

# Gas Laws WS

## Gay Lussac's Law

Name: \_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_

- 1) **Gay Lussac's Law** states that with a constant amount of gas and a constant volume, there is a relationship between the \_\_\_\_\_ and \_\_\_\_\_ of a gas. The two quantities are \_\_\_\_\_ proportional, which means that as one of them gets bigger, the other one gets \_\_\_\_\_. The mathematical equation for the law is:

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

2)  $P_1 = 2 \text{ atm}$      $T_1 = 200 \text{ K}$   
 $P_2 = 0.5 \text{ atm}$      $T_2 = ?$

4)  $P_1 = 200 \text{ psi}$      $T_1 = 373 \text{ K}$   
 $P_2 = ?$      $T_2 = 500 \text{ K}$

3)  $P_1 = 760 \text{ mm Hg}$      $T_1 = 125 \text{ K}$   
 $P_2 = 1520 \text{ mm Hg}$      $T_2 = ?$

5)  $P_1 = 85.0 \text{ kPa}$      $T_1 = 1250 \text{ K}$   
 $P_2 = ?$      $T_2 = 750. \text{ K}$

- 6) A volume of gas that starts at 2 atm of pressure changes temperature from 10°C to 2°C as a result of a pressure change.
- What are your knowns?
  - What is your unknown?
  - What was the new pressure of the gas?
- 7) A solid container with 10.0 atm of pressure is heated from 25°C to 500°C. What is the pressure within the container?

- 8) When a hydrogen bomb is dropped, the pressure within the bomb will multiply by up to 10,000 times instantaneously. If it starts at standard temperature and pressure, what will the temperature within the bomb rise to at the instant of detonation?
- 9) If you were to try and crush a balloon by increasing the pressure from 1.0 atm to 10. atm by squeezing it with your hands, but it was not able to change its volume, what would the temperature of the air in the balloon become if it started at 50.°C?
- 10) Your 5.0 L car engine warms up on a winter day from 0.0°C before you start it to 250°C after it turns on. If the pressure started at 1.0 atm, what is the pressure within your engine after it is turned on?
- 11) The pressure at the center of the sun is  $3.5 \times 10^{11}$  atm and has a temperature of 15.0 million °C. What is the pressure on the surface if it has a temperature of 5,500°C?
- 12) Your heart at rest has a pressure of 840.0 mm Hg and when contracting has a pressure of 880.0 mm Hg. If your body temperature is 98.60°F at rest, then what is your temperature in Fahrenheit when the heart contracts?