



Challenge: Operation Big Lift

Each group will need:



Water



Object/s to lift – something light or an increasing amount of mass to lift



15 ice cream sticks



2 syringes (we use 10ml)



1 tube (3.2 or 4mm diameter)



Tape



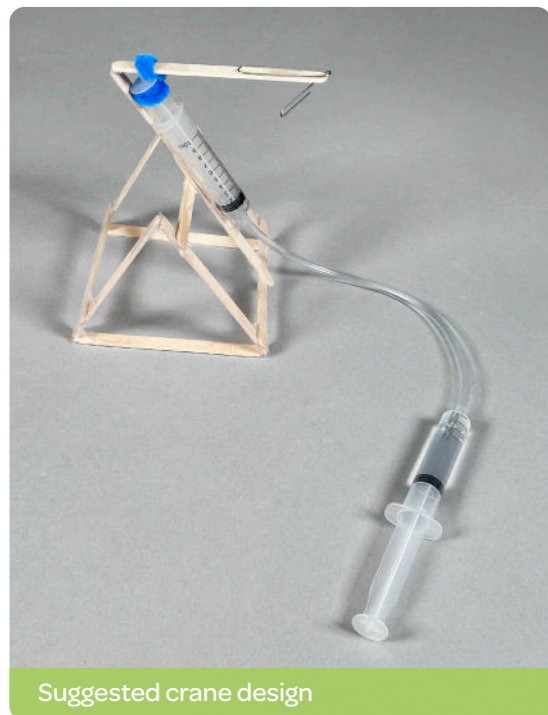
1 pipe cleaner



Teacher slides

The challenge:

1. Split class into groups and hand out equipment.
2. After they have finished their construction, gather around and test the cranes using the object you have chosen to lift.
3. You can award a winner based on:
 - Lifting ability – the heaviest object lifted
 - Design
 - Class vote



Suggested crane design



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Challenge prep:

The following are steps you might want to do for the students or allow them to work it out for themselves.

Make the hydraulic system

Ideally you do not want bubbles in your tube.

- Suck up the maximum amount of water into your syringe (11 ml).
- Insert one end of the tubing onto the syringe nozzle.
- Push the plunger down until the tubing is full of water. This should take around 1ml.
- Attach the second syringe to the other end of the tubing.

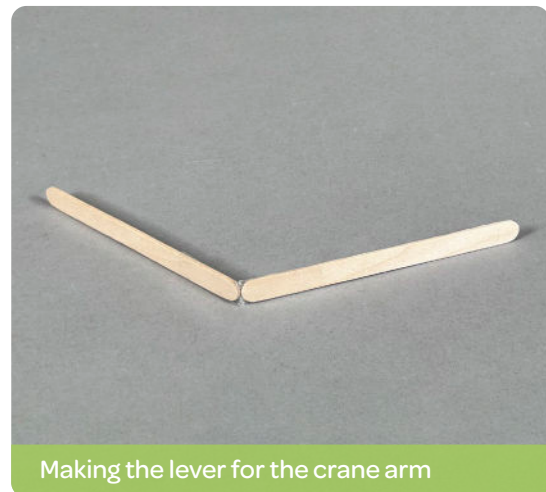
Use of the pipe cleaner and/or paper clip

To help the students you could give them the following prompts:

- Let the students know that the pipe cleaner is to be used to attach the syringe plunger to the lever
- Show them the paperclip is used as a hook at the end of the lever

Make the lever for the crane arm

- Put two ice cream sticks on top of each other .
- Add a piece of tape to one end so that they are joined together.
- Open up the lever and wrap the tape around.
- Add more tape if necessary (depending on the tape width).



Making the lever for the crane arm