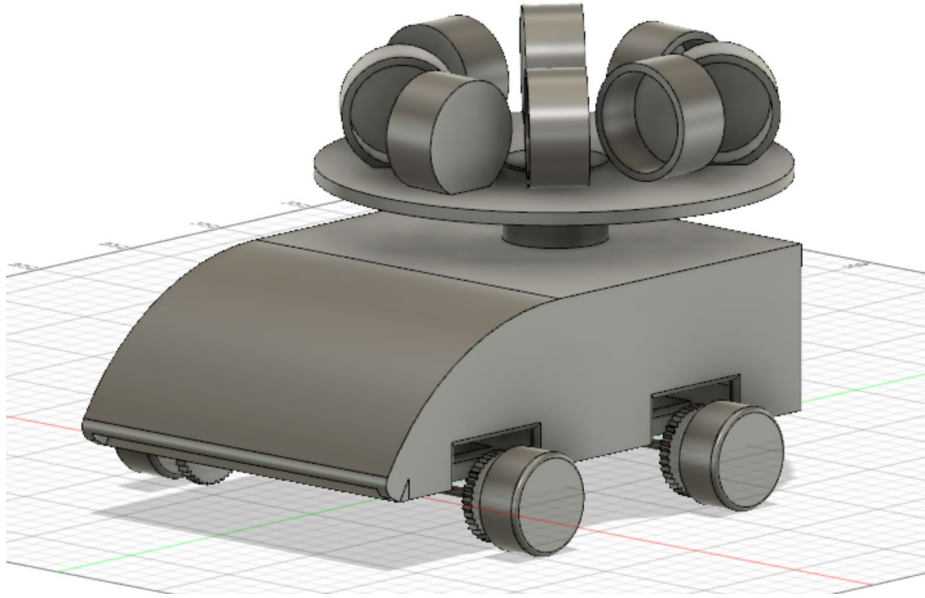


Purpose of creating product

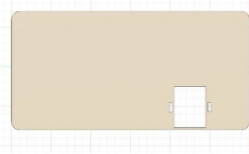
- **The purpose of creating my product is to make an eco-friendly vehicle by using renewable wind energy, generating electricity, and activating it.**
- **My product helps the problem to stop using non-renewable energy**

How to make wind-powered vehicle

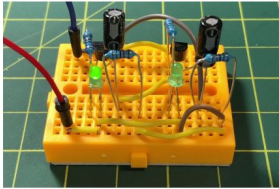


Materials

- 1) 8 Bottle caps
- 2) 3 black wires
- 3) 4 red wires
- 4) 1 black wire with the switch
- 5) a CD
- 6) Two DC motors (for wind turbine & wheels to move)
- 7) Board with one rectangular hole (for motor).
<14cm width, 7cm length>



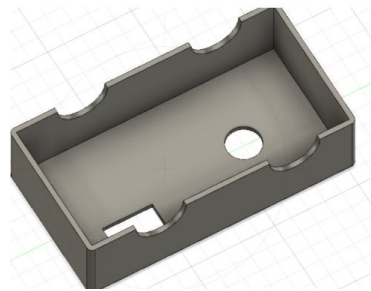
- 8) A capacitor (5v)
- 9) Four wheels
- 10) mini breadboard



- 11) One small gear (approximately 1-2 cm)
- 12) Two big gear (approximately 5-6 cm)
- 13) Two metal axes
- 14) Battery
- 15) 2 connectors

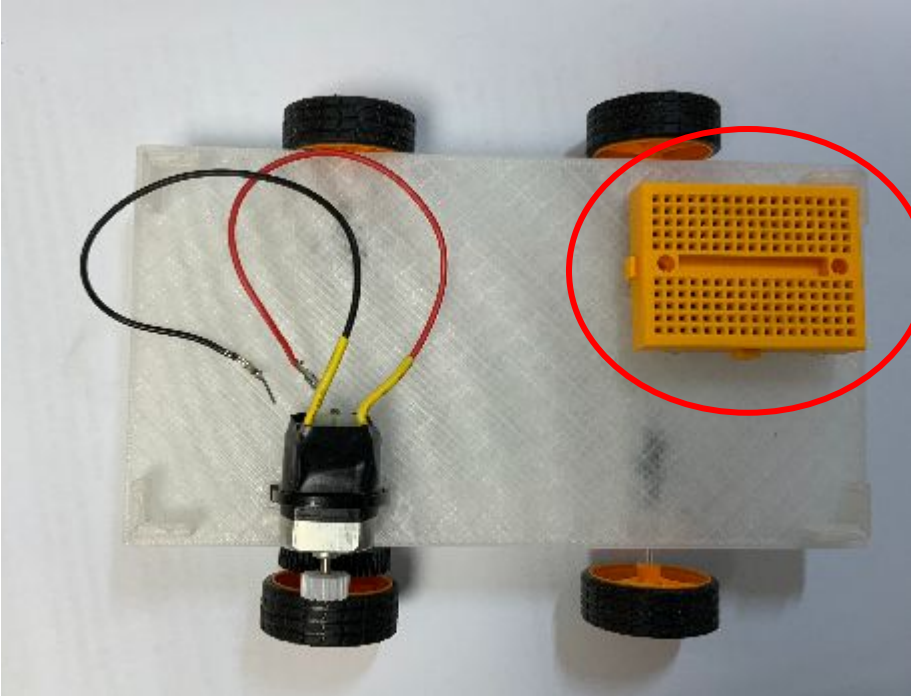


- 16) Vehicle model with switch hole and wind turbine motor hole.



Function of Materials

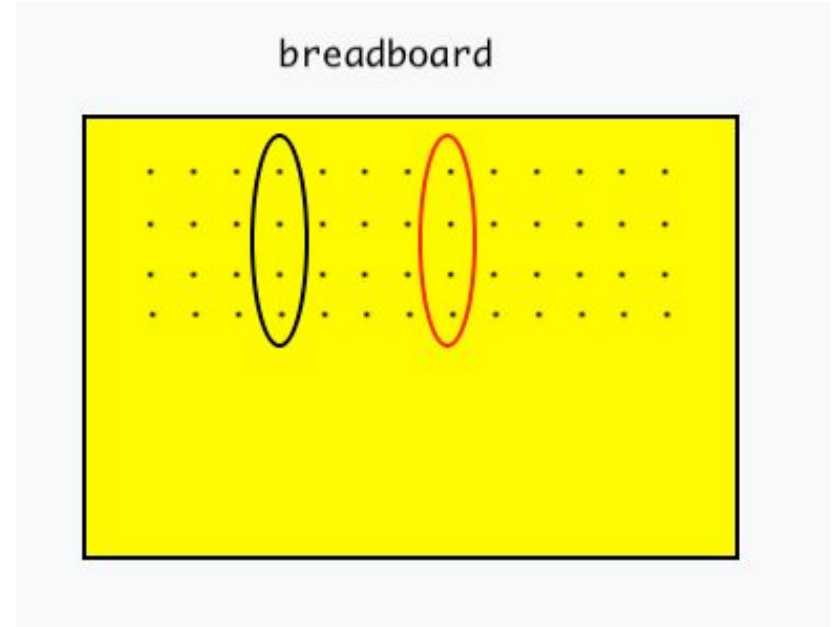
- **Wires make an energy source to transfer to the motor to drive the vehicle.**
- **Mini breadboard makes electronic components(ex battery, capacitor) that can be inserted and connected to each other without the need for soldering.**
- **DC motors convert electrical energy into mechanical energy, which is used to rotate a shaft.**
- **Connector used to join two or more electrical circuits together**



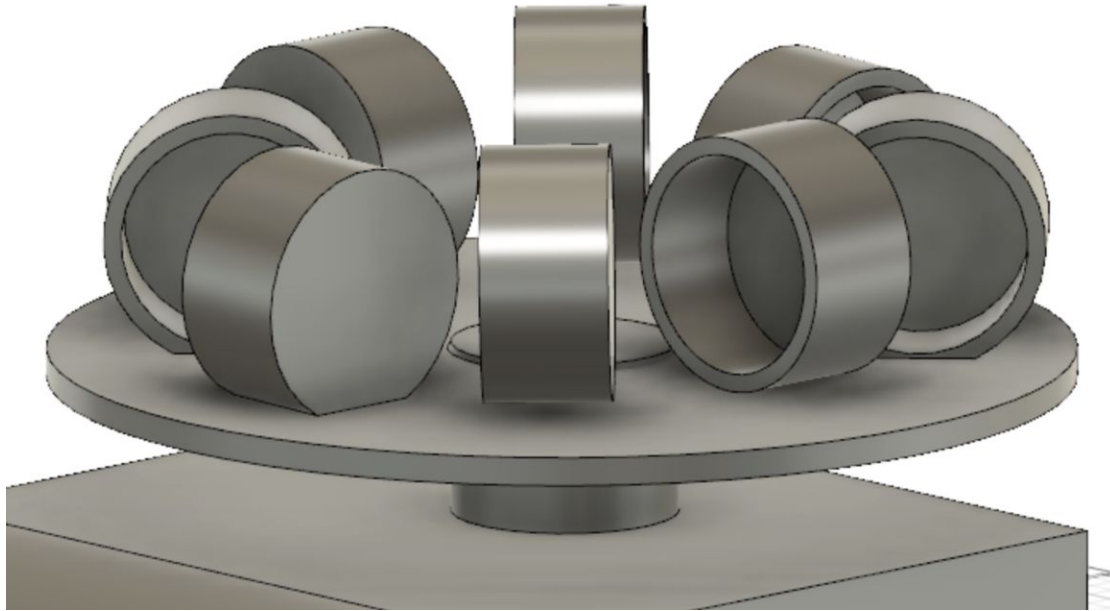
Prepare breadboard

It typically consists of a plastic board with a grid of holes, where electronic components can be inserted and connected to each other without the need for soldering.

Vertical line are all connected.



Turbine spins, generate electricity from dc motor.

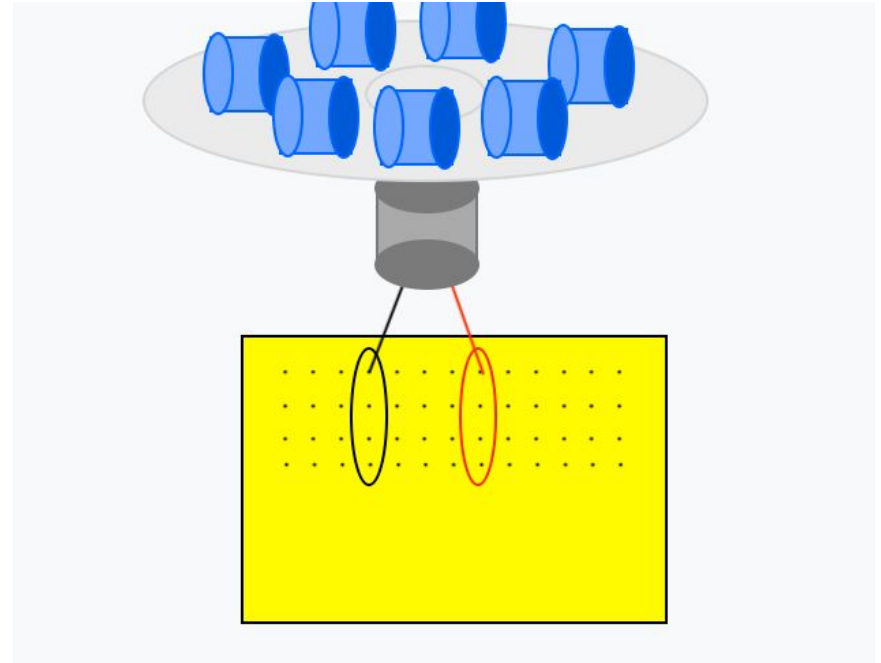


Plug(red&black)wire of wind turbine into First hole.

When the wind turbine rotates by wind, the DC motor will turn too. The DC motor is a ready-made generator that will generate electricity.

How will it generate electricity?

It converts mechanical energy (rotation) into electrical energy. This is done through the interaction between a magnetic field and a current-carrying conductor in the motor, which generates an electrical voltage across the conductor.



Plug capacitor on the second hole

(*longest part need to be left hole)

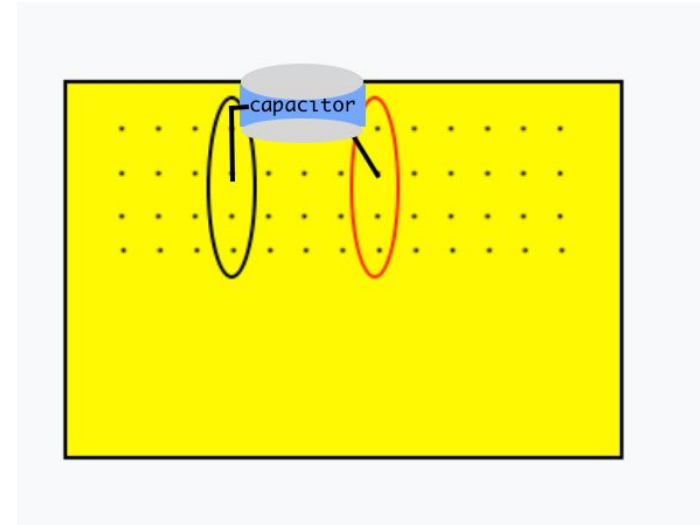
Longest part of Capacitor has positive terminal & shortest part has negative terminal.

What is capacitor?

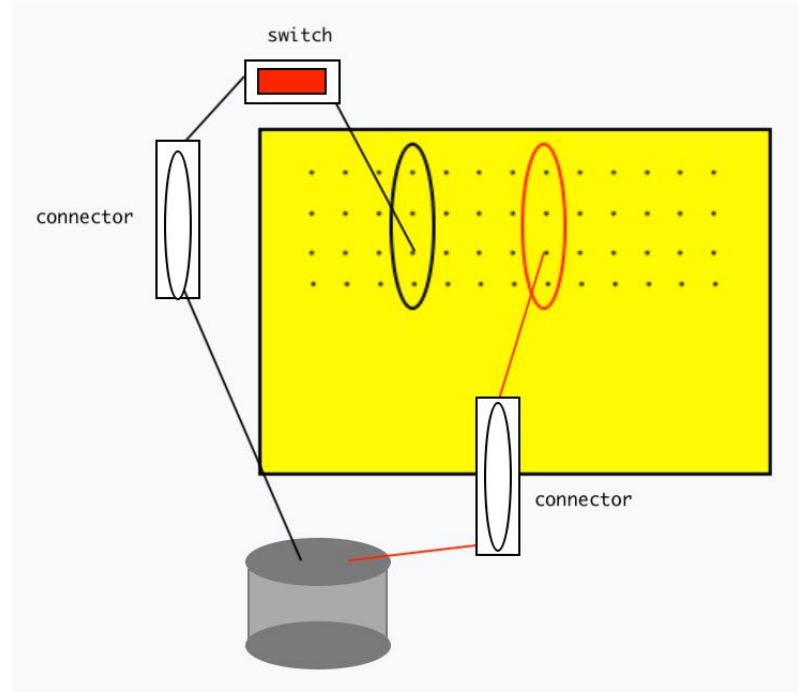
Capacitor is a two-terminal electrical device that can store energy as an electric charge. In electrical circuits, the capacitor acts as the water tank and stores energy.

How it store energy?

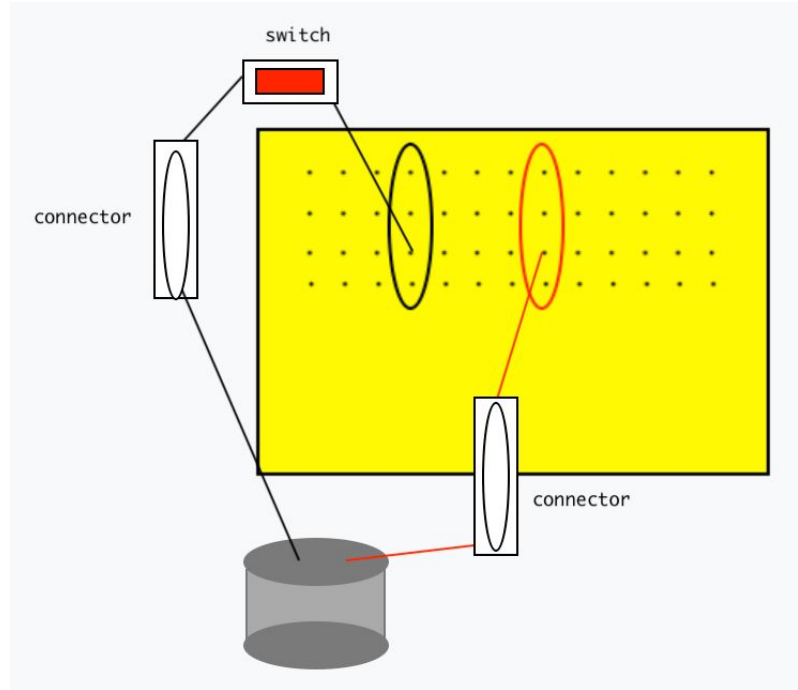
A capacitor comprises two metal plates separated by a non-conductive material called a dielectric. When a voltage is applied to the plates, electrons flow onto one plate, creating a negative charge, while the other plate becomes positively charged due to the loss of electrons. This creates an electric field between the two plates that store electrical energy. By capacitor, we can use electric energy to move the vehicle.



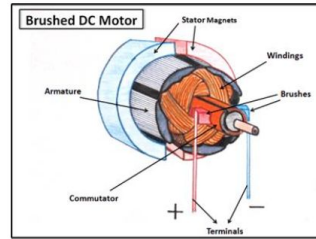
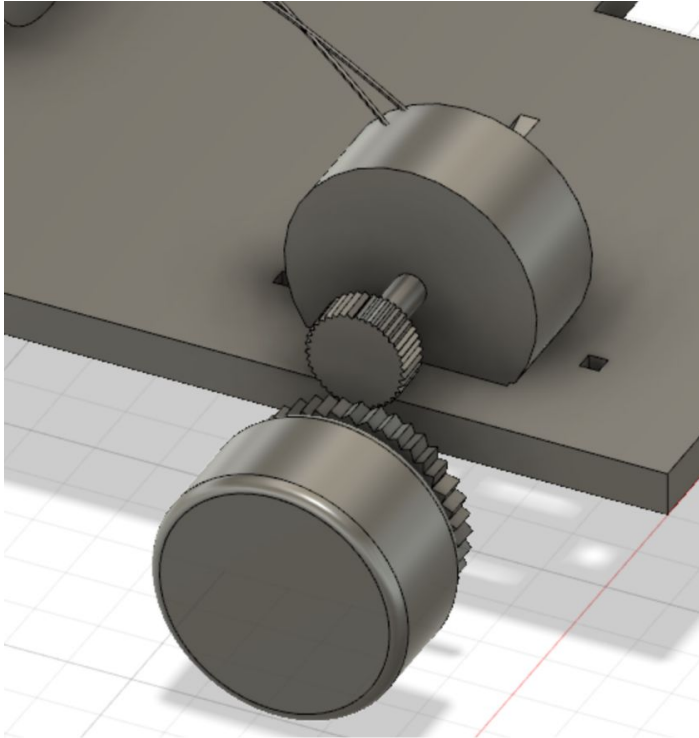
Connect the connector on the end of the red&black wire(dc motor)



Left side of connector, connect the black wire with the switch and plug into a Third hole(left) of breadboard.

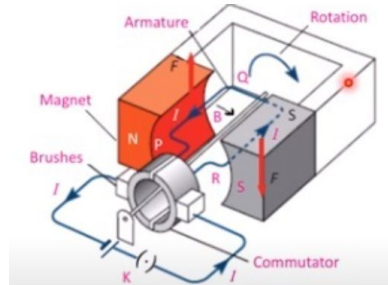


Motor will rotate small gear as well as big gear to spin the wheels.

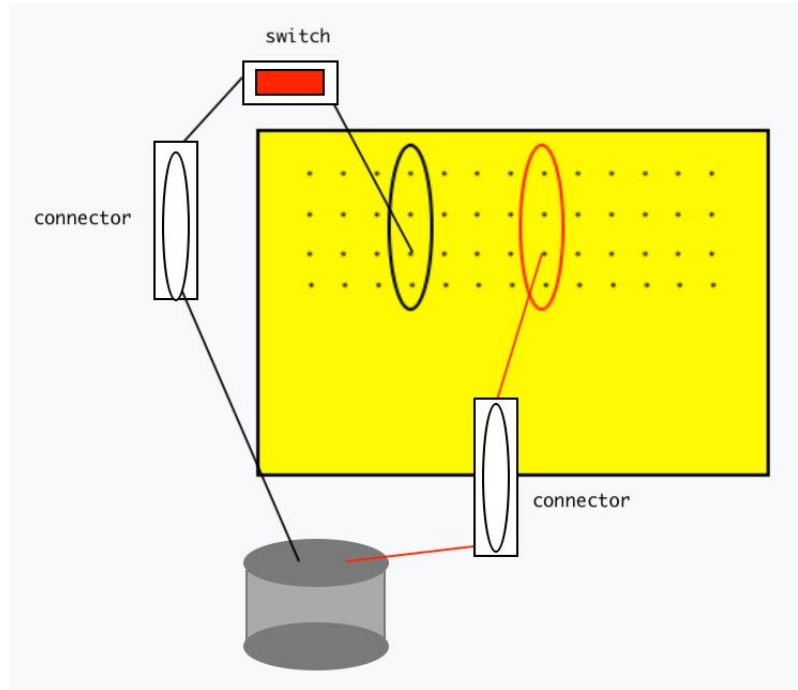


(Scientific concept) When electrical power is supplied to the dc motor, it flows through the stator(magnet), creating a magnetic field that interacts with the magnetic field created by the armature on the rotor(winding).

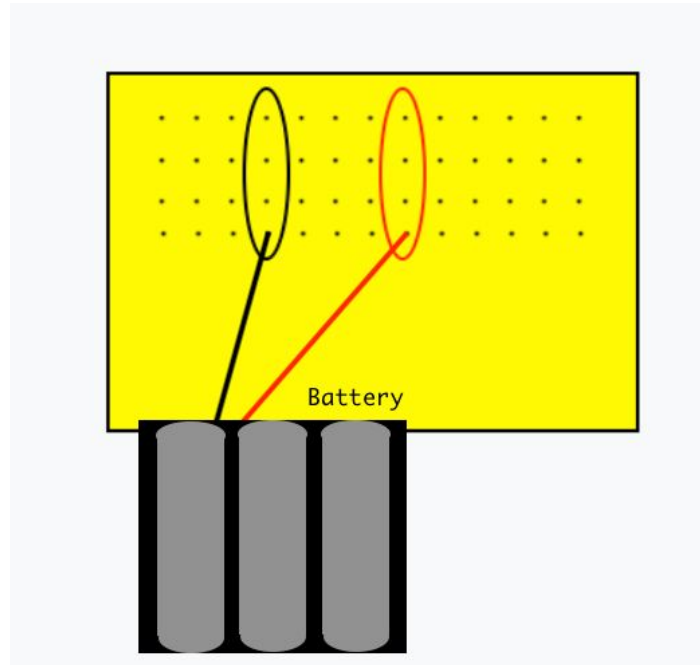
The interaction between these two magnetic fields causes the armature on the rotor to rotate. As the rotor rotates, the commutator switches the direction of the electrical current flowing through the armature, causing the magnetic field to change direction and continue to push the rotor in the same direction. This continuous switching of the current and magnetic field causes the rotor to rotate continuously.



Right side connector, connect another red wire and plug into a third hole(right) of breadboard.



connect red & black wire on the battery and plug into the fourth hole of the breadboard.



Constraints

My prototype and specification doesn't meet well all the constraints given in your brief. DC motor generates little of electricity so capacitor doesn't have enough electricity to move the vehicle. By using battery, i could move vehicle

However, most of my prototype and specification meets well the constraints like aesthetic appearance, Danger to make, designers' level of expertise, Environmental harm etc.