**Station 1: Volume and Temperature Conversions**

In chemistry, we often use the Kelvin scale for calculations. The conversion between Kelvin and Celcius is shown below:

$$K = °C + 273$$

Convert the following values into Kelvin:

1. 63.0°C ____336K_ 2. -42.0°C ____231K__ 3. 15.0°C ____288K____

For pressure, there are numerous different units.

Pascal = Pa
ilopascal = kPa
atmospheres = atm
millimeters of mercury = mmHg
torr = torr

The relationships between the units are shown below. Any two can be used together as a conversion factor.

**101300 Pa = 101.3 kPa = 760 mmHg = 760 torr = 1 atm**

ex) Convert 814 mmHg to atmospheres.

$$814 \text{ mmHg} \times \frac{1 atm}{760 mmHg} = 1.07 \text{ atm}$$

Convert the following values:

1. 513.4 kPa to torr

   3852 torr

2. 2.30 atm to Pa

   $2.33 \times 10^5$ Pa

3. 695 mmHg to Pa

   $9.26 \times 10^4$ Pa

4. 0.850 atm to mmHg

   646 mmHg

**<u>Station 2:</u> Kinetic Molecular Theory (KMT)**

Use your video notes (and the textbook if needed) to answer the following questions.

1. What does it mean to have an elastic collision?

No energy is lost when particles collide.

2. What are gases made up of?

Tiny particles that are in constant, random, straight-line motion.

3. What can we assume about the volume of a gas based on KMT?

It is negligible when compared to the spaces between particles.

4. How will oxygen gas act compared to carbon dioxide gas?

All gases behave similarly regardless of identity.

5. What does it mean when we say that gases are compressible?

The particles can be pushed closer together.

6. What relationships and types of measurements are explained by KMT?

Pressure, Volume, Temperature, # of particles (or # of moles)

**<u>Station 3:</u> Diffusion, Effusion, and Graham's Law**

What is the difference between diffusion and effusion?

diffusion – movement of gases toward lower concentration in an open area
effusion – movement of gases through a tiny hole/pore

What is the formula for Graham's Law?

rate A/rate B = $\sqrt{MM\ B}$ / $\sqrt{MM\ A}$

On the table are cards containing various gases. Pick two and determine the rate between them until all of your spots are filled. Show all work

1. ____ and ____

2. ____ and ____

3. ____ and ____

4. ____ and ____

## **Station 4:** Dalton's Law of Partial Pressures

**All units must match when calculating**

Section 1: Pick three gases from the cards on the table and find the total pressure of the system you have created.

1. ____ ____ ____

2. ____ ____ ____

3. ____ ____ ____

Section 2: Pick two gases from the cards on the table. Find the pressure of the missing gas based on the given total pressure.

1. $P_{total}$ = 972 mmHg ____ ____

2. $P_{total}$ = 455.0 kPa ____ ____

3. $P_{total}$ = 8.12 atm ____ ____

**<u>Station 5:</u> Calculating Gas Pressure using Manometers**

Using your notes, calculate the pressure of the gas given the following situations.

1. In an open manometer, the side exposed to the gas is 48mm higher when the atmospheric pressure is 773 mmHg. What is the pressure of the gas?

   725 mmHg

2. In a closed manometer, the mercury is 45 mm higher on the closed end. What is the pressure of the gas?

   45 mmHg

3. In a closed manometer, the mercury is 59 mm higher on the closed end when the atmospheric pressure is 760. mmHg. What is the pressure of the gas?

   59 mmHg

4. In an open manometer, the side exposed to the atmosphere is 17 mm higher when the atmospheric pressure is 761 mmHg. What is the pressure of the gas?

   778 mmHg

5. In an open manometer, the side exposed to the gas is 22 mm higher when the atmospheric pressure is 781 mmHg. What is the pressure of the gas?

   759 mmHg

**<u>Station 6</u>: Things You Should Probably Review to Survive Spring Semester**

1. How many atoms of fluorine are in $5.4 \times 10^{24}$ grams of sulfur difluoride?

2. What is the difference between intramolecular forces and intermolecular forces?

3. If 50.0 grams of iron are allowed to react with 30.0 grams of oxygen, how many grams of product are formed?

4. List the types of crystalline solids in order of increasing melting point.

5. What is the law of conservation of mass?