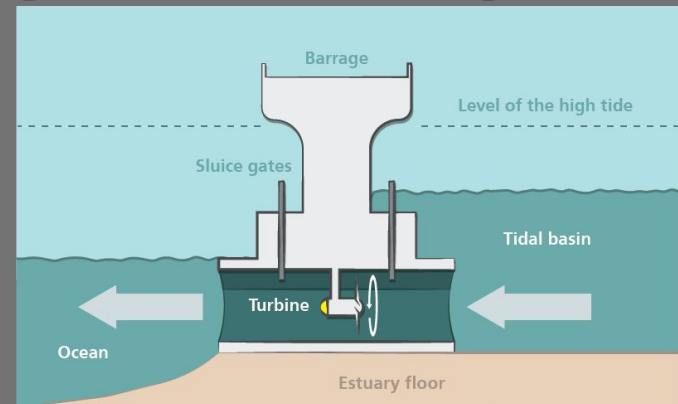


Tidal Power



Question



How does the different size and shape of the blade on the tidal power fan affect how high it can carry two pennies by rolling up a string that is attached to a skewer that is attached to the wheel. I am changing the shape of the fan blades and measuring how high up the fan can carry the two pennies.

Changed (Manipulated) Variable: The fans

Measured Variable: How high the fan carries the weight

Prediction

I predict that the tidal power fan with the wider fan blades will carry up the two pennies higher than the tidal power fan with the narrower fan blades because the wider fan blades have a bigger surface area, meaning that more water will be able to land on it pushing the fan blades down and bringing the weight up faster than the narrower fan blades.



Materials

- 1 desk
- 4 plastic spoons
- 1 empty plastic orange juice bottle
- 1 wooden skewer
- 2 corks
- 1 hot glue and a hot glue gun
- 2 wooden planks
- 2 feet of string
- 2 pennies
- 1 1' ruler
- 6 quarts of water
- 1 two inches of tape
- 1 drill



Procedure

Step 1. Place two 1.5"x3.5"x 10" wooden planks standing upwards on top of the desk parallel to each other.

Step 2. With adult supervision, drill out one hole in each plank 1.5" from the top, and it is in the center. The hole is .5" wide.

Step 3. Take a cork and four spoons. Have an adult cut four spoons three inches long. With adult supervision, hot glue them evenly onto the cork.

Step 4. Take another cork and an empty orange juice bottle. Cut out four 2"x .75" rectangles from an empty orange juice bottle and have an adult carefully hot glue them evenly onto the cork. **Step 5.** Take the cork with the spoon on it and carefully stick the skewer through the cork and center it. Place the end of the skewers through the holes in the wooden planks.

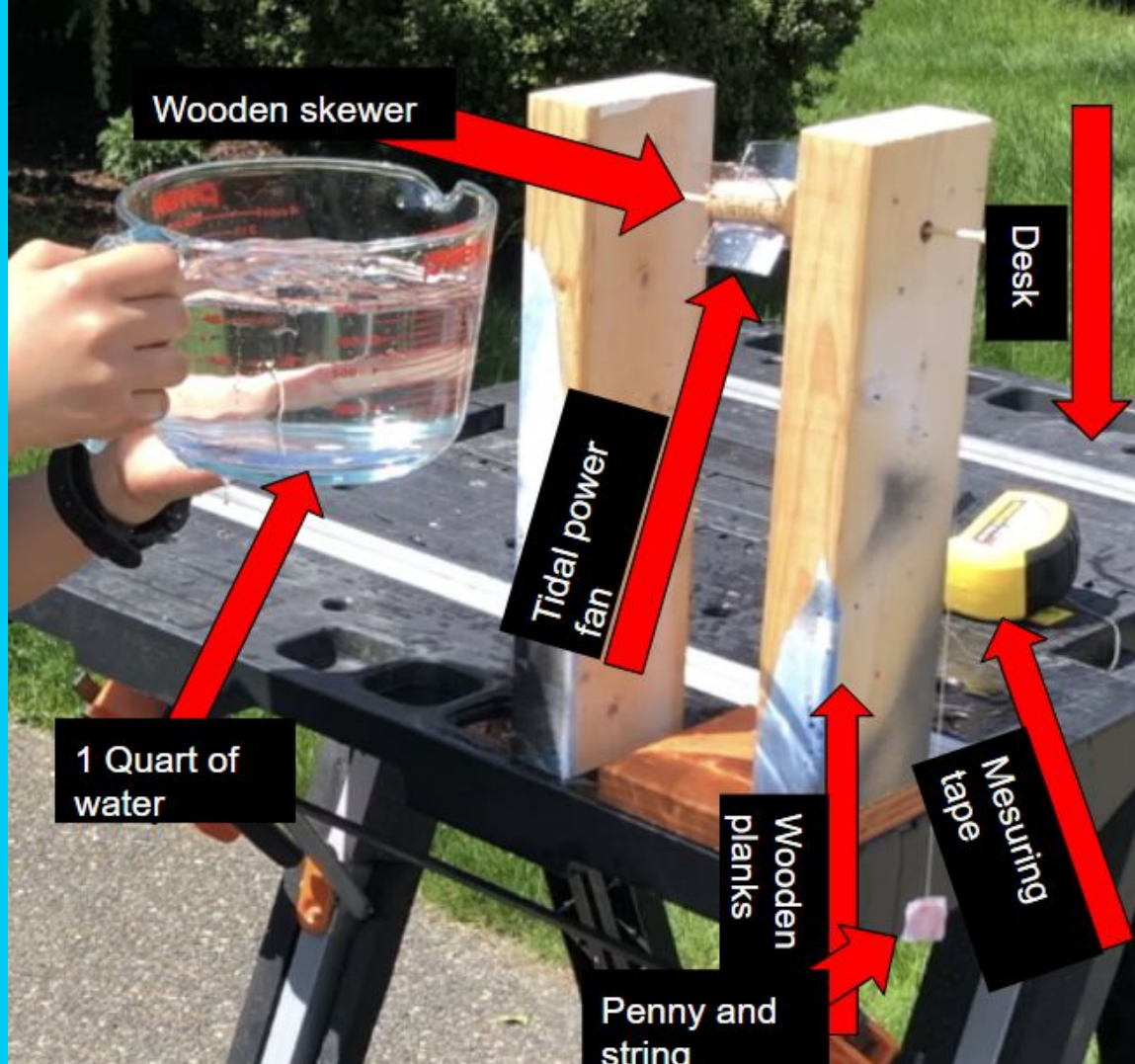
Step 6. Take the cut out bladed cork and stick the skewer through the cork and center it. Then place the ends of the skewers through the holes of the wooden planks.

Step 7. For both of the fans, take a two foot long string and tie one end onto the skewer in between the two planks and tape two pennies onto the other end of the string.

Step 8. For both of the wheels, to set up the experiment, off of where you are doing your experiment, drop the pennies that are connected to the string off the desk or table so that the pennies are hanging. Once they are hanging, measure the height the pennies are off the floor or the ground. Then, subtract the height that the pennies were hanging before you poured the water.

Step 9. Pour 1 quart of water onto the spoon fan blades and measure the peak of how high the pennies are carried up.

Step 10. You will run the experiment 3 times with the spoon cork, and 3 times with the orange juice bottle cut out cork. After each test, measure how high the fan carried the cork and then, find out which fan carried the weights higher.



How many inches did the rectangle bladed fan lift two pennies off the ground	How many inches did the spoon bladed fan lift two pennies off the ground
5 inches	5 inches
3 inches	1 inch
$\frac{1}{2}$ inch	8 and $\frac{1}{2}$ inches

In conclusion, my prediction was wrong because the cut out spoon fan was more efficient than the cut out rectangle fan. The rectangle cut out fan blades raised the two pennies an average of about 2.8 inches off the ground. The spoon bladed fan raised the two pennies on an average of about 4.8 inches off the ground. This shows that the spoon bladed fan was more effective on lifting the two pennies off the ground than that rectangle cut out fan blades. Therefore the spoon bladed fan is more efficient.