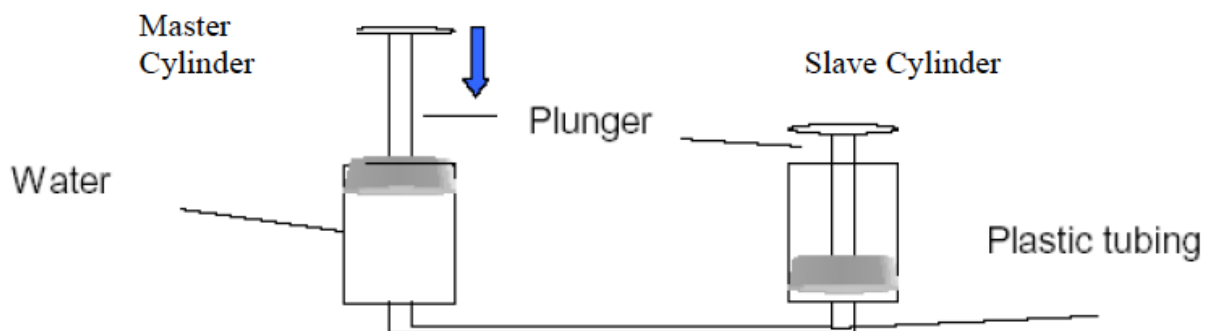


Investigating Hydraulic Systems (Student)

In this activity, you and a partner will use plastic syringes to investigate Pascal's Principle.

Group Materials

- 2 10 cc syringes
- 1 20 cc syringe
- 1 60 cc syringe
- Plastic tubing
- Water
- Ruler



http://www.bookterra.com/index.php/SA_NC_Saaste_Tech:Activities_Hydraulics_%26_Pneumatics

The “master” cylinder is the cylinder to which you apply force and the “slave” is the cylinder, which reacts to the force. In the following investigation, you will investigate the displacement of the slave caused by the displacement of the master cylinder. You can measure the **volume** difference using the scale on the cylinder (in cc's) and measure the **displacement** of the cylinder using a ruler.

First fill the system by filling the Master Cylinder. Next attach the piece of tubing and fill it with water as well. Finally, attach the Slave Cylinder to the other end of the tube. Make sure the piston of the slave is completely pushed in before connecting the tube.

Complete the following table using two 10 cc cylinders.

Table 1: Volume and Displacement Comparisons for Two 10 cc Cylinders

Volume of water displaced in master cylinder (cc)	Volume of water displaced in slave cylinder (cc)	Displacement of master cylinder (cm)	Displacement of slave cylinder (cm)
2			
4			
6			
8			

How does the displacement of the slave cylinder compare to the displacement of the master cylinder? Is this what you would expect?

Replace the slave with a 20 cc cylinder and repeat these measurements.

Table 2: Volume and Displacement Comparisons for 10 cc Master and 20 cc Slave Cylinders

Volume of water displaced in master cylinder (cc)	Volume of water displaced in slave cylinder (cc)	Displacement of master cylinder (cm)	Displacement of slave cylinder (cm)
2			
4			
6			
8			

How does the displacement of the slave cylinder compare to the displacement of the master cylinder? Is this what you would expect?

Now, replace the slave with a 60 cc cylinder.

Table 3: Volume and Displacement Comparisons for 10 cc Master and 60 cc Slave Cylinders

Volume of water displaced in master cylinder (cc)	Volume of water displaced in slave cylinder (cc)	Displacement of master cylinder (cm)	Displacement of slave cylinder (cm)
2			
4			
6			
8			

How does the displacement of the slave cylinder compare to the displacement of the master cylinder? Is this what you would expect?

Adapted from

http://sts.schools.smcdsb.on.ca/UserFiles/Servers/Server_97729/Image/St.Thomas%20Aquinas%20Catholic%20Secondary%20School/Staff%20Sites/Mr.Eagan/SPH4C/jan%201ec%20Pascals-Principle-Lab-Activity1.pdf