Pressure at sea level and 0°C:

1 atm = 760 mm Hg = 760 torr = 101.3 kPa

1. What is the definition of pressure? What two properties can we change to change pressure?
   Pressure is a force divided by area. Pressure can be changed by changing total force or by changing area by changing the volume of the container.

2. What causes pressure in a container of a gas?
   Gas pressure is caused by collisions of gas particles with the wall of the container.

3. What causes atmospheric pressure?
   Atmospheric pressure is caused by the weight of the atmosphere.

4. Describe the forces that held the hemispheres or the "suction" cups together. Be sure to contrast what is inside and outside the containers.
   When the hemispheres are evacuated or the "suction" cups squeezed, there is nothing inside them, so there is no force pushing outward. However, the outside atmospheric force is still present, pushing inward.

5. What is the device used to measure atmospheric pressure? What must be true about the weight of the liquid inside the device? Why does the height of the liquid not depend on the diameter of the tube?
   A barometer measures atmospheric pressure. The weight of the liquid inside the barometer must equal the weight of the atmosphere that would be in an equal diameter tube. The height does not depend on the diameter because the pressure is per unit area, so as area increases force increases but pressure stays the same.

6. What is the device used to measure pressure in a laboratory container?
   A manometer measures pressure in a laboratory container.

7. The air pressure for a certain tire is 109 kPa. What is this pressure in atmospheres (atm)?

$$? \text{ atm} = 109 \text{ kPa } \times \frac{1 \text{ atm}}{101.3 \text{ kPa}} = \boxed{1.08 \text{ atm}}$$

8. The air pressure inside a submarine it 0.62 atm. What would be the height of a column of Hg supported by this pressure?

$$? \text{ mm Hg} = 0.62 \text{ atm} \times \frac{760 \text{ mm Hg}}{1 \text{ atm}} = \boxed{471 \text{ mm Hg}}$$

9. An experiment is performed at an atmospheric pressure of 758.5 mm Hg. What is the pressure in atm?

$$? \text{ atm} = 758.5 \text{ mm Hg} \times \frac{1 \text{ atm}}{760 \text{ mm Hg}} = \boxed{0.998 \text{ atm}}$$

10. A bag of potato chips is sealed in a factory near sea level at a pressure of 761.3 mm Hg. What is the pressure inside the bag in kPa?

$$? \text{ kPa} = 761.3 \text{ mm Hg} \times \frac{101.3 \text{ kPa}}{760 \text{ mm Hg}} = \boxed{101.5 \text{ kPa}}$$

11. A mixture of neon and argon gases exerts a total pressure of 2.39 atm. The partial pressure of the neon alone is 1.84 atm, what is the partial pressure of the argon?
$P_{Total} = 2.39 \text{ atm} = 1.84 \text{ atm} + P_{Ar}; P_{Ar} = 2.39 \text{ atm} - 1.84 \text{ atm} = 0.55 \text{ atm}$

12. What is the total pressure of a mixture of gases made up of CO_2, O_2 and H_2 if the partial pressures are 22.3 kPa, 44.7 kPa and 112 kPa respectively?
$P_{Total} = 22.3 \text{ kPa} + 44.7 \text{ kPa} + 112 \text{ kPa} = 179 \text{ kPa}$

13. Find the partial pressure of carbon dioxide in a gas mixture with a total pressure of 30.4 kPa if the partial pressures of the other two gases in the mixture are 16.5 kPa and 3.7 kPa.
$P_{CO_2} = 30.4 \text{ kPa} - (16.5 \text{ kPa} + 3.7 \text{ kPa}) = 10.2 \text{ kPa}$

14. Explain how changes in atmospheric pressure affect the height of the column of mercury in a barometer.
An increase in atmospheric pressure increases the pressure on the surface of mercury and the column rises; a decrease in atmospheric pressure decreases the pressure on the surface of the mercury and the column drops.