

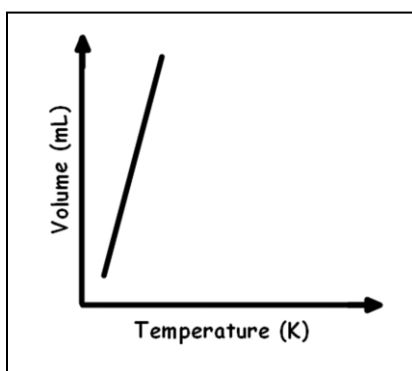
1) A balloon has a volume of 1.20 L at 24.0°C. The balloon is heated to 48.0°C. Calculate the new volume of the balloon.

- a) 1.30 L **Correct**
- b) 1.70 L **Incorrect**
- c) 2.10 L **Incorrect**
- d) 2.40 L **Incorrect**

This feedback is for all of the answer choices.  
1<sup>st</sup> convert temperatures to Kelvin by adding 273  
2<sup>nd</sup> plug values in Charles' Law  $V_1T_2 = V_2T_1$   
 $(1.2L)(321K) = (V_2)(297K)$   
3<sup>rd</sup> solve for the unknown  
 $V_2 = 1.30L$

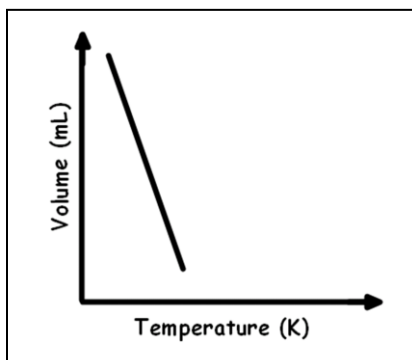
2) Which graph best shows the relationship between the volume of a gas and its temperature as the gas pressure remains constant?

a)



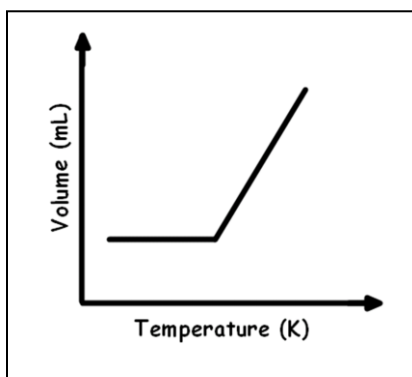
Correct; as temperature increases, volume increases according to Charles' Law

b)



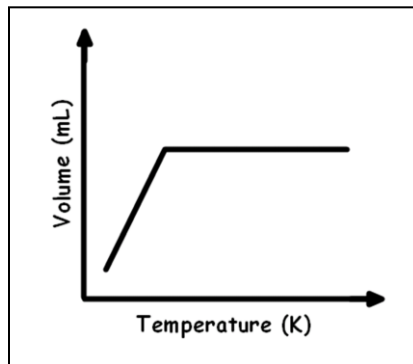
Incorrect; as temperature increases volume does not decrease it should increase.

c)



Incorrect; as temperature increases the volume does not hold constant and then increase. As temperature increases, the volume should increase as well.

d)



Incorrect; as temperature increases volume does increase but volume doesn't become constant at a certain temperature it would continue to increase.

3) Charles' Law states that if a given quantity of gas is held at a constant pressure, then its volume is directly proportional to the absolute temperature. This law explains why –

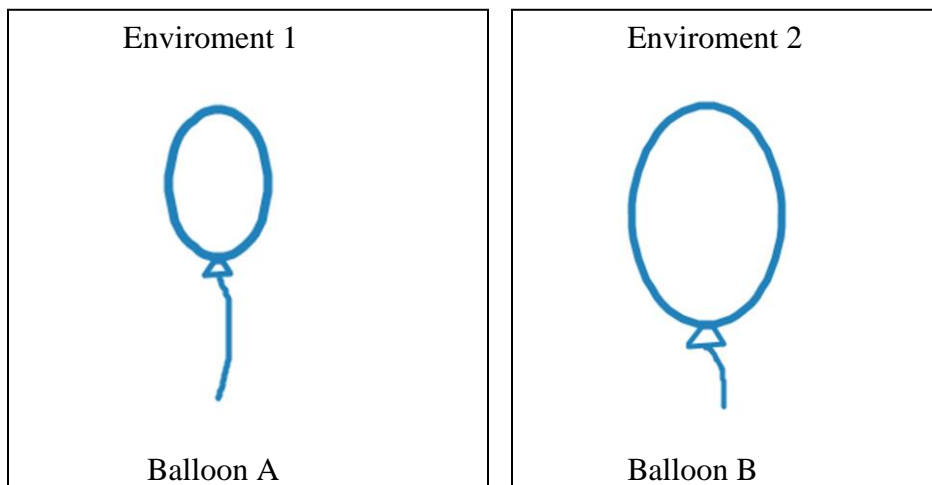
- a) the pressure of a gas increases when volume decreases (incorrect; pressure is held constant in Charles' Law not increased)
- b) solids require heat in order to change into gases (Incorrect; the gas laws only deal with gases not solids or liquids)
- c) a gas-filled balloon expands when it is heated (Correct; if a gas is heated then its temperature is increasing which means the volume should also increase.)
- d) some gases only react with each other at high temperatures (Incorrect; this gas law does not tell us anything about the reactivity of a gas)

4) A sample of carbon dioxide gas occupies a volume of 20L at standard temperature and pressure (STP). What will be the volume of a sample of argon gas that has the same number of moles and pressure but twice the absolute temperature?

- a) 80 L (Incorrect)
- b) 40 L (Correct)
- c) 20 L (Incorrect)
- d) 10 L (Incorrect)

This feedback is for all of the answer choices. According to Charles' Law the Kelvin temperature and volume of a gas are directly proportional so if the temperature is doubled the volume of the gas should also be doubled.

5) The two balloons below were filled with an identical number of moles of gas. Which of the following best explains why balloon B is larger than balloon A?



- a) The gas in balloon B is cooler. (Incorrect; this would cause the balloon B to be smaller)
- b) The gas in balloon A is under less pressure. (Incorrect; this would cause balloon A to be larger)
- c) The gas in balloon A is warmer. (Incorrect; heating balloon A would cause it to be larger)
- d) The gas in balloon B is warmer. (Correct; heating balloon B would cause it to be larger)