

Answer the following questions on a separate sheet of paper.

1. What do scientists believe were the main components of our atmosphere before there was life on earth?
2. Briefly describe what caused the changes in the composition of our atmosphere.
3. List the main gases that comprise our atmosphere and give their relative abundances.
4. For the following gases in our atmosphere, state their importance and how their deposited.
 - a. Nitrogen
 - b. Oxygen
 - c. Carbon dioxide
5. How has the carbon dioxide content of our atmosphere changed over the last hundred years or so? What are the causes of this change? How has this change affected global temperatures?
6. What are some of the effects of a rise in average global temperatures?
7. State the major historical contributions (with respect to gases) of the following scientists:

- Galileo	- Torriceli	- Von Guericke	- Pascal
- Huygens	- Dalton	- Gay-Lussac	- Avogadro
8. Define pressure.
9. Define standard pressure, and give its value in atm, kPa, bar, mbar, mmHg.
10. Why could Galileo's pump only raise a column of water about 32 feet?
11. Compare and contrast manometers and barometers.
12. Compare and contrast mercury and aneroid barometers.
13. Give 3 examples of how we feel pressure.
14. Explain why divers will feel more pressure when diving in salt water rather than fresh water.

15. State the *relationship* (as a proportionality) that each of the following scientists developed, then show how their laws were derived:
- Robert Boyle - Jaques Charles - Joseph Gay-Lussac
16. What is absolute zero? How was its value determined?
17. Show how the three gas laws can be combined into one formula.
18. Convert the following to either °C or Kelvin:
- | | |
|--------------|------------|
| a. - 32.3 °C | b. 400 K |
| c. 98.4 °C | d. 231.3 K |
19. Convert the following pressures into the other 4 units we have learned. (units: atm, mmHg, bar, mbar, kPa)
- | | |
|-------------|-------------|
| a. 521 mmHg | b. 87.3 kPa |
| c. 2.3 bar | d. 1.4 atm |
20. You are wearing scuba gear and swimming under water at a depth of 66.0 ft. You are breathing air at 3.00 atm and your lung volume is 10.0 L. Your scuba gauge indicates that your air supply is low so, to conserve air, you make a terrible and fatal mistake: you hold your breath while you surface. What happens to your lungs? Why?
21. 300 mL of O₂ are collected at a pressure of 645 mm of mercury. What volume will this gas have at one atmosphere pressure?
22. A container of oxygen has a volume of 30.0 mL and a pressure of 4.00 atm. If the pressure of the oxygen gas is changed to 202.6 kPa and the temperature is kept constant, what is the new volume of the oxygen gas?
23. If 540.0 mL of nitrogen at 0.00 °C is heated to a temperature of 100.0 °C what will be the new volume of the gas?
24. A balloon has a volume of 2500.0 mL on a day when the temperature is 30.0 °C. If the temperature at night falls to 10.0 °C, what will be the volume of the balloon if the pressure remains constant?
25. If 15.0 liters of neon at 25.0 °C is allowed to expand to 45.0 liters, what must the new temperature be to maintain constant pressure?
26. A sample of gas at 3.00×10^3 mm Hg inside a steel tank is cooled from 500.0 °C to 0.00 °C. What is the final pressure of the gas in the steel tank?
27. The temperature of a sample of gas in a steel container at 30.0 kPa is increased from - 100.0 °C to 1.00×10^3 °C. What is the final pressure inside the tank?