3) Atoms combine in simple ratios to form compounds.
4) Atoms get rearranged in chemical reaction, but never created or destroyed.

C. JJ Thomson - Cathode Ray Experiment: passed electricity thru a gas filled tube & noticed a glowing line, put a magnet around the tube & the line bent toward the positive part of the magnet, decided that the glowing line is made of negatively charged particles called electrons (e^-)

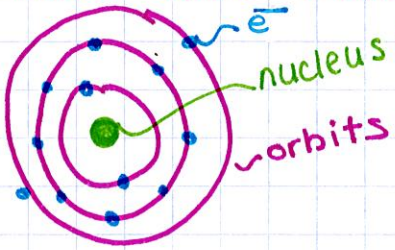


Plum Pudding model

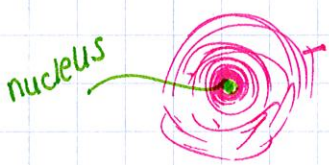
D. Ernest Rutherford - Gold Foil Experiment: directed positively charged alpha particles toward gold foil, expecting them to pass straight through. Some, however, came off at odd angles. Determine that the alpha particles were hitting & bouncing off something positive in the atom, he called it the nucleus. He later discovered protons (p^+) & neutrons (n^0) with James Chadwick



E. Neils Bohr - Planetary Model



F. Quantum Mechanical Model - e^- exist in orbitals with the electron cloud surrounding the nucleus ↳ 90% chance of finding an e^-



2. Atomic Structure

A. protons - in the nucleus electrons - around the nucleus
neutrons - in the nucleus

B. atomic number = # protons = # electrons
mass number = # protons + # neutrons

C. isotopes - atoms of elements w/ same atomic number but different # neutrons.

D.

Name	Symbol	Atomic #	Mass #	# p+	# e-	# n°	Isotopic Symbol
beryllium	Be	4	9	4	4	5	$^{9}_{4}Be$
manganese	Mn	25	56	25	25	31	$^{56}_{25}Mn$
cadmium	Cd	48	110	48	48	62	$^{110}_{48}Cd$
arsenic	As	33	75	33	33	42	$^{75}_{33}As$

E. A.M = (23.98504 • .7870) + (24.98584 • .1013) + (25.98259 • .1117)
A.M. = 24.31 amu

3. Electron Configurations

A. O $1s^2 2s^2 2p^4$
B. K $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$
C. As. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^3$
D. Tc. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^5$

4. Electrons & Light

A. Heating the elements excites their electrons, makes them jump up an energy level. However that is unstable, so the electrons give off photons of energy that have frequencies in the visible light spectrum.

B. i) $c = \lambda \cdot \nu$

$3.00 \times 10^{8}\ m/s = (6.80 \times 10^{-7} m) \cdot \nu$

$\frac{3.00 \times 10^{8}\ m/s}{6.80 \times 10^{-7} m} = \nu$

$4.41 \times 10^{14}\ 1/s = \nu$

$E = h \cdot \nu$

$E = (6.626 \times 10^{-34} J \cdot s)(4.41 \times 10^{14}\ 1/s)$

$E = 2.92 \times 10^{-19} J$

ii.) $c = \lambda \cdot \nu$

$3.00 \times 10^{8}\ m/s = \lambda \cdot 5.25 \times 10^{14}\ 1/s$

$\frac{3.00 \times 10^{8}\ m/s}{5.25 \times 10^{14}\ 1/s} = \lambda$

$5.71 \times 10^{-7}\ m = \lambda$

iii) $c = \lambda \cdot \nu$

$3.00 \times 10^{8}\ m/s = 4.85 \times 10^{-7}\ m \cdot \nu$

$\frac{3.00 \times 10^{8}\ m/s}{4.85 \times 10^{-7}\ m} = \nu$

$6.19 \times 10^{14}\ 1/s = \nu$

$E = h \cdot \nu$

$E = (6.626 \times 10^{-34}\ J \cdot s)(6.19 \times 10^{14}\ 1/s)$

$E = 4.10 \times 10^{-19}\ J$

iv) $c = \lambda \cdot \nu$

$3.00 \times 10^{8}\ m/s = \lambda \cdot 7.00 \times 10^{14}\ 1/s$

$\frac{3.00 \times 10^{8}\ m/s}{7.00 \times 10^{14}\ 1/s} = \lambda$

$4.29 \times 10^{-7}\ m = \lambda$

$E = h\nu$

$E = (6.626 \times 10^{-34}\ J \cdot s)(7.00 \times 10^{14}\ 1/s)$

$E = 4.64 \times 10^{-19}\ J$

5. Nuclear Chemistry

A) fission - splitting a large nucleus into smaller nuclei

fusion - combining 2 smaller particles into a larger atom.

B) Elements form through fusion in stars up to iron. Heavier elements form through fusion when a star undergoes super nova.