

## INVESTIGATION SKILLS =FORCE TRANSFER Part 2

**Remember always use new syringes which you can buy from a pharmacy.**

In this experiment, you will experience force transfer with **force multiplication** between two unequal syringes.

**You will need:**

- one 10 ml syringe
- one 20 ml syringe
- one connecting tube approximately 180 mm long.

Working in your groups, make up a syringe system as follows:

- 1 Mark the smaller syringe A and the larger syringe B.
- 2 Fill the syringe system by putting everything under water. This will prevent air bubbles in the system.
- 3 Fill syringe A with water up to the 5 ml mark. Leave syringe B at the 0 ml mark.
- 4 Connect the two syringes at the spout by fitting the tube securely between them.
- 5 Mount the syringe system on a stand as shown in **FIGURE 4**. If you do not have a stand, you may place the syringe system on your desk.
- 6 Make sure that the piston is on the 5 ml mark in syringe A.  
The piston should be on the 0 ml mark in syringe B.
- 7 Push the piston on syringe A until all the water is transferred to syringe B.
- 8 Measure how far piston A has moved.
- 9 Now measure how far the piston in syringe B has been displaced.

Compare the volume of liquid transferred to the distances the piston moved.

Copy this table into your workbook and record your findings:

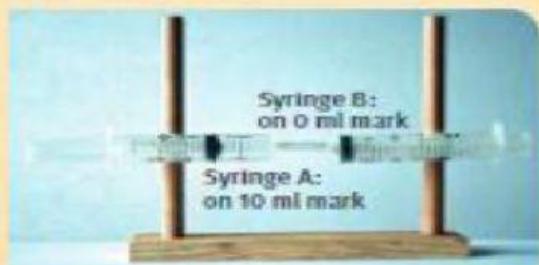


FIGURE 4

Make your own hydraulic system as shown in the photo.

Distance moved by piston A	mm
Distance moved by piston B	mm
Volume transferred by piston A	ml
Volume displaced by piston B	ml

Move the piston on syringe B back to the zero mark on the syringe. This will transfer the liquid back to syringe A, and to the 5 ml mark.

While you do this, feel the force output on piston A.

Now move the piston on syringe A from 5 ml to 0 ml. Liquid will transfer from syringe A to syringe B. Feel the force transfer from syringe A to syringe B. Compare the force transfer from syringe B to syringe A and from syringe A to syringe B.

Record your findings in your workbook: Mark your answer with ✓

Force transfer from the smaller syringe A to the bigger syringe B was:

equal

more

less

- 1 In a hydraulic system with two equal syringes, we get \_\_\_\_\_ distance and \_\_\_\_\_ force between the two syringes.
- 2 In a hydraulic system where the movement is from a small syringe to a larger syringe, the output distance is \_\_\_\_\_ and the output force is \_\_\_\_\_.
- 3 When the output force is increased by the force transfer from the input force, we call this \_\_\_\_\_.

