



Name _____ Class _____ Date _____

AFTER THIS WORKSHEET YOU CAN

- ✓ Understand: Boyle's Law ✓ Understand: Charles's Law ✓ Understand: Gay-Lussac's Law
✓ Understand: The Combined Gas Law

Section A · Concept Check • BEGINNER $4 \times 1 = 4$ _____

- 1 A gas has volume 8L at pressure 2 atm. Find volume at 4 atm (Boyle's Law).

- 2 A gas has volume 5L at 250K. Find volume at 500K (Charles's Law).

- 3 A gas has pressure 2 atm at 300K. Find its pressure at 600K (Gay-Lussac's Law, constant volume).

- 4 A gas has $P_1=2\text{atm}$, $V_1=6\text{L}$, $T_1=300\text{K}$. Find P_2 if $V_2=3\text{L}$ and $T_2=600\text{K}$.

Section B · Problem Solving • INTERMEDIATE $4 \times 3 = 12$ _____

- 5 Why does a sealed bag of chips appear to puff up at high altitude?

- 6 Why does a balloon shrink when placed in a freezer?

- 7 Find n if a gas has $P=1\text{atm}$ ($\approx 101325\text{ Pa}$), $V=0.0224\text{ m}^3$, $T=273\text{K}$ ($R=8.314$).

- 8 Why does a car tire's pressure increase after driving for a while (constant volume)?

Section C · Challenge • CHALLENGE $2 \times 2 = 4$ _____

- 9 What must stay constant to apply Boyle's Law directly?

- 10 What must stay constant to apply Charles's Law directly?

Reflection — the most useful thing I learned: _____

8< ANSWER KEY – FOLD OR CUT BEFORE HANDING OUT

1 = $16=4*V_2$, $V_2=4L$ 2 = $5/250=V_2/500$, $V_2=10L$ 3 = $2/300=P_2/600$, $P_2=4atm$ 4 = $(2*6)/300=(P_2*3)/600$,
 $0.04=P_2/200$, $P_2=8atm$ | 5 = Lower outside atmospheric pressure allows the gas inside the bag to
expand (Boyle's Law), since the bag's internal pressure is now higher relative to the surroundings
6 = Lower temperature reduces the gas's volume at constant pressure (Charles's Law) 7 =
 $n=PV/RT=101325*0.0224/(8.314*273)\approx 1 \text{ mol}$ 8 = Friction heats the tire, raising the gas temperature,
which increases pressure at constant volume (Gay-Lussac's Law) | 9 = Temperature (and amount of
gas) 10 = Pressure (and amount of gas)