Name: $\qquad$ Date: $\qquad$
Chemistry $\sim$ Ms. Hart Class: Anions or Cations

### 8.10 Boyles's Gas: Affect of Pressure on Volume of a Gas

Example 1: A sample of gas in a syringe has a volume of 9.66 mL at a pressure of 64.4 kPa . The plunger is depressed until the pressure is 94.6 kPa . What is the new volume?

G- Step 1. Write the given (include units!)?
$\square$
U- Step 2. What is our unknown (include units!)? $\square$
E-Step 3. What equation gives us the relationship between pressure and volume?

S-Step 4: Substitute! $\square$

## S- Step 5: SOLVE

Example 2: A gas in a rigid cylinder with a movable piston has a volume of 145 mL and a pressure of 125 kPa . Then the gas is compressed to a volume of $80 . \mathrm{mL}$. What is the new pressure of the gas?

G- Step 1. Write the given (include units!)?

U- Step 2. What is our unknown (include units!)?


E-Step 3. What equation gives us the relationship between pressure and volume?

S-Step 4: Substitute! $\square$

## In-class Practice:

Directions: Answer the following questions based on your knowledge of chemistry.

1. Nitrous oxide $\left(\mathrm{N}_{2} \mathrm{O}\right)$ is used as an anesthetic. The pressure on 2.50 L of $\mathrm{N}_{2} \mathrm{O}$ changes from 105 kPa to 40.5 kPa . What will the new volume be? [hint: units for volume can be L or mL- it doesn't change anything!]
2. The gas volume in the cylinder in 6.2 milliliters and its pressure is 1.4 atmospheres (atm). The piston is then pushed in until the gas volume is 3.1 milliliters while the temperature remains constant. Calculate the pressure, in atmospheres, after the change in volume. [hint: it doesn't matter if the units for pressure are atm or kPa- you do the problem the same way!]
3. A gas with a volume of 4.00 L at a pressure of 205 kPa is allowed to expand to a volume of 12.0 L . What is the pressure in the container if the temperature remains constant?
4. As the pressure of a gas at 150 kPa is changed to 100 kPa at constant temperature, the volume of the gas
(1) decreases
(2) increases
(3) remains the same
5. The pressure on a 200-milliliter sample of $\mathrm{CO} 2(\mathrm{~g})$ at constant temperature is increased from 60 kPa to 120 kPa . What is the new volume of the gas? (show all work!)
(1) 100 mL
(2) 300 mL
(3) 400 mL
(4) 600 mL
6. A gas sample has a volume of 25.0 milliliters at a pressure of 1.00 atmosphere. If the volume increases to 50.0 milliliters and the temperature remains constant, the new pressure will be
(1) 1.0 atm
(2) 2.00 atm
(3) 0.250 atm
(4) 0.500 atm
7. The pressure on 20 milliliters of a gas at constant temperature is changed from 4 atmospheres to 2 atmospheres. The new volume of the gas is
(1) 5 ml
(2) 10 ml
(3) 40 ml
(4) 80 ml
8. A sample of a gas has a volume of 40 . milliliters at 76.0 kPa . What will be the new volume of the gas if the pressure is increased to 80.0 kPa , temperature remaining constant?
(1) 80 ml
(2) 42 ml
(3) 38 ml
(4) 20 ml
9. As the volume of a 1-mole sample of gas increases, with temperature remaining constant, the pressure exerted by the gas
(1) decreases
(2) increases
(3) remains the same
10. If the pressure on 36.0 milliliters of a gas at STP is changed to a pressure of 25.3 kPa at constant temperature, the new volume of the gas is
(1) 9.00 ml
(2) 126 ml
(3) 144 ml
(4) 226 ml
11. A gas occupies 1.56 L at 1.00 atm . What will be the volume of this gas if the pressure become 3.00 atm?

Review (let's not forget the rest of the Unit! Test on TUESDAY)
12. An unsaturated solution is formed when 80 . grams of a salt is dissolved in 100 . grams of water at $40 .{ }^{\circ} \mathrm{C}$. This salt could be
(1) KCl
(2) $\mathrm{KNO}_{3}$
(3) NaCl
(4) $\mathrm{NaNO}_{3}$
13. Which compound is insoluble in water?
(1) calcium bromide
(2) potassium bromide
(3) silver bromide
(4) sodium bromide
14. What is the molarity of 1.5 liters of an aqueous solution that contains 52 grams of lithium fluoride, LiF, (gram-formula mass $=26$ grams $/ \mathrm{mole}$ )?
(1) 1.3 M
(2) 2.0 M
(3) 3.0 M
(4) 0.75 M
15. Which unit can be used to express solution concentration?
(1) $\mathrm{J} / \mathrm{mol}$
(2) $\mathrm{L} / \mathrm{mol}$
(3) $\mathrm{mol} / \mathrm{L}$
(4) $\mathrm{mol} / \mathrm{s}$
16. A 2400.-gram sample of an aqueous solution contains 0.012 gram of $\mathrm{NH}_{3}$. What is the concentration of $\mathrm{NH}_{3}$ in the solution, expressed as parts per million?
(1) 5.0 ppm
(2) 15 ppm
(3) $20 . \mathrm{ppm}$
(4) $50 . \mathrm{ppm}$

