



Build it!

Download the step-by-step instructions at:
scouts.org.uk/the-british-army

Make a piston engine

Learn about the principles of converting pressure into movement using tin cans



This activity will help young people learn the basic principles of how a Stirling piston engine works, by converting heat energy into mechanical energy. The heat from the candle increases the local temperature of the air in the bottom of the can. This causes the air to expand and lift the wire wool displacer. The air then travels into the balloon where it is cooled by the surrounding air. This subsequent cooling contracts the air and causes it to travel back to the bottom of the can, ready for the next cycle. The Stirling engine operates under the 'ideal gas law', where increases in air temperature result in increased pressure when in a limited space. The engine has been used for power generation, refrigeration and on submarines. It is often chosen due to its quietness. Young people will enjoy getting to grips with the principles of how it works and seeing it in action.

Suitable for Scouts

You will need

- 1.5mm diameter steel wire
- 22mm PVC pipe elbow
- 4mm bolt, nut and 2 washers (about 10mm long)
- balloon
- an old CD
- double-sided tape
- fizzy drinks can x 2
- food can
- lolly stick
- nylon twine (fishing line is acceptable)
- plastic milk bottle top
- tealight candle
- wire wool

Tools

- craft knife
- drawing pin
- drill
- lighter/matches
- sandpaper
- scissors
- tin opener

Time needed 90 minutes

Badge



The Army partners the Scout Mechanic Activity Badge

Partner

ARMY

Outcomes

With this activity, Scouts will learn the basic principles of the piston engine, a system which converts heat energy into mechanical energy. The heat from the candle powers the tin can pistons, which then convert pressure into a rotating motion, turning the crankshank, connecting rod and the disc.

More information

The Royal Electrical and Mechanical Engineers (REME) maintain and manufacture equipment to keep the British Army aircraft, tanks and weapons in working order. For more information visit: scouts.org.uk/the-british-army.

