deSTEMber

SCIENCE ★ TECHNOLOGY ★ ENGINEERING ★ MATH

PRESENTED BY: girlstart

# Pendulum Painting

Trade in your paintbrush for a paint-filled pendulum to create unique patterns of art. Discover how the force of gravity affects velocity, acceleration, and kinetic and potential energy in this new painting technique.

## TEKS:

SCI 3.6B: The student is expected to demonstrate and observe how position and motion can be changed by pushing and pulling objects to show work being done, such as swings, balls, pulleys, and wagons.
SCI 4.6D: The student is expected to design an experiment to test the effect of force on an object, such as a push or a pull, gravity, friction, or magnetism.
SCI 6.2A: The student is expected to plan and implement comparative and descriptive investigations by making observations, asking well-defined questions, and using appropriate equipment and technology.
SCI 6.8B: The student is expected to identify and describe the changes in position, direction, and speed of an object when acted upon by unbalanced forces.
SCI 8.6: The student knows that there is a relationship between force, motion, and energy.

## Materials:

- Broom
- 2 chairs
- 8-12 oz. foam or paper cup
- Large piece of butcher/craft paper, or other surface to be painted
- Paint
- Plastic tablecloth/Drop cloth
- Scissors
- Sharp pencil
- String
- Tape
- Water

## How To:

1. Prepare your painting area by covering the floor with a plastic tablecloth or drop cloth.
2. Place the chairs on your drop cloth 2-3 feet apart with the chair-backs facing each other.

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3. Extend the broom horizontally across the chairs to make a bar hover across the painting area.
4. Lay your butcher/craft paper or other surface to be painted on the floor between the chairs.
5. Use the pencil to poke a hole into the center of the bottom of the cup.
6. Make two more holes across from each other underneath the rim of the cup on its sides.
7. Thread a piece of string through the side holes and tie the string to make a handle.
8. Attach the cup handle to the broom with another piece of string so that your cup hangs over your work area. The length of your pendulum is up to you and can always be adjusted.
9. Tape over the hole in the bottom of your cup and add your paint to the cup. Use a 2:1 ratio of 2 parts paint and 1 part water. Stir to mix.
10. Remove the tape and swing your pendulum cup. Observe how the pendulum swings and creates a pattern of paint below.
11. Allow the paint to dry.
12. Revise your pendulum. What happens if you change the length of your string? What if you swing the pendulum faster or slower? Or what if you change the height from which you release the pendulum? Have fun painting new patterns!

https://handmadekidsart.com/pendulum-painting/

## STEM Explanation:

A pendulum is an object hanging from a fixed point that swings freely due to gravity. The force of gravity accelerates the pendulum down toward the Earth. The momentum built up by the acceleration of gravity causes the mass to swing in the opposite direction to a height equal to the original position. This momentum can be explained by Newton's law of inertia, which states an object in motion will stay in motion unless acted on by an unbalanced force. Because energy can neither be created nor destroyed, potential energy and kinetic energy alternate as the pendulum swings. These components come together to create different paint patterns as your pendulum swings.

## Career Connection:

*Physicists* are scientists who do research in physics, which involves the study of matter and its motion through space and time, along with related concepts such as energy and force. More broadly, it is the general analysis of nature conducted in order to understand how the universe behaves.

## Resource:

https://kidssteamlab.com/pendulum-painting/


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