

Build Your Own Flywheel

Background

As with all forms of energy storage, flywheels are used when we have access to energy but will want to save it for later. This activity is designed to demonstrate how flywheels store kinetic energy that can be used later when demand is high, and supply is low. We need to input energy to raise the flywheel to the top of the string. Once power is needed again, we let go of the flywheel, allowing the kinetic energy to spin the flywheel by the string turning the wooden skewer. In a real life the flywheel will turn a turbine to create electricity.



Materials Required

Your flywheel should contain the following materials:

- 1 empty roll of toilet paper
- 2 pieces of uncooked penne pasta
- 2 nuts and 2 bolts
- 2 plastic pop bottles
- 1 wooden skewer
- Thread
- 2 marshmallows

Tools

Gather together the following tools:

- Super glue or glue gun
- A drill
- Utility knife

Construction Plan: Build It!

These step-by-step instructions provide you with a plan for making a flywheel.

Before you begin:

View this video for the construction of your Flywheel:



Step 1: Cut or drill 4 small holes, evenly dispersed around the toilet paper roll. 0°, 90°, 180° and 270°.

Tip: These holes should be big enough to snugly fit the pasta into.



Step 2:

1. Place the 2 pieces of uncooked pasta into the hole you cut/drilled, into the 0° and 180° holes in the toilet paper roll.

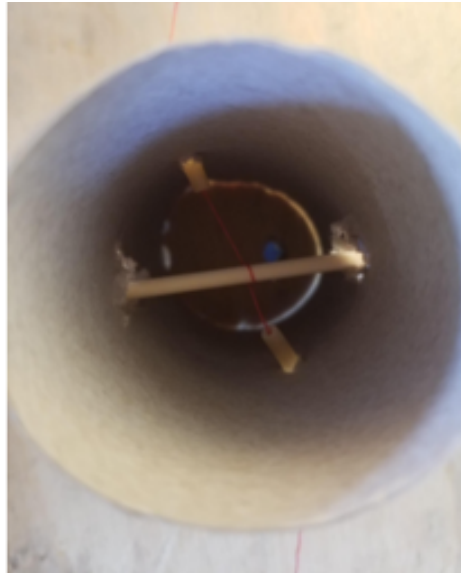
a. **Tip:** They should be evenly placed in the hole, equal parts extending outside and inside the toilet paper roll. Ensure that there is clearance between them inside the roll so that they are not nearly touching each other on the inside.

2. Using your hot glue gun, secure the pasta in place.

Step 3: Guide your string through the 2 pieces of uncooked pasta so that it goes through one side and out the other.



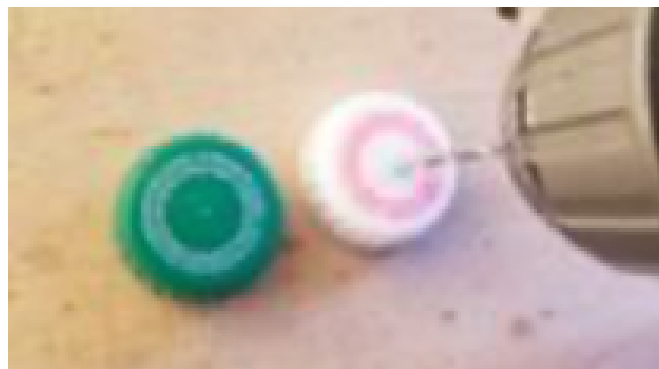
Step 4: In the opposite holes (90° and 270°) place the wooden skewer. You can remove the skewer once you have confirmed that it spins freely in the hole.



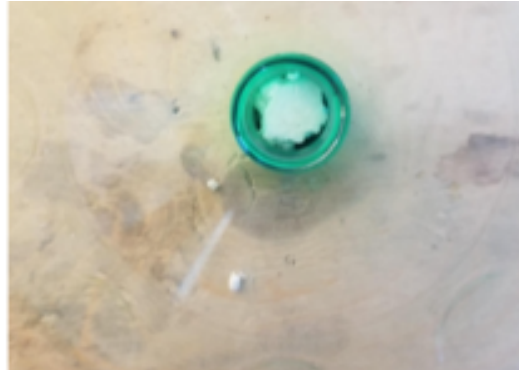
Step 5: Carefully cut the top cylinder off the plastic bottle using a utility knife.



Step 6: Carefully drill a hole into each of the bottle caps, small enough that the wooden skewer will fit in snugly.



Step 7: Using either a hot glue gun or regular glue, insert marshmallow or any material that the wooden skewer will be able to pierce through into the bottle cap. The marshmallow is meant to keep the skewer to remain straight in the bottle cap. Once the glue is dry, screw the bottle cap back onto the lid of the pop bottle.



Step 8: Carefully push the wooden skewer through the drilled-out hole in the cap. Once the skewer is straightly aligned in the cap, glue the skewer to the marshmallow to ensure that the skewer will not freely spin in the cap.

Tip: If the skewer is not straightly aligned, it may be difficult to create spin.



Step 9: Before attaching the second bottle cap, insert the skewer into the toilet paper rolls drilled out holes (90° and 270°). Loop the string around the skewer for one rotation before pushing the skewer out the other side.



Step 10: While ensuring there is enough clearance to freely spin the plastic bottle tops, secure the other plastic bottle cap the same way that you did in step 8.

Step 11: Tie each end of the string around a nut and a bolt. One will be a handle to hold onto your flywheel, while the other will be a counterweight to ensure your flywheel has a straight path to follow.



Congratulations! You have completed the construction portion of the flywheel activity! If you want you can add some color to your flywheel like below, and let it fly!

