WORKSHEET #1

Name: **KEY**   Date: Period: Seat #:

$$1\ atm = 760\ mmHg = 760\ torr = 101.3\ kPa = 14.7\ psi$$

Background:
Pressure is defined as Force / Area such as pounds per square inch (psi).
The weight of air pushing down per square inch is 14.7 pounds per square inch or 14.7 psi.

A barometer can be used to measure pressure. A column of mercury (Hg) that is 0.760 meter (760 mm) tall has the same weight as a column of air from sea level to the edge of the stratosphere. The height of this column is a good measure of air pressure… 760 mmHg.

Evangelista Torricelli did a lot of experiments with pressure and so 1 mmHg is also called 1 torr. So, air pressure has a value of 760 torr. This amount of pressure is also called 1 atm (one atmosphere) because it IS the atmosphere.

In metric units, pressure if Newtons (force) per square meter (area). One Newton is not very much pressure… about the weight of a small apple (get it… apple… Newton)… and if that force is exerted over a square meter, the amount of pressure is very small and called a pascal (Pa). It is more useful to talk of kilopascals (kPa) which would be the weight of 1000 small apples exerted over a square meter. Air pressure is equal to 101.3 kPa.

Since each of these values (see the top of the page) represent the same amount of pressure, any two of them can be used as a conversion factor. You can convert one pressure unit into another.

$$What\ is\ 515\ mmHg\ in\ kPa?\quad 515\ mmHg\ x\ \frac{101.3\ kPa}{760\ mmHg} = 68.6440789\ kPa = 68.4\ kPa$$

EXAMPLE:

PRACTICE:

745 mmHg into psi	522 torr into kPa
$745\ mmHg\ x\ \dfrac{14.7\ psi}{760\ mmHg} = 14.4\ psi$	$522\ torr\ x\ \dfrac{101.3\ kPa}{760\ torr} = 69.6\ kPa$
727 mmHg into kPa	1.10 atm into psi
$727\ mmHg\ x\ \dfrac{101.3\ kPa}{760\ mmHg} = 96.9\ kPa$	$1.10\ atm\ x\ \dfrac{14.7\ psi}{1\ atm} = 16.2\ psi$
52.5 kPa into atm	800. mmHg into atm
$52.5\ kPa\ x\ \dfrac{1\ atm}{101.3\ kPa} = 0.518\ atm$	$800.\ mmHg\ x\ \dfrac{1\ atm}{760\ mmHg} = 1.05\ atm$
0.729 atm into mmHg	125 kPa into torr
$0.729\ atm\ x\ \dfrac{760\ mmHg}{1\ atm} = 554\ mmHg$	$125\ kPa\ x\ \dfrac{760\ torr}{101.3\ kPa} = 938\ torr$