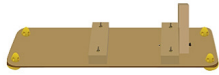
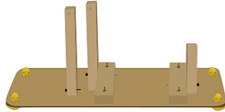


HOW TO MAKE A JCB-HYDRAULIC ARM

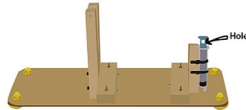
- 1 Take the wooden base on which two wooden blocks are bolted. Take the smaller given wooden stick and bolt it with the wooden block fixed towards the end of the base.



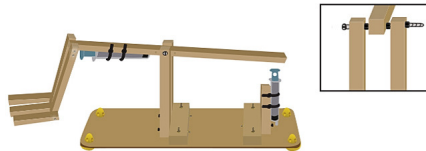
- 2 With another wooden block, fix another pair of wooden sticks using allen bolts & nuts.



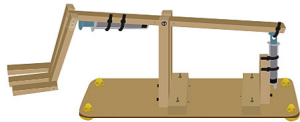
- 3 Take the syringe that has a hole on its piston and tie it vertically with the wooden stick using two tie pins.



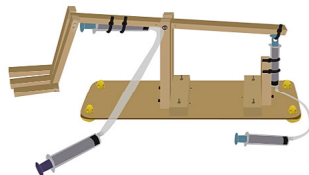
- 4 Take the structure of JCB arm & fix it in between the two vertically fixed wooden sticks. Use golden chisel bolt and nut for the same purpose.



- 5 Take one tie pin, pass it through the hole made on the syringe's piston and tie it with the wooden stick.



- 6 Connect smaller syringe using thin connecting pipe. Connect bigger syringe fixed on the arm using thick connecting pipe.



Working:- Take out the syringes fixed in step 6 and fill them half with water. Reconnect with pipe and move the JCB arm using the power of moving water.



Future STEM Explorers

JCB Hydraulic Arm



Learning Outcomes:

Students will be able to

- Know about JCB hydraulic arm and its application in the real world
- Discuss the concept of lever as simple machine and how does it helps in lifting up things
- Understand the working of hydraulics in an easy manner
- Explain how to apply pressure on an incompressible liquid.

Introduction

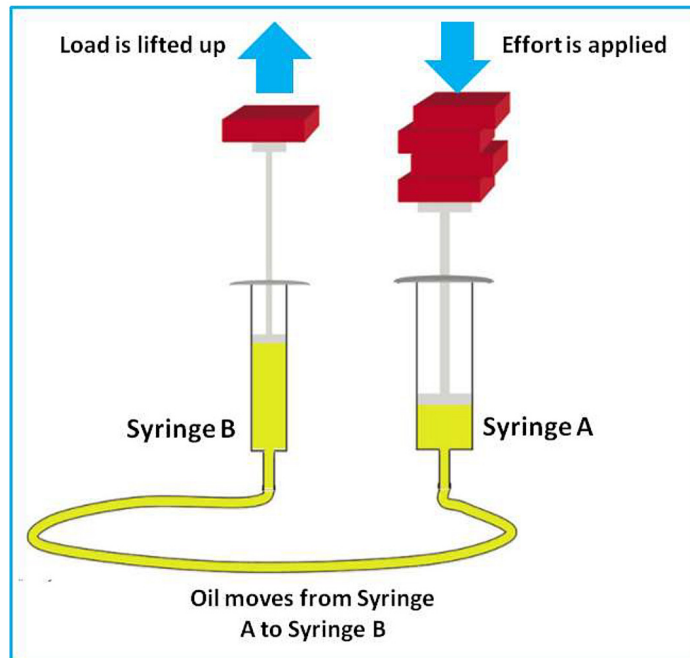
JC Bamford Excavators limited, universally known as JCB is a British multinational corporation that manufactures equipments for construction, agriculture, waste handling and demolition. It is the world's third largest construction equipment manufacturer.

It was founded in 1945 by Joseph Cyril Bamford after whom it is named.

Hydraulics-

As stated above, the JCB hydraulic arm works on the principle of hydraulics. The basic idea behind any hydraulic system is very simple - **Force that is applied at one point is transmitted to another point using an incompressible fluid.**

As shown in the picture given below, effort is applied from **Syringe A** and load kept on **Syringe B** is lifted up. The force applied on **Syringe A** travels through the liquid filled in the syringe system and pushes the piston of **Syringe B**.



Such a power of moving liquids is known as **hydraulics**. The power of hydraulics is used in many machines like- car jack, cranes and press machines.

Quiz Time

1. Write down some of the uses of hydraulic arm.

2. The model you made works on the principle of hydraulic system. But what would happen if sand is filled in the syringes? Will it still work like it worked using hydraulic system?

3. The model of hydraulic arm is based on the structure of a lever. What do you think can be the reason behind that.