LEARNING MATERIALS
Homopolar motor

A homopolar motor was the first electrical motor to be built. This motor is designed based on Lorentz force. A conductor with an electric current placed in a magnetic field feels the force perpendicular to both the magnetic field and the current.

In this experiment, a battery provides electric current and a copper wire connects both poles letting electrons move along the wire and magnets close the circuit and create the magnetic field around the wire so the perpendicular force will rotate the wire.

Questions for testing comprehension:
(1) Why do we use copper wire and what are alternatives? Does the rotation speed change when we use different materials?
(2) What would happen if we use a larger battery or add more magnets?
(3) What happens if we flip the battery upside down (reverse poles)?
(4) Think about other wire shapes and experiment setup. There are many different ways to build a homopolar motor.

Further reading and materials:
(1) Wikipedia: https://en.wikipedia.org/wiki/Homopolar_motor
(2) https://youtu.be/voHz6sxwQ2Q
(3) https://en.wikipedia.org/wiki/Lorentz_force