SCIENCE ★ TECHNOLOGY ★ ENGINEERING ★ MATH

PRESENTED BY: girlstart

Egyptian Shaduf

Explore irrigation engineering of the past as you construct a shaduf. Learn how simple machines like levers help us complete difficult tasks!

TEKS:

SCI 3/4/5.3 C: The student is expected to connect grade-level appropriate science concepts with the history of science, science careers, and contributions of scientists

SCI 4/5.6 D: The student is expected to design a descriptive investigation to explore the effect of force on an object such as a push or a pull, gravity, friction, or magnetism.

Materials:

- Bowl or bin
- 2 chopsticks or wooden dowels
- 8 craft sticks
- Masking tape
- Scissors
- Small paper or plastic cup
- Stick of clay
- String
- Water

How To:

1. Cross two craft sticks into the shape of an "X" so that approximately one inch of each stick makes up the top part of the "X." Secure the X with tape.

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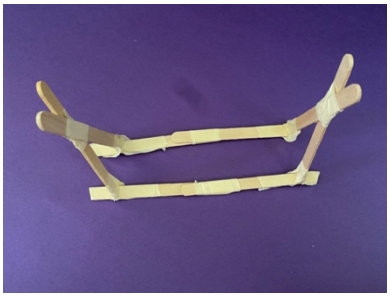
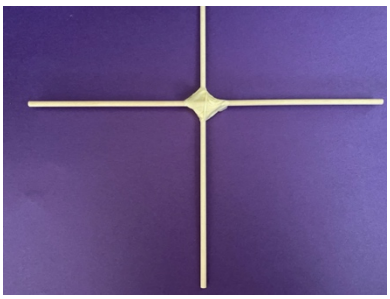
2. Repeat step 1 with two other craft sticks. These two X's represent the sides of your Shaduf.
3. Create the base of the Shaduf with the remaining four craft sticks. Place one craft stick underneath each end of the upright X's and secure with tape. It should look like the X's are wearing skis!

4. Connect the bases with tape, as shown in the photo below.



5. Cross the two chopsticks or dowels so they are perpendicular to each other and secure with tape.



6. Roll the stick of clay into a ball. Tie a piece of string around the clay and use the string to attach the clay to one end of one chopstick. This will act as the shaduf's counterweight.

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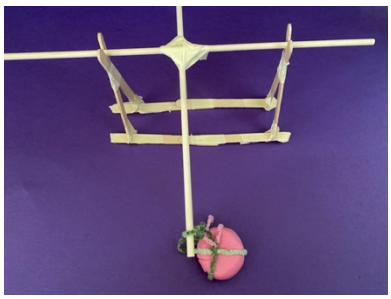
7. Balance the crossed chopsticks on top of the craft stick X's.



8. Use string and tape to attach the small paper cup to the opposite end of the chopstick as the clay counterweight.

9. Your shaduf is ready for testing! Fill a bin or bowl with water and see if you can use the cup and counterweight to scoop water out of the bin.

STEM Explanation:

Shadufs were created long ago to help people lift water out of a lake or river to irrigate their land. In India, Egypt, and other countries, they still use shadufs today. Shadufs are a type of simple machine called a lever. Levers help us lift heavy objects, or loads, and are made up of a rigid object that pivots on a fulcrum. The load of the shaduf is the cup filled with water and the fulcrum is the point where the two chopsticks overlap. The clay counterweight provides the force needed to make the lever lift the load of water!

Career Connection:

Irrigation engineers plan and design irrigation systems that distribute water to land used for agriculture. These irrigation systems can be canals, drains, dams, sprinklers, and more. Irrigation engineers are responsible for creating systems that improve water and soil conservation while also taking into consideration what system would be the best for the land.

Resources:

https://en.wikipedia.org/wiki/Shadoof
http://www.britannica.com/technology/shaduf

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