MOTORIZED SPIN ART MACHINES

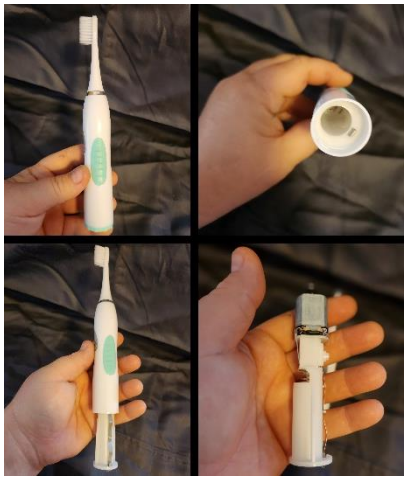
MATERIALS:

Dollar Store Electric Toothbrush
White Cardstock
Scissors
Markers
Aluminum Foil
Electrical Tape
Corks
Snap Circuits Kit
AA Batteries
AAA Batteries
AA & AAA Battery Holders with Leads
Duct Tape
1.5-3 Volt DC Motor
Various Plastic Lids
Hot Glue and Hot Glue Gun

VOCABULARY:

Circuit
Insulator
Centrifugal
Motor
Negative
Force
Conductive
Positive
Electricity

ELECTRIC TOOTHBRUSH DIRECTIONS:



1. Remove the cap on the bottom of the toothbrush.
2. Tap the toothbrush on a table until the inside part falls out- you may need to pull it the rest of the way out.
3. Put the battery that came with the toothbrush into the battery holder.
4. Lay a piece of aluminum foil over the bottom of the toothbrush so it touches the bottom of the toothbrush and the metal prong near it- this completes the circuit to make it run.

5. Use electrical tape to secure the aluminum foil into place and keep the battery from falling out.
6. Press the power button to make sure the motor on top will spin.
7. Use electrical tape to secure a plastic lid to the top of the motor.
8. Test it to make sure it can spin.
9. Tape a circular piece of cardstock to the lid.
10. Turn on the spin art machine.
11. Hold a marker gently to the cardstock while it spins to make colorful circular patterns.
12. Optional: Use more electrical tape and duct tape to cover the base of the toothbrush component in a decorative way.

DC MOTOR AND CORK DIRECTIONS:

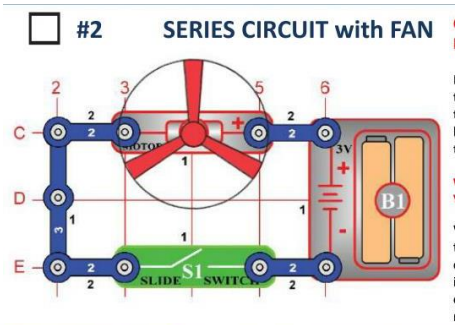
1. Connect the motor to the battery pack. Strip the ends of the red and black wires on the battery pack to expose about ½" of metal wire. Turn the battery pack on and touch the exposed ends to the leads on the motor. The leads look like two U's. The rotor on the motor should spin once the leads touch the wires. Turn the battery pack OFF and then thread one wire through one motor lead and secure in place with electrical tape. Repeat with the other wire for the second lead. Turn the battery pack on and make sure the rotor spins. If you do not have a battery pack holder (they can be found on Amazon, at Hobby Lobby, etc.), you can connect the

battery directly to the motor using insulated wire and electrical tape, instead. You will need to tape the exposed ends of the wires the battery and you will not have an on/off switch.

2. Make a cork structure to hold the motor. Gather 3 corks and hot glue the motor in the center of the corks so that the rotor is projecting above the corks and can spin freely. Then tightly wrap duct tape around the corks. Secure in place with rubber bands. As the motor spins, it heats up and the hot glue will soften which is why the duct tape/rubber bands are so important to add.
3. Make the spinner *Adults only: Slice off a section of the cork*. Hot glue a small plastic lid to the cork. Next glue a second larger plastic lid on top of the small lid. You now have a basic spinner!
4. Assemble your spin art machine. Carefully press the cork on the spinner into the motor rotor to create a secure connection.
5. Add the circular paper. You can use the templates at the end of the directions or make your own. Tape the paper to the large plastic lid. Turn on the spinner. Hold the cork base with one hand. With your other hand gently touch a marker to the coaster or cardboard as it spins. You will have lovely spin art!

SNAP CIRCUITS SPIN ART MACHINE

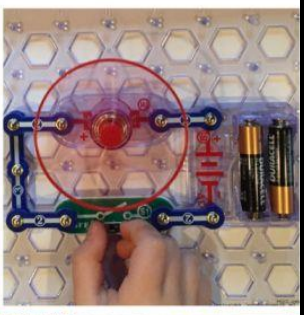
1. Complete Project 2: DC Motor and Switch using the directions in the Snap Circuits Project Book or use the diagram with these directions.
2. Cut out a small circle of cardstock.
3. Tape the circle to the red fan.
4. Turn on the circuit using the switch.
5. Gently touch a marker to the coaster or cardboard as it spins. You will have colorful spin art!

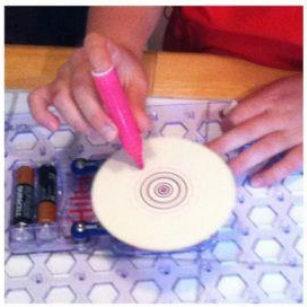


THE STEAM BEHIND THE EXPERIMENT:

When an object spins there is a force that pushes away from the center. This is called Centrifugal Force (psst..it's actually not a real force as defined in science). When you drop paint on the spinning top of a spin art machine, it lands on the paper and flies outward away from the center. Since we are using markers in this experiment, the ink stays on the circular path instead of flying outwards.

The spin art machines work because the motor is on a circuit. Electricity flows through conductive material in a circle, or circuit. The battery provides the power needed to make the motor move. With the electric toothbrush, the circuit was completed using the aluminum foil. With the DC motor and corks, the circuit was completed using the wires attached to the battery pack. With the Snap Circuits, the metal snaps conduct electricity along the circular path you built with the different pieces.



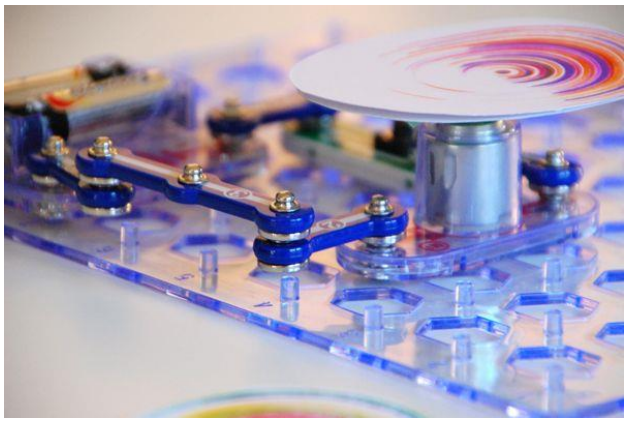


MAKE IT AWESOME:

Try using different sizes and types of paper and different types of markers.

EXTENSIONS:

1. What happens when you use paint instead of markers?
2. Can you make a motorized spinner using different materials?What other changes can you come up with for this experiment?

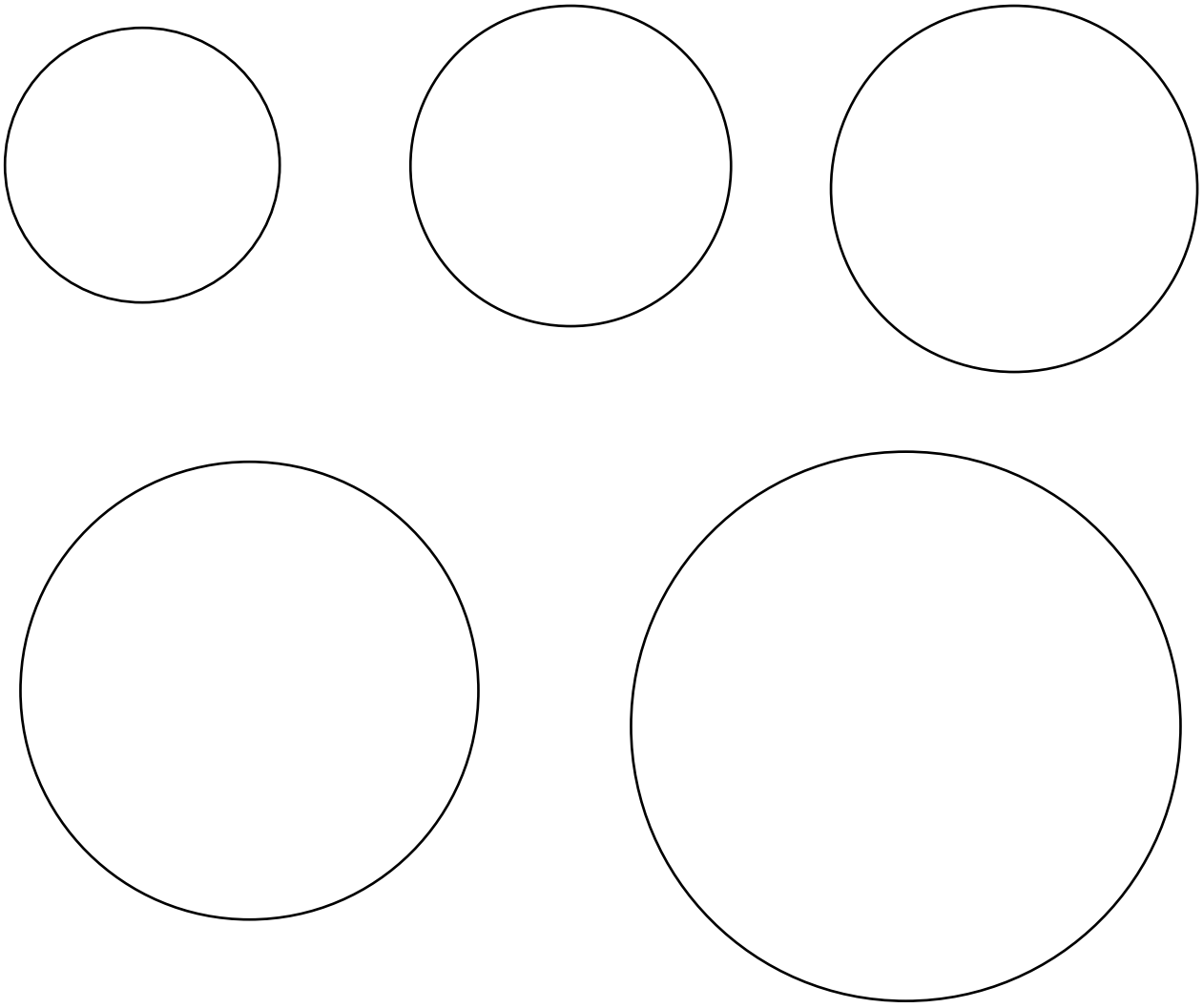


WEBSITES AND VIDEOS:

1. Video: Make a Motorized Spin Art Machine: https://youtu.be/OBzGW629VeU
2. Website: Non-motorized CD Spin Art: https://babbledabbledo.com/diy-spin-art-art-spinners-from-steam-play-

learn/#:~:text=The%20Science%3A%20When%20an%20object%20spins%20there%20is,CD%20and%20flies%20outward%20away%20from%20the%20center.

3. Another Version of a Motorized Spin Art Machine: https://youtu.be/H1lDuU_RjqQ



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