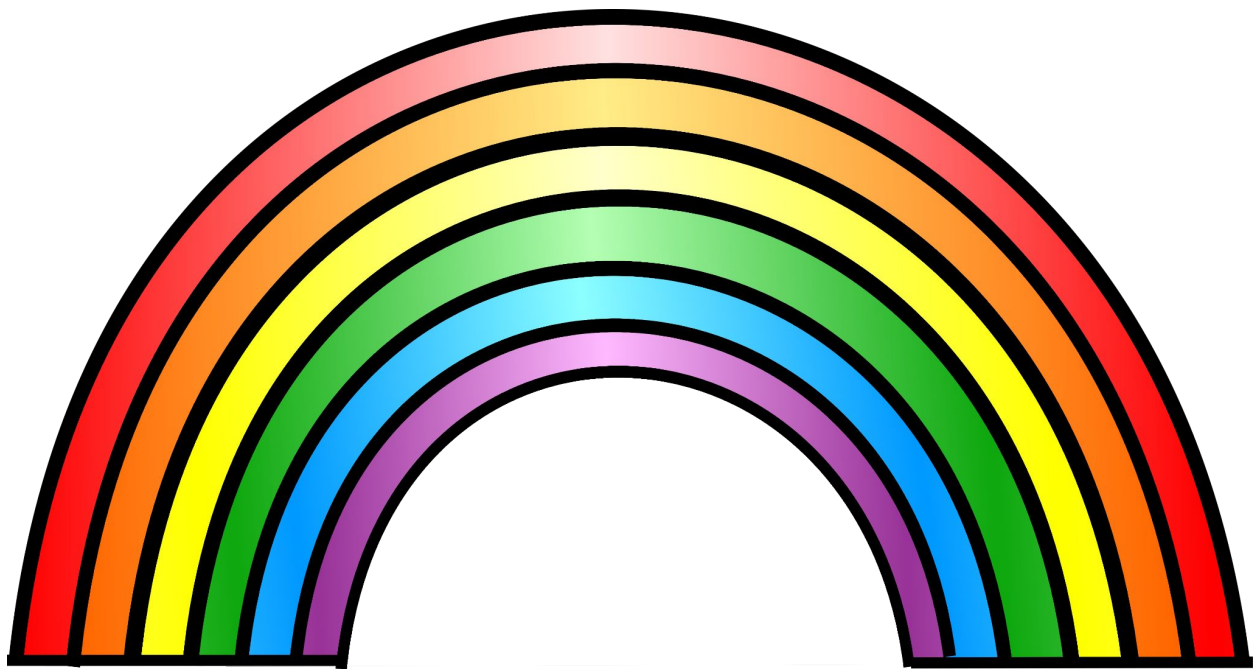


# Rainbow Bridge

Science Activity



# Rainbow Bridge

## Materials:

- Paper towel
- Washable markers (red, orange, yellow, green, blue, purple)
- Two clear cups
- Water

## Setup:

1. Fill two cups about halfway with water.
2. Fold a paper towel and cut it lengthwise so it forms a long strip (this will be the “bridge”).
3. Use markers to color rainbow stripes on each end of the paper towel. Leave the middle mostly blank.
4. Place one end of the paper towel in each cup of water, forming a bridge between the cups.

# Rainbow Bridge



# Teacher Notes

## What Happens:

- The water travels up the paper towel through tiny spaces in the fibers.
- As the water moves upward, it pulls the marker ink with it.
- The colors move toward the center of the paper towel.
- Eventually, the colors from both sides meet in the middle, forming a connected rainbow.

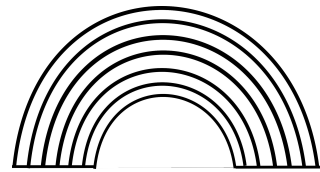
## Why It Works:

This activity demonstrates **capillary action**, which is when water moves through small spaces in materials like paper towels. The paper towel fibers act like tiny tubes that pull the water upward. As the water moves, it carries the marker pigments along with it.

## Challenge Variations:

- Use different color combinations
- Change the distance between the cups
- Use multiple paper towel bridges
- Use a different kind of paper

Name: \_\_\_\_\_



**Before the Experiment:**

Prediction:

**During the Experiment:**

Observation:

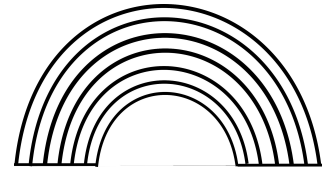
**After the Experiment:**

Did the results match your prediction?

Why do you think the water moved like it did?

Where else in nature does water move like this?

# Answer Key: Sample Responses



## Before the Experiment:

### Prediction:

I think the colors will join to form a rainbow.

## During the Experiment:

### Observation:

The marker colors spread to meet in the middle.

## After the Experiment:

Did the results match your prediction?

Yes. The water moved through the paper towel and the colors spread like I thought it would.

Why do you think the water moved like it did?

The water moved through the paper towel because of capillary action. The tiny fibers in the paper towel pull the water through small spaces.

Where else in nature does water move like this?

Water moves like this in plants. Plants pull water from their roots up through the stem to the leaves using tiny tubes inside the plant.

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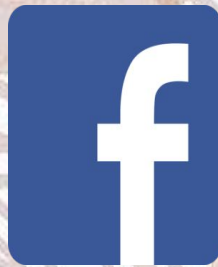
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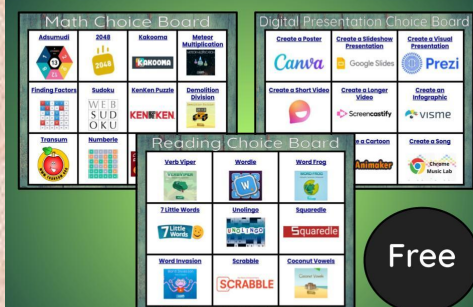
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## Choice Boards



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# Ready for more?

## Build a Boat

**Vocabulary**

- Float:** To rest on the surface of a liquid.
- Sink:** To go below the surface of a liquid.
- Submerged:** To be under the surface of a liquid.
- Buoyancy:** An upward force that opposes the weight of an object immersed in a fluid.

**Types of Boats**

- Hull:** The main body of a ship.
- Flat Bottom:** Flat bottom boats are lightweight and very stable. They are often used for fishing boats and are used in calm water.
- Round Bottom:** Round bottom boats displace water around them. They require less effort to move through water. Canoes and rowed bottom hulls.

**Build a Boat STEM Challenge**

**Overview**

- You will use the Engineering Design Process to ask, imagine, plan, create, test, improve, and reflect on your design.
- You will determine the question to solve.
- You will sketch a plan.
- You will create a boat with your plan.
- You will make adjustments to your boat.
- You will reflect on your boat and what went well and what went better.

**STEM Challenge**

## Build a Bridge

**Types of Bridges**

- Beam:** A beam bridge is the simplest form of bridge. The weight is supported by beams on each end and sometimes pillars in the middle.
- Arch:** An arch bridge uses a curved structure to support the weight of the bridge.

**Vocabulary**

- Engineer:** The person responsible for the bridge design.
- Abutments:** The supports at each end of an arch bridge.
- Chords:** The supports along the top and bottom in a truss bridge.
- Pier:** A solid structure that supports the bridge by extending into the water.
- Deck:** The surface of a bridge.
- Span:** The distance from one support to the other side of a bridge.

**STEM Challenge**

## Design a Marble Run

**Vocabulary**

- Gravity:** An invisible force that pulls objects towards the center of the Earth.
- Slope:** How steep the surface is.
- Funnel:** A tube or pipe that narrows at the top and bottom.
- Momentum:** The motion of an object. You can change the momentum of an object by changing its velocity.
- Velocity:** The speed of an object in a certain direction.
- Friction:** The force that opposes the motion of an object.

**STEM Challenge**

**Success Criteria (Requirements)**

- The marble must move for at least 10 seconds.
- The marble run must have at least 3 turns.
- The marble run must be able to hold at least 2 marbles at the same time.

**STEM Challenge Background Information**

- The track needs to have lots of angles in order to slow down the marble.
- The angles must be gradual and smooth enough that the marble does not get stuck. Tape can help fix rough spots.
- Use cardboard to build the track.
- Use materials like tape to hold the track together.

**STEM Challenge**

## Egg Drop

**STEM Challenge**

**Sample Timeline**

- Day 1:** Present the challenge to the students.
- Day 2:** Students work on their designs.
- Day 3:** Students test their designs.
- Day 4:** Students present their designs.

**STEM Challenge Teacher Background Information**

Objects with large flat surface areas fall slower than objects with a smaller compact surface area.

Softening materials can absorb the kinetic energy of the falling object preventing it from shattering directly.

**STEM Challenge**

## Trap a Mouse

**Simple Machines**

- Wedge:** A simple machine that is used to split things or to hold things together.
- Wheel and Axle:** A simple machine that consists of a wheel attached to a central axle.
- Lever:** A simple machine that consists of a rigid bar that pivots on a point called a fulcrum.
- Inclined Plane:** A simple machine that consists of a flat surface that is tilted at an angle.
- Screw:** A simple machine that consists of a threaded rod.
- Pulley:** A simple machine that consists of a wheel with a rope or cord that runs over it.

**Mouse Trap STEM Challenge**

**Overview**

- You will use the Engineering Design Process to ask, imagine, plan, create, test, improve, and reflect on your design.
- You will determine the question to solve.
- You will sketch a plan.
- You will create a chain reaction machine to trap a mouse.
- You will test your machine.
- You will make adjustments to your machine.
- You will reflect on your machine and what went well and what went better.

**STEM Challenge**

## Winter Sled and Slope

**STEM Challenge**

**Success Criteria (Requirements)**

- Your sled must travel a great distance.
- Your sled must be large enough for the class.
- The sled must be able to hold at least 2 students.

**Vocabulary**

- Force:** A push or pull that makes something move.
- Velocity:** The rate of change in an object's position.
- Gravity:** An invisible force that pulls objects towards the Earth.
- Friction:** The resistance that an object experiences when moving against another surface.
- Angle:** The point at which two straight lines meet. It is often measured in degrees.
- Mass:** The amount of matter an object contains. More matter will weigh more.

**STEM Challenge**