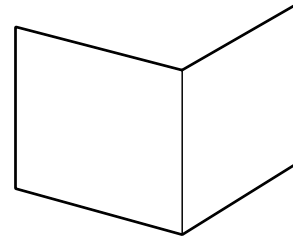


Make a model shaduf

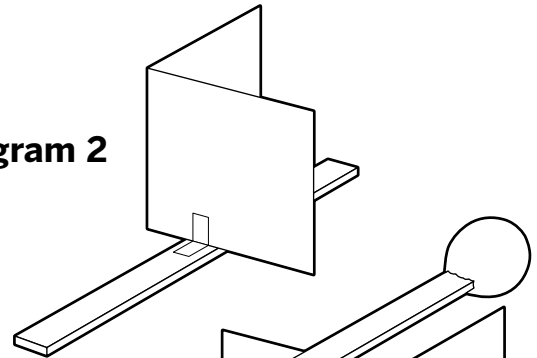
1. Take a piece of cardboard and bend it as shown in diagram 1.
2. Place the middle of a wooden ruler under the cardboard and use sticky paper to keep it in place as diagram 2 shows.

Diagram 1



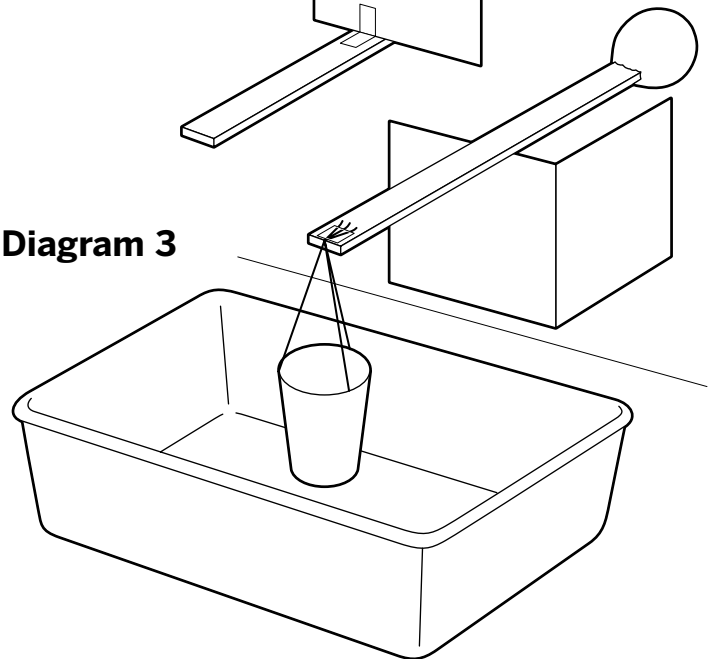
3. Turn the cardboard over so that the ruler has become like a see-saw.
4. Take three pieces of string about 10 cm long and attach them to the sides of a small plastic cup or beaker as shown in diagram 3.

Diagram 2



5. Take the other ends of the three strings and tie them in a simple knot, then stick the knot to the end of the ruler with sticky tape.

Diagram 3



6. Make a ball of Plasticine about 5 cm in diameter and stick it on the other end of the ruler. You have now made a model shaduf.

7. Set up the shaduf by an empty sink or bowl as diagram 3 shows.

8. Take the Plasticine ball off the end of the ruler and fill the cup with water from a jug.

9. Hold the ruler on the card for support and press on the ruler at the place marked **x** on the diagram. Feel how hard you have to push to raise the cup of water.

10. Place the ball of Plasticine on the end of the ruler and repeat step 9. What do you find?



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Make a model shaduf

Age range

- Years 3/4 (SP4/5).
- Years 5/6 (SP6/7).

Resources

Copies of the worksheet. A picture of a shaduf, a piece of strong cardboard about 26 cm long by 12 cm wide, a wooden ruler, sticky paper, a small plastic cup or beaker, three pieces of string 10 cm long, a ball of Plasticine 5 cm in diameter, jug of water.

Using the worksheet

You may wish to begin by saying that the Egyptians needed to supply water to their crops growing along the sides of the Nile. They built channels to carry water through the fields but they needed a way of moving the water from the river to the channels. Tell the students that the Egyptians invented the shaduf to help them and show the students a picture of one. Ask the students how they think the weight helped the man who used the shaduf to lift water out of the river. Tell the students that they are going to make a model shaduf to help them find out. They should find that the weight helps to reduce the force needed to raise the water and this in turn reduces the energy needed by the man to lift the water out of the river and put it in the channel.

Younger students

You may wish to have a team of teacher helpers in class for this activity. The students may need help in holding the ruler in place on the cardboard when the model is ready to lift water.

Outcomes

The students can:

- Follow instructions and interpret diagrams.
- Use materials and simple equipment safely.
- Use a working model to test their ideas.

Older students

The students can work in pairs. Some students may like to make a larger model using wood after they have made the small model. They could attach a hook on the underside of the place marked with an **x** and attach a force meter to it to measure the lifting force with and without a weight.

Outcomes

The students can:

- Follow instructions and interpret diagrams.
- Use materials and simple equipment safely.
- Use a working model to test their ideas.