Tuesday, April 14/15
Science 122

1. Questions?
   Worksheet: Fluids - The Equation of Continuity

2. Ideal Fluid Flow and Bernoulli's Equation

3. Cutnell - Page 332 #56, 57, 58, 59
   Worksheet - Fluids - Continuity and Bernoulli's Equations
   Worksheet - Fluids - Continuity and Bernoulli's Equations #2

4. Test - Fluid Mechanics: Friday

Example

An aneurysm is an abnormal enlargement of a blood vessel such as the aorta. Suppose that, because of an aneurysm, the cross-sectional area A_1 of the aorta increases to a value $A_2 = 1.7\,A_1$. The speed of the blood ($\rho = 1060$ kg/m^3) through a normal portion of the aorta is $v_1 = 0.40$ m/s. Assuming that the aorta is horizontal, determine the amount by which the pressure P_2 in the enlarged region exceeds the pressure P_1 in the normal region. (55 Pa)

$\hookrightarrow \Delta P$

P_1

$\widehat{P_2}$

A_1 $v_1 \longrightarrow$ v_2 reference level

A_2

Label
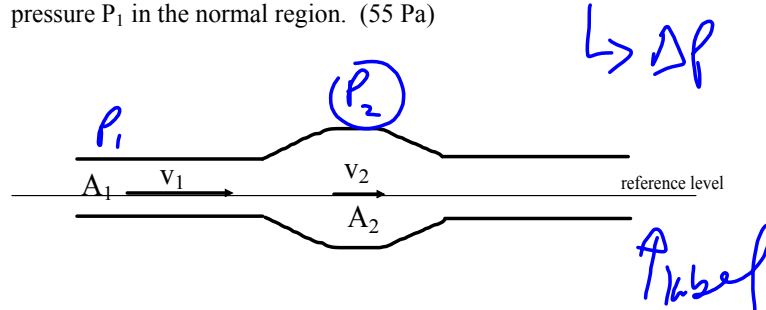
$$P_1 + \tfrac{1}{2}\rho v_1{}^2 + \cancel{\rho g y_1} = P_2 + \tfrac{1}{2}\rho v_2{}^2 + \cancel{\rho g y_2}$$

$$P_1 + \tfrac{1}{2}\rho v_1{}^2 = P_2 + \tfrac{1}{2}\rho v_2{}^2$$

$$P_2 - P_1 = \tfrac{1}{2}\rho v_1{}^2 - \tfrac{1}{2}\rho v_2{}^2$$

$$\Delta P = \tfrac{1}{2}\rho (v_1{}^2 - v_2{}^2)$$

The value of v_2 is unknown. Use the Equation of Continuity.

$$A_1 v_1 = A_2 v_2$$

$$v_2 = \frac{A_1 v_1}{A_2}$$

$$v_2 = \frac{\cancel{A_1} v_1}{1.7 \cancel{A_1}}$$

$$v_2 = \frac{v_1}{1.7} \qquad \qquad 0.235 \; m/s$$

$$\Delta P = \tfrac{1}{2}\rho \left(v_1{}^2 - \left[\frac{v_1}{1.7} \right]^2 \right)$$

$$\Delta P = \tfrac{1}{2}(1060)\left((0.40)^2 - \left[\frac{0.40}{1.7} \right]^2 \right)$$

$$\Delta P = 55 \text{ Pa}$$

☆

Worksheet - Continuity

#54.   a) $\dfrac{kg}{h}$] mass flow rate.

$$\dfrac{m}{t} = \rho A v$$

$$\dfrac{m}{\Delta t} = \rho \pi r^2 v$$

$$\dfrac{m}{\Delta t} = 1000\pi (0.0800)^2 (3.0)$$

$$\dfrac{m}{t} = \underline{\qquad} \dfrac{kg}{s}$$

$$m = \left(\quad \dfrac{kg}{s} \right) \times t$$

$$m = 2.2 \times 10^5 \, kg$$

$$A_1 v_1 = 3 A_2 v_2$$

Tuesday, April 14/15
Physics 122/121

1. Experiment 7.2 - Range of a Projectile
                    - Due: Today, April 14/15

2. Quiz: U2-S1 (Projectiles) -> Rewrite: IS - Wednesday, April 15/15

3. Uniform Circular Motion - Centripetal Acceleration
                             - Centripetal Force

4. Worksheet - Circular Motion - HW

5. Unbanked and Banked Curve Problems

6. Worksheet - Unbanked and Banked Curve Problems

Tuesday, April 14/15
Science 10

1. Quiz - Topics
        - Friday

2. Lab Safety Contract

3. Lab - Types of Reactions

4. Worksheet - Counting Atoms (Front Side)

5. Worksheet - Balancing Chemical Reactions (Front Side)

6. Worksheet - Formation and Decomposition Reactions

7. Worksheet - Single and Double Replacement Reactions

8. Worksheet - Combustion Reactions

9. Worksheet - Predicting the Products of Chemical Reactions

10. Reaction Rates

Quiz - Compounds and Reactions

→ or covalent

1. Be able to identify ionic and molecular compounds.

   ionic compounds - generally begins with a metal

   $NaCl$ (m)

   -> simple binary

   NH_4Cl

   -> involving polyatomic ions   ate or ite Na_2SO_4

   -> involving multivalent metals

   Cu, Fe, Cr

   (roman numerals 1 to 10 required) ←

   -> involving polyatomic ions and

   multivalent metals $CuSO_4$
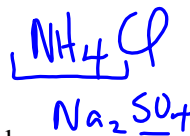
   molecular compounds - begin with a nonmetal or metalloid

   CO_2
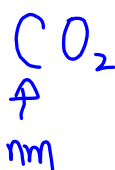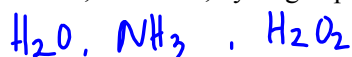   ↑
   nm

   -> binary

   -> prefixes 1-10

   -> diatomic molecules (hydrogen, nitrogen,
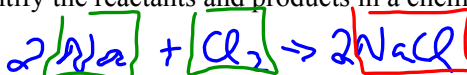
   oxygen, fluorine, chlorine, bromine and

   iodine)

   -> S_8, P_4

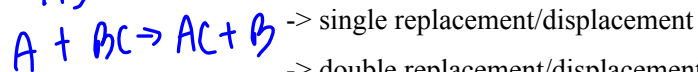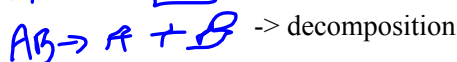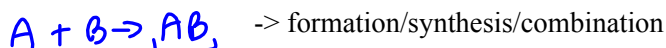   -> water, ammonia, hydrogen peroxide

   H_2O, NH_3, H_2O_2

2. Be able to write the names and chemical formulas for ionic and

   molecular compounds. $NaCl \rightleftarrows$ Sodium chloride

3. Be able to identify the reactants and products in a chemical

   reaction. $2Na + Cl_2 \rightarrow 2NaCl$

4. Be able to identify the five reaction types.

   $A + B \rightarrow AB$ -> formation/synthesis/combination

   $AB \rightarrow A + B$ -> decomposition

   $A + BC \rightarrow AC + B$ -> single replacement/displacement

   -> double replacement/displacement

   $AB + CD \rightarrow AD + CB$ -> combustion   hydro + $O_2 \rightarrow H_2O + CO_2$

   Carbon

   C, H
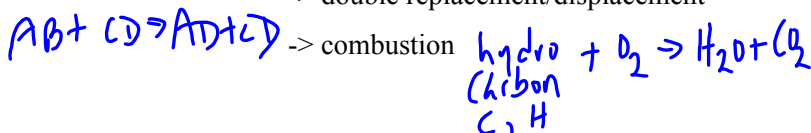
5. Be able to balance chemical reactions.

6. Be able to predict the products of chemical reactions.

   You'll need your 2 periodic tables.