AP Chemistry Daily Videos

3.4 Ideal Gas Law

Daily Video #1

1. What are the different variables used in the Ideal Gas Law?

2. What is the relationship between volume and pressure?

3. Sketch a graph that represents this relationship.

4. What is the relationship between number of moles and pressure?

5. Sketch a graph that represents this relationship.

6. What is the relationship between temperature and pressure?

7. Sketch a graph that represents this relationship.

8. Combining all of these relationships together we get the ideal gas law. What is the Ideal Gas Law?

9. What is R? What is the value of R?

10. Pause the video at 11:00, 11:43, and 12:38 and attempt the problem, then evaluate how you did and identify any errors.

Below, specific changes in one or more variables of a gas will be given; predict the effects on the other variables – try doing this without a calculator!

1. A gas in a rigid container has a pressure of 6.0 atm. The container is opened until the pressure is reduced to 3.0 atm, and then closed again.

2. A balloon is filled with hot air, and then taken outside on a cold day. The volume of the balloon is decreased by one-sixth of its original volume.

3. Gas in a movable piston is compressed from an initial volume of 12 L to 6 L, and the temperature is increased from 400 K to 800 K.

Daily Video #2

1. What is partial pressure?

11. What is Dalton's Law of partial pressures?

12. Define mole fraction

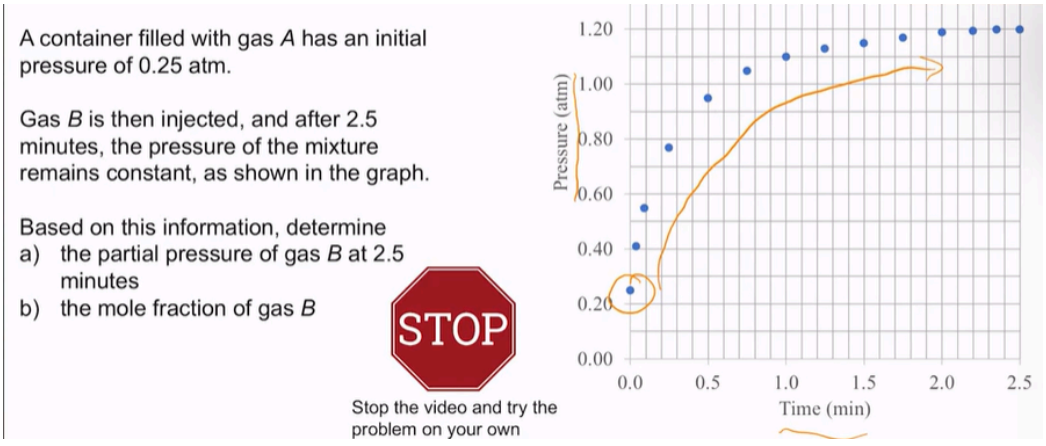
13. What is the relationship between partial pressure and mole fraction?

14. Pause the video at 7:04 and attempt the problem, then evaluate how you did and identify any errors.

A container filled with gas *A* has an initial pressure of 0.25 atm.

Gas *B* is then injected, and after 2.5 minutes, the pressure of the mixture remains constant, as shown in the graph.

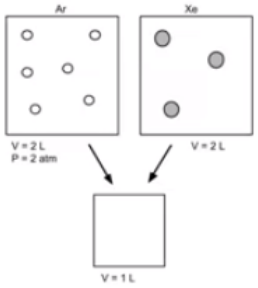
Based on this information, determine
a) the partial pressure of gas *B* at 2.5 minutes
b) the mole fraction of gas *B*



Daily Video #3

1. Pause the video at 1:23 and attempt the problem, then evaluate how you did and identify any errors.

The figures below represent two sealed containers each with the same volume of 2 L. The pressure of the Ar container is 2 atm. The contents of both containers are transferred to a 1 L container at the same temperature. The total pressure in the new container will be closest to:



(A) 1.5 atm

(B) 2 atm

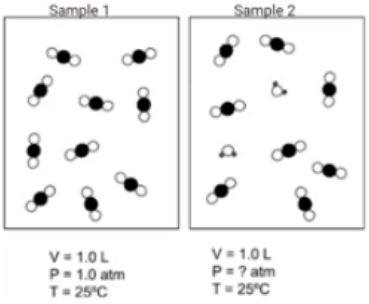
(C) 3 atm

(D) 6 atm

Stop the video and try the problem on your own

2. Pause the video at 4:36 and attempt the problem, then evaluate how you did and identify any errors

The figures below represent two identical sealed containers both at 298 K. The container on the left contains only carbon dioxide (MW 44 g/mol). The sample on the right also contains CO_2 but it is contaminated with a few water molecules. Both samples of gases behave ideally. The pressure in sample 2 is most likely?



(A) less than 1 atm

(B) 1 atm

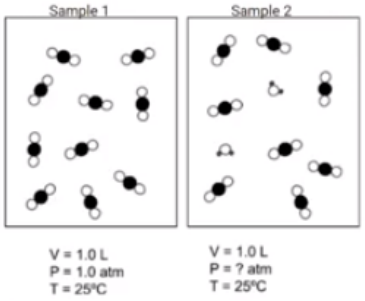
(C) more than 1 atm

(D) Cannot be determined with information given

Stop the video and try the problem on your own

3. Pause the video at 6:25 and attempt the problem, then evaluate how you did and identify any errors

The figures below represent two identical sealed containers both at 298 K. The container on the left contains only carbon dioxide (MW 44 g/mol). The sample on the right also contains CO_2 but it is contaminated with a few water molecules. Both samples of gases behave ideally. Which sample has the greater density?



(A) Sample 1

(B) Sample 2

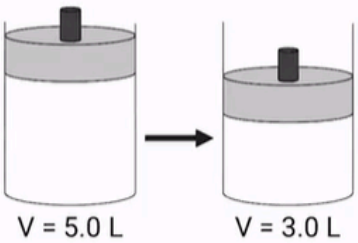
(C) Their densities are equal

(D) Cannot be determined with information given

Stop the video and try the problem on your own

4. Pause the video at 98:34 and attempt the problem, then evaluate how you did and identify any errors

A gas is contained in a cylinder with a moveable piston. The initial volume of the gas is 5.0 L at a pressure, P_1. The piston is compressed to a new volume of 3.0 L and a new pressure, P_2. The temperature is held constant. What effect does this change have on the average kinetic energy of the particles?



(A) The average kinetic energy increases

(B) The average kinetic energy decreases

(C) The average kinetic energy remains the same.

(D) The average kinetic energy cannot be determined without pressure values