

$$\frac{V_1}{T_1} = \frac{V_2}{T_2} \text{ OR } V_1 T_2 = V_2 T_1$$

## Charles' Law Worksheet ANSWER KEY

- 1) The temperature inside my refrigerator is about 4° Celsius. If I place a balloon in my fridge that initially has a temperature of 22° C and a volume of 0.5 liters, what will be the volume of the balloon when it is fully cooled by my refrigerator? 0.47 L
- $V_2 = \frac{0.5L}{295K} \times 277K$
- 2) A man heats a balloon in the oven. If the balloon initially has a volume of 0.4 liters and a temperature of 20 °C, what will the volume of the balloon be after he heats it to a temperature of 250° C? 0.71 L
- $0.4 \times \frac{293K}{293K} \times 523K =$
- 3) On hot days, you may have noticed that potato chip bags seem to "inflate", even though they have not been opened. If I have a 250 mL bag at a temperature of 19 °C, and I leave it in my car which has a temperature of 60° C, what will the new volume of the bag be? 285 mL
- 4) A soda bottle is flexible enough that the volume of the bottle can change even without opening it. If you have an empty soda bottle (volume of 2 L) at room temperature (25 °C), what will the new volume be if you put it in your freezer (-4 °C)? 1.81 L
- 5) Some students believe that teachers are full of hot air. If I inhale 2.2 liters of gas at a temperature of 18° C and it heats to a temperature of 38° C in my lungs, what is the new volume of the gas? 2.35 L
- 6) How hot will a 2.3 L balloon have to get to expand to a volume of 400 L? Assume that the initial temperature of the balloon is 25 °C. 51,800 K
- $\frac{2.3L}{293K} = \frac{400L}{T_2} \quad T_2 = \frac{400L \times 293K}{2.3L} =$
- 7) I have made a thermometer which measures temperature by the compressing and expanding of gas in a piston. I have measured that at 100° C the volume of the piston is 20 L. What is the temperature outside if the piston has a volume of 15 L? What would be appropriate clothing for the weather? **The temperature is 298.5 K, which corresponds to 0.5° C. A jacket would be appropriate clothing for this weather.**

20°C = 293K  
250°C = 523K

25°C = 298K

$$T_2 = V_2 \times T_1 / V_1$$