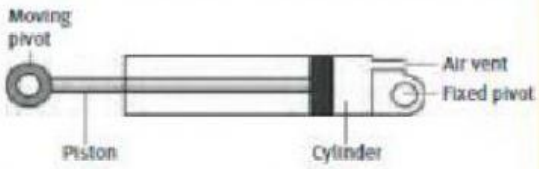
Summary

- In this term you revised syringe mechanics using two equal sized syringes linked by a tube. You observed force transfer between the syringes filled with compressed air and water – a pneumatic and a hydraulic system.
- You carried out action research and experimented with two different sized syringes; and you learned about Pascal's Principle.
- You investigated a hydraulic press and a hydraulic jack and evaluated the design. You also drew a systems diagram which described the way a hydraulic jack works.
- You continued with further investigations into pulleys, and mechanical control systems (ratchet and pawl, disc brake, bicycle brake and cleat).
- You revised spur gears and learned about bevel gears, rack-and-pinion gears and worm gears.
- You examined various items using mechanisms found in the modern kitchen and/or home, workshop/garage and drew single vanishing point perspectives.
- In the Mini-PAT you designed a mechanical, electrical, hydraulic or pneumatic solution to a problem. You designed a brief, drew a plan, made a prototype and presented your solution.

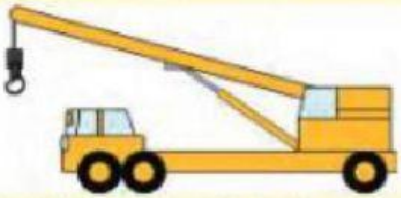
Questions

1 Explain why pneumatic energy in this design is more effective than hydraulic energy.

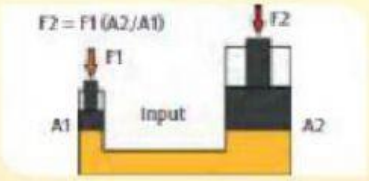


2 A picture of train doors is shown below. The doors of trains and buses work with pneumatic systems because the doors are light and have to open wide. Draw a system diagram of the two cylinders which will increase distance movement of the doors.

3 The following picture is of a heavy crane. Why is hydraulic fluid a better option than compressed air?



4 The following picture shows a hydraulic press.
If F1 is the input force which is 50 N
A1 is the diameter and is equal to 40 mm
A2 has a diameter of 120 mm
Calculate the output force at F2.



5 What are the main differences between:
- **5.1** A single wheel fixed pulley and
- **5.2** a single wheel moveable pulley?

Answers

1.

2.

3.

4.

5.

3.