Hydraulics

Hydraulics is the word given to a confined, pressurized system that uses moving liquids. They use liquid under pressure to move many things.

A hydraulic system is made up of different components. It requires the liquid to go inside the system, called the hydraulic fluid. Hydraulic systems also require pumps and valves. Pumps push the liquid through the system, often against gravity. Valves control the flow of the fluid in the system. A hydraulic system is a closed system which means that the fluid is circulated through the system and is not used up.

The heart is an example of a hydraulic system. The heart acts as the pump, the valves in the veins as well as between the chambers in the heart are the valves in the system, keeping to fluid flowing in one direction. The blood in the system is the hydraulic fluid.

Diagram 1:

Diagram 2:

Note: In both diagrams, both syringes will have equal amount of water. In diagram 1, if 10 mL of water was pushed from syringe A to syringe B; syringe B will have 10 mL of water. In diagram two, is 20 mL of water is pushed from syringe C to both syringe A and syringe B; both syringe A and syringe B will both have 10 mL of water to total up 20 mL.

Examples of hydraulic systems:

- a dentist's or a hairdresser's chair
- the Jaws of Life that are used by fire departments
- dump trucks
**Pneumatics**

Pneumatics is the name given to a confined, pressurized systems that use moving air. A pneumatic system is very similar to a hydraulic system. An air compressor provides the supply of air in the system. This compressor serves the same purpose as a pump in a hydraulic system. Your respiratory system is a pneumatic system. Your lungs act like a pump, by drawing in oxygenated air and pushing out carbon dioxide. The lungs can not do this without the diaphragm. The diaphragm is like a syringe, which pulls down and creates negative pressure. This allows the air from the outside to enter into your lungs to fill the space that has been created. When you expel, the diaphragm pushes up, which causes the pressure inside your chest to increase, which pushes the air out of your lungs.

Diagram:

Note: If 10 mL of air was pushed from syringe A to syringe B, a full 10 ML will not make it to syringe B because air is compressible.

Examples of pneumatic systems:
- a car lift or hoist
- an hydraulic jack
- automobile braking system
- air compressors
- automobile/bicycle Tires