Passage 6 - Data on gas behaviour (chemistry)

Overall:
Experimental set-up: 3L and 6L vessel with gas inlet valve and pressure and temp sensors.
-air pumped out until pressure is 0 torr (for calibration)
-vessel is then placed on a balance, which is reset to 0g (for calibration)

-gas was then added to the vessel until the temperature in the vessel reached 22C

-**the scale of the y-axis is different in Figures 1 and 2**.

Figure 1:
- 3L vessel
-at a given mass, O2 has the highest pressure and Kr the the lowest.
-for example, at 10g added, pressure of O2 is ~1800torr; pressure of CO2 is ~1300torr; pressure of Kr is ~700 torr

Figure 2:
-6L vessel (double the volume of the first set of experiments)
-again, O2 has highest pressure and Kr lowest
-for example, at 10g added, pressure of O2 is ~900torr; pressure of CO2 is ~700torr; pressure of Kr is ~350torr.
-The pressure of a certain mass of a particular gas is higher in the 3L vessel than in the 6L vessel

Conclusion:
-As volume of the vessel <u>decreases</u>, pressure <u>increases</u>. This is an inverse relationship.
-As mass of the gas <u>increases</u>, pressure <u>increases.</u> This is a direct relationship.

Notes:
What can explain the difference in O2, CO2, and Kr? Since O2 is the smallest compound, CO2 is larger, and Kr is the largest (using the periodic table), we can say that:
-If you have the same mass of O2 and Kr, there will be MORE of the tiny O2 molecules than the larger Kr molecules.
(If that concept isn't making sense, try this: imagine you have one pound of oranges and one pound of grapes. Which one weighs more, a single orange or a single grape? In the one pound, will you have more oranges or more grapes? An orange weighs more than a grape. There are more grapes than oranges in a pound. 2-5 oranges will make a pound, whereas 50-100 grapes will. Molecules are the same - some are big and heavy; others are small and light. Their properties will be affected by this.)