



Activity Title: Spinning Energy

Recommended Grades

Kindergarten, Grade 1, Grade 2, Grade 3, Grade 4

Curriculum Connections

Matter

- 2 – create an object for a purpose

Energy

- K – how objects move
- 1 – direction, pathways, speed of moving objects
- 3 – how forces affect movement of objects
- 4 – how forces act on objects without contact (gravity)

Computer Science

- K – instructions to be followed, have steps
- 1 – instructions to be followed, have steps

Scientific Methods

- 1 – engage in and describe investigation

Time

15-20 minutes for each experiment, additional drying time needed for Experiment 2

Skills Focused On

- Creativity
- Observation
- Critical Thinking

Materials Needed

Experiment 1: Make a Spinning Top	Experiment 2: Make a Spinning Painting
<ul style="list-style-type: none"> • Hot glue gun • Cardboard • Scissors • Wooden dowel • Marbles • Markers 	<ul style="list-style-type: none"> • Salad spinner • Washable paint • Coffee filters • Tape • Spoon or paintbrush



Background Information

What do spinning objects and batteries have in common? We can use spinning objects to store energy (just like batteries!) using something called a flywheel.

Flywheels are similar to a manual pottery wheel. A pottery wheel stores energy from a person's hand or a foot pump which pushes the disk along, even if the potter stops propelling the wheel. This energy of motion is called kinetic energy.

Flywheels are mechanical batteries. We can charge them when we have extra electrical energy – for example, if it's a really sunny day, and we get more energy from the Sun than we need, we can use the extra electricity to spin a flywheel with help from a motor. Then, when we need energy later (when the Sun isn't shining), we use the motor as a generator, slowing down the flywheel by converting its mechanical energy back into electrical energy.

So let's use spinning to have some fun.

Experimental Steps

Experiment 1: Make a Spinning Top

1. Cut out a circle from your cardboard.
2. Draw a design on your cardboard circle using your markers.
3. On the bottom of your circle (the side that isn't coloured), glue a marble in the centre. Remember, the hot glue gun is HOT!
4. Take an approximately 1 inch long piece of wooden dowel. Glue it on the top of your circle (the side with colour) in the centre.

Wait a minute or two for your glue to dry, then give it a spin!

Experiment 2: Make a Spinning Painting

WARNING: This experiment will be messy! Make sure you are doing it outside, wearing clothes that you don't mind getting dirty, and that you have a grown-ups permission.

1. Place your coffee filter at the bottom of your salad spinner, using lots of tape to hold it in place. Make sure you ask before using the salad spinner.
2. Drip paint all over your coffee filter. The more the better!
3. Shut your salad spinner. Make sure it is securely closed!
4. Spin your salad spinner!
5. Carefully remove it from the spinner. It will be wet, so set it or hang it somewhere to dry.

Hang up your masterpiece!



Discussion/Experimental Extensions

Experiment 1: Make a Spinning Top

Can you make your top spin faster and longer? Would a bigger or smaller marble help? How about changing the size of your cardboard circle? Think like an engineer and experiment with new designs.

Experiment 2: Make a Spinning Painting

Centrifugal force causes the paint to move outwards from where we placed it. The same thing happens when you use your salad spinner to dry lettuce. Centrifugal force sends the water flying to the outside of the spinner, leaving the lettuce dry in the centre (since lettuce is too big to pass through the walls of the spinner). Try spinning slower and faster to create different art.

Additional Resources

Spinning Energy: Flywheels, Crafts, and More! experimental video produced by Future Energy Systems - provides background information and instructions for experiment: <https://youtu.be/Fibl1CuGJOs?feature=shared>.

Learn more about Future Energy Systems (<https://www.futureenergysystems.ca/>) and access more learning content, including storytimes, lab tours, ask an experts and more (<https://www.futureenergysystems.ca/engage/learning> <https://www.youtube.com/channel/UCJr8N9KyFJ6d-t36TPtUlwg>).