**Circle the correct words**

1. Pressure and volume are (directly/inversely) related, when you increase one the other must (increase/decrease).

2. Pressure and temperature are (directly/inversely) related, when you increase one the other must (increase/decrease).

3. Volume and temperature are (directly/inversely) related, when you increase one the other must (increase/decrease).

**Answer the following questions**

4. What happens when you place a balloon in a vacuum pump? Why?

5. What happens when you take an aluminum can with boiling water and submerge it into ice water? Why?

6. What happens if you get a balloon really really cold? Why?

**Solve the following problems. Show all work and units.**

7. A 10.5 mL sample of gas is taken at room temperature (25oC), what will the new volume be if the sample is heated to 400oC?

8. A fun game for the summer is to dive into a swimming pool with a balloon and see how far under water you can go. In Utah, the atmospheric pressure is usually around 30.1 inches of Hg. If you take a 2 L balloon and dive 10 feet underwater where the new pressure is 40.5 inches of Hg, what will the new volume be?

9. A water heater will explode and turn into a rocket at pressures over 300 psi. If the water comes into your home at 75 psi and 25 oC, how hot do you have to get the temperature (in oC) before you run the risk of creating a rocket in your basement?

10. Kids often wonder what happens to their Helium balloons when they let them go flying into the atmosphere. They don’t actually go into space, but pop when the conditions are right. High in the atmosphere temperature and pressure drop drastically. If a balloon filled with 0.1 moles of gas can only expand to 4 Liters before popping, and the temperature is down to -32 oC, what pressure will the balloon pop at?

11. Diborane (B2H6) is a highly toxic gas. If I take 56 g of diborane and release into a closed 90 kPa, 26 oC room, how many liters of deadly gas will I produce?

12. Nitrous oxide (N2O) is made industrially be combining nitrogen gas with oxygen gas. How many liters of nitrous oxide can be produced from 10.2 liters of oxygen at 2.4 atm and 101 oC?

**Circle the correct words**

1. Pressure and volume are (directly/**inversely**) related, when you increase one the other must (increase/**decrease**).

2. Pressure and temperature are (**directly**/inversely) related, when you increase one the other must (**increase**/decrease).

3. Volume and temperature are (**directly**/inversely) related, when you increase one the other must (**increase**/decrease).

**Answer the following questions**

4. What happens when you place a balloon in a vacuum pump? Why?

**It’s volume increases. A vacuum pump lowers the pressure so volume will increase**

5. What happens when you take an aluminum can with boiling water and submerge it into ice water? Why?

**It’s volume decreases. A decrease in temperature causes a decrease in volume**

6. What happens if you get a balloon really really cold? Why?

**It’s volume decreases. A decrease in temperature causes a decrease in volume**

**Solve the following problems. Show all work and units.**

7. A 10.5 mL sample of gas is taken at room temperature (25oC), what will the new volume be if the sample is heated to 400oC?

**23.7 mL**

8. A fun game for the summer is to dive into a swimming pool with a balloon and see how far under water you can go. In Utah, the atmospheric pressure is usually around 30.1 inches of Hg. If you take a 2 L balloon and dive 10 feet underwater where the new pressure is 40.5 inches of Hg, what will the new volume be?

**1.49 L**

9. A water heater will explode and turn into a rocket at pressures over 300 psi. If the water comes into your home at 75 psi and 25 oC, how hot do you have to get the temperature (in oC) before you run the risk of creating a rocket in your basement?

**919 oC**

10. Kids often wonder what happens to their Helium balloons when they let them go flying into the atmosphere. They don’t actually go into space, but pop when the conditions are right. High in the atmosphere temperature and pressure drop drastically. If a balloon filled with 0.1 moles of gas can only expand to 4 Liters before popping, and the temperature is down to -32 oC, what pressure will the balloon pop at?

**49 kPa**

11. Diborane (B2H6) is a highly toxic gas. If I take 56 g of diborane and release into a closed 90 kPa, 26 oC room, how many liters of deadly gas will I produce?

**54.0 L**

12. Nitrous oxide (N2O) is made industrially be combining nitrogen gas with oxygen gas. How many liters of nitrous oxide can be produced from 10.2 liters of oxygen at 2.4 atm and 101 oC?

**2N2 + O2 🡪 2N2O**

**20.4 L of N2O**