WATER TURBINE

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MATERIALS REQUIRED

1. Plastic bottle caps *(no of caps=11)*
2.Ice cream sticks *(no of sticks=10)*
length 10cms
3. Water source(or)supply
4.Bucket(or) small tub
5.Manometer(or) Transparent U-shape tube
6.DC motor (to generate electricity)
7. Small LED bulb
8.Hot Glue
9.Thin Rod (10cm)

WORKING PRINCIPLE

- **The design of water turbines are based on principles from fluid dynamics, The goal is to convert the energy of a fluid (such as air, steam, or water) into mechanical work as efficiently as possible.**

Conservation of Energy (Bernoulli's Principle):

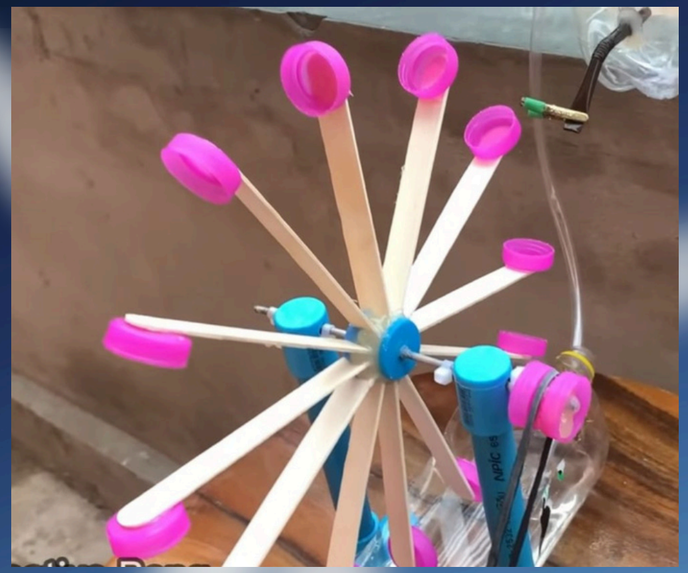
- The Bernoulli equation is central to understanding how pressure, velocity, and height (potential energy) interact in a flowing fluid. In turbines, the fluid's kinetic energy and pressure energy are converted into rotational energy of the blades. The design optimizes this energy conversion to maximize efficiency.

$$P_1 + \frac{1}{2}\rho v_1^2 + \rho g h_1 = P_2 + \frac{1}{2}\rho v_2^2 + \rho g h_2$$

STEPS TO BUILD WATER TURBINE

- Use icecream sticks and water bottle caps to design or to build turbine blades and secure the stick with glue.
- After design of turbine prepared have to insert turbine in thin rod of length 10cm and fix it to stable stand.

- Then whole setup of project is put direct water onto the turbine blades by direct water supply or source place a bucket or small tub beneath the turbine to collect the water.
- Attracting U-shaped tube(or) manometer to measure pressure and velocity And we additionally use LED bulb to conservation of energy by flow of water through turbine.
- Finally we observe the energy how energy is conserved by the flow of water.



APPLICATIONS IN REAL LIFE

HYDROELECTRIC POWER GENERATION:

- Water turbines are key in hydroelectric power plants, converting water flow into electricity.

RENEWABLE ENERGY:

- Water turbines harness renewable energy from rivers and dams, providing a sustainable energy source.

EFFICIENCY CHALLENGES:

- Optimizing blade design, minimizing drag, and improving flow regulation are critical for maximizing efficiency

CONCLUSION

- In this project The water turbine is the goal is to convert the energy of a fluid(such as air , stream and water) into mechanical work as efficiently possible.
- The fluids kinetic energy and potential energy are converted into rotational energy of the blade of turbine. Additionally we put a LED bulb to show how energy is conserving.


THANK YOU
For your attention