

Welcome to

Innovation Fest

2024



Take chances-
Get messy-
Make mistakes.

Ms. Frizzle

Colored Shadows



Big Idea:

White light is made up of a blend of colors!

Materials:

cardstock, red, green, and blue LED lights, conductive tape, 3-coin batteries

Challenge:

Build a colored shadow display that shows that not all shadows are black.

Procedure:

1. Students will attach conductive tape to paper
2. Tape 1 coin battery to each pre-cut section on paper
3. Attach each LED to 3 different strips of conductive tape (R, G, B)
4. Adjust outward LED light to make sure that the overlap of light is creating white light
5. Test it out!

What color do we see when the red, blue, and green blend together?

What do you think will happen if we put something in front of the lights?

What do you predict will change if we turn one light off?

High Tech – Colored Shadows

Literacy: Little Blue and Little Yellow

Big idea: White light is made up of a blend of colors.

Procedure:

- Plug different colored light bulbs in to a power strip
 - Direct the lights at a blank white wall or sheet
 - o For best results put the green bulb in between the red and blue bulb
 - Use the switches on each light to change the combinations of colors
 - Hold an object or body part in front of light
 - Have pre-prepared bags of materials to make a personal version to take home
 - o Bag will include cardstock, red, green, and blue LED lights, pre-cut pieces of conductive tape, 3-coin batteries
1. Students will attach conductive tape to the cardstock
 2. Tape 1 coin battery to each pre-cut section on the cardstock
 3. Attach each LED light to the 3 different strips of conductive tape (R,G,B)
 4. Adjust outward LEDs to make sure that the overlap of light is creating white light
 5. Test it out!

Tools & Materials:

- Plug strip
- Light bulb holder
- White wall/sheet
- Various colored light bulb (red, green, blue)
- Cardstock
- Red, green, blue LED lights
- Conductive Tape
- 3-coin batteries

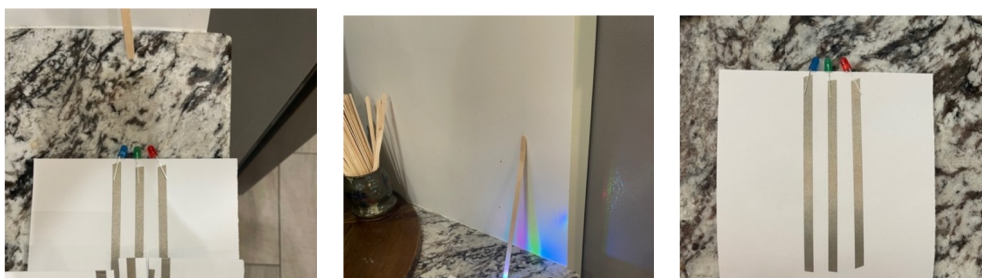
Assessment:

- What do you think will happen if you put something in front of the light display?
- What do you predict will change if you turn one light off?
- What do you predict will happen if you turn a specific color off/keep one on?
- How might you think we could make a small, personal version of this display?

Differentiation:

- Helping younger students change the switch for the light bulbs
- Have the older students talk through what they think is happening
- Have older students take charge in changing the color combinations
- Assist younger students in creating the mini version

Picture:



WHERE IS THE AIR?

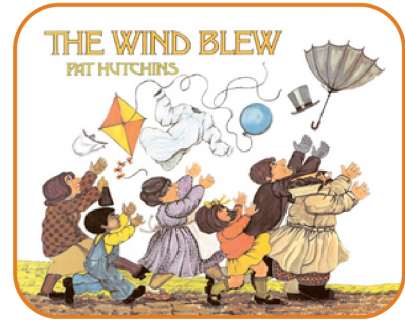
STEM DESIGN CHALLENGE

BIG IDEA: AIR IS A FORCE THAT CAN MAKE THINGS MOVE

CHALLENGE

Show that air is a force that moves objects. Build a sailboat that will move when a fan blows air at it.

LITERACY CONNECTION



MATERIALS

- Foam boat base
- Fuzzy Sticks
- Construction Paper
- Scissors
- Hole Punch
- Gutter
- Plastic Tarp

CONSTRAINTS

- Your boat must move across the water when the wind blows it
- You may only use the materials provided



PROCEDURE

1. Have the student blow on their hand to feel the air
2. Have students cut out their sail and attach it to the boat using the fuzzy sticks as the mast.
3. Place the boat in the water and have students blow through a straw to aim air at the sail, moving the boat down the water.
4. Allow students to make modifications to their sails improving speed and stability

Assessment & Modifications

- Students can be assessed based on time to cross the water. In this format, students should work as a team, collaborating as they move through the engineering design loop to make improvements to the initial design. Students should collaborate effectively and complete an engineering design journal documenting the process
- More advanced students could be challenged additionally by being asked to use recycled materials to create a new boat base that increases speed while adhering to size constraints. Students that need more supports could be provided precut sails, allowing them to place the mast and adjust angles only.



Example of student sailboat with multiple masts and sails. Students will have freedom to modify their designs for optimized speed.



KALEIDOSCOPES: SEE THROUGH ROSIES GLASSES

DESIGN AND CONSTRUCT A FUNCTIONAL KALEIDOSCOPE USING A TOILET PAPER ROLL, YOUR OWN CREATIVE DRAWINGS, REFLECTIVE PAPER, A STRAW AND SUNLIGHT. CREATE COOL PATTERNS BY REFLECTING LIGHT, SHOWING OFF YOUR CREATIVITY AND LEARNING ABOUT HOW LIGHT WORKS!

MATERIALS:

- TOILET PAPER ROLL
- REFLECTIVE PAPER
- TAPE
- COLORED MARKERS, CRAYONS, OR PENCILS
- SCISSORS
- STRAW
- WHITE CIRCLE PAPER



BIG IDEA:

*WE CAN REFLECT COLOR TO
CREATE DIFFERENT SHAPES*

LITERACY CONNECTION:

“ROSIE’S GLASSES” BY
DAVE WHAMMOND

KALEIDOSCOPE

"Rosies Glasses"
by Dave Whamond

Design Challenge:

Design and construct a functional kaleidoscope using a toilet paper roll, student drawings, reflective paper, and sunlight. Create cool patterns by reflecting light, showing off your creativity and learning about how light works in this fun STEM activity.



Big Idea:

We can discover what reflective material and color does when they mix together if we use a little bit of creativity, our eyes, and the sun!

We can reflect color to create different shapes

Materials:

1. Toilet paper roll
2. Reflective paper or aluminum foil
3. Tape
4. Colored markers, crayons, or pencils
5. Scissors
6. Straw
7. White Circle Paper

Questions:

1. How might the length of the toilet paper roll affect the way our kaleidoscope works?
2. How might the colors and patterns we choose impact the patterns we see in the kaleidoscope?
3. What do you think the reflective paper or foil does inside the kaleidoscope?

Procedure:

1. Attach the reflective paper to the inside of the toilet paper roll using transparent tape. Make sure the reflective side is facing inward.
2. Draw 4 designs using color on your circle white paper and poke a hole in the center.
3. Insert the straw into the hold and use tape to connect to the toilet paper roll, leaving no space in between.
4. Decorate the outside of the kaleidoscope with stickers, glitter, or other decorative materials
5. Hold the kaleidoscope up to a source of light, such as sunlight or a lamp, and rotate it slowly.

Differentiation:

- For younger grades, I could have all of the materials pre-cut and folded.
- I can introduce basic scientific principles such as light reflection and symmetry.

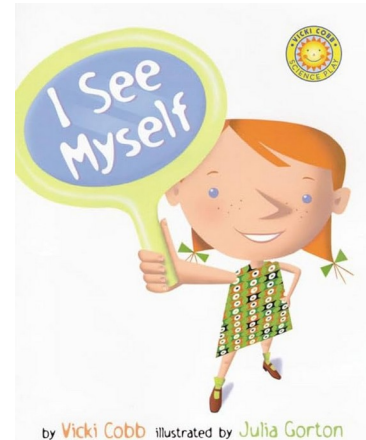
“Tinted Brilliance: Creating Stained Glass with 3D Pens”

Big Idea: Light can be reflected through different surfaces to project colors.

Children’s Literature: “I See Myself” by Vicki Cobb

Procedure:

Students will read or have the challenge read to them. “Today you will be creating a stained-glass light catcher using 3-D printing pens. You will create a design that is meaningful to you!”. Then, students will start designing on the wax paper with a sharpie and then use the 3D pen to trace their design. Then, students will bring their creation to me and I will hot glue their design to a piece of tissue paper. Next, students will cut out their design and then color in the tissue paper with Crayola markers. Students will then holepunch the wax paper and then tie a string to their design and they will have a final stained-glass piece.



Materials/Tools:

- 3-D Printer Pens
- Wax paper
- Hot glue (teacher use only)
- String + hole punch
- Tissue Paper
- Crayola Markers
- Scissors

Potential Assessment – Why can we see the colors on the ground when we hold the stained-glass piece up to a window? What would layering the different colors do? How is light reflected through the stained glass?

Pictures of final product:



How you can modify the challenge for different age groups

- For K-2, I will read the challenge out loud. I will guide the discussion about light, colors, and reflections.
- For 3-6, I will have the students read the challenge themselves. I will ask the students the assessment questions and not lead the discussion.

Unleashing Creativity: The “Finish the Picture” Activity

Big Idea: Shapes and patterns can help us finish the picture!

The Procedure: Students will be given a template with an unfinished picture. They will use playdough along with everyday recycled materials to put their ideas into physical form to “finish the picture”. The creation does not have to stand on its own but should look different than the shape initially given.

Potential Questions: “What does this shape remind you of when you see it?”

“What can you turn this picture into?”

“Before you begin, what are some ideas you would turn this into?”

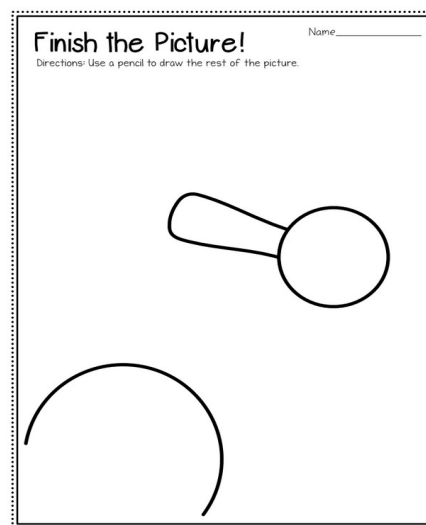
“What was something that was hard during this?”

Tools: Playdough, stencils, markers, wax paper, and everyday recycled materials (straws, paper clips, marbles, erasers, yarn, wooden dowel rods, etc).

Literature Element: “Made by Maxine” written by Ruth Spiro and illustrated by Holly Hatam.

This book talks about how “anything is possible with enough tinkering, imagination, and perseverance.” Maxine uses recycled materials to transform them into something new.

Pictures:



How to modify it for young kids: For younger children, I could show them a simple stencil of a playdough mat and they could shape/form the playdough to follow the path. For older children, I will give them a more challenging stencil to follow.

Unleashing Creativity: The “Finish the Picture” Activity

“If I can dream it, I can make it!” Welcome to our creativity workshop! Today, we're diving into a fun activity called "Finish the Picture." It's all about taking a simple shape made of playdough and turning it into something new using everyday materials. Feel free to take a look at the book “Made By Maxine” to see how she incorporates old recycled materials into brand-new things!

This activity is like a journey of transformation. With just a small shape of playdough, students get to unleash their imagination and create something totally unique. It's not just about making art; it's about problem-solving, thinking outside the box, and having fun with creativity.

As students get their hands dirty and start molding, they'll discover endless possibilities. From making animals to buildings, there are no limits to what they can create. Our job as facilitators is to support their journey and encourage them to explore their artistic instincts.

So, let's get started on this adventure of creativity. Together, we'll see where our imaginations take us and celebrate the magic of turning something simple into something extraordinary. Simply ask for your shape of playdough and pick any materials from the bin!

Galactic Gliders

Big Idea: This challenge focuses on understanding the principles of aerodynamics and air pressure. Students will also learn about concepts such as thrust, control, and precision while guiding the ball through the course.

Procedure: The students will be guiding a ping pong ball through an obstacle course using a blow dryer. The course will be set up on a table with hoops that vary in height and distance from each other that the students will guide the ball through. The students will be timed to see how fast they can complete the obstacle course.

1. Take a wood plank about 7" X 4" wide and 1 inch high.
2. Drill a hole to fit a 1" PVC pipe at the center of the plank.
3. Cut the PVC pipe to the desired heights and lengths. Create different angles and designs with the cut PVC pipes using the connectors. At the end of each PVC pipe attach a wire ring as shown in the picture.
4. Make about 5 to 6 stations.
5. Turn a hair dryer on the highest setting and point it directly up so the air stream is toward the ceiling. (We found that adding a small attachment to the end of the blow dryer to control the airflow allowed the ping pong ball to balance more easily.)
6. Place a ping pong ball above the hair dryer and balance it in the air stream.
7. Let the ping-pong ball pass through different rings created as shown in the picture above.
8. Slowly start to tilt the hair dryer side to side and watch the ping pong ball float.
9. Change the speed of the blow dryer and see if it affects the ball.



Tools:

- Stopwatch
- Blow dryer
- PVC pipe cutter
- Drill and drill bits
- Wire cutters
- Tape

Materials:

- Ping-pong balls
- PVC pipes and connectors
- Wood plank stands
- Wire hoops
- Fuzzy sticks

Challenge: Welcome, young astronauts! Are you ready to join Ms. Frizzle on an exciting journey through space? Your mission is to navigate your spacecraft (a ping-pong ball) through a meteor shower. Stay focused and work quickly to avoid the meteors as you fly your spacecraft to safety!

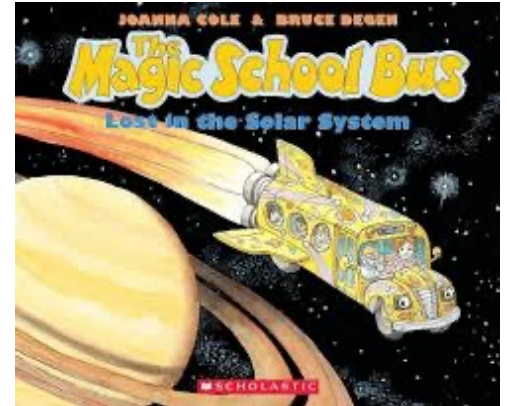
Assessment: The students will be assessed by how they modify their techniques to pass through the hoops successfully.

Essential Questions:

- What techniques can you use to guide the ball through the course?
- How can you control the blow dryer to keep the ball on track?
- How do the different sizes and placements of rings affect the movement of the ball?
- What do you think makes the ball float in the air?
- How can you get the ball through the hoops faster? Easier?

Age Modifications: You can simplify the obstacle course for younger students by making larger rings that are closer together.

Book Tie-In: *The Magic School Bus: Lost in the Solar System* by Joanna Cole



BEAUTY AND THE BEAK



FEATHERS AND
FRIENDS: DESIGNING
A HELPING HAND FOR
BEAUTY THE EAGLE



BEAUTY AND THE BEAK

Feathers and Friends: Designing a Helping Hand for Beauty the Eagle

Low/ High Tech

Big idea:

- Problem solving through engineering design can be used to help others: Develop Empathy

Essential Questions:

- How can you design a prosthetic hand through paper engineering that can move?

The Challenge:

Your challenge is to build a prosthetic hand through paper engineering that can move. Beauty the Eagle is very weak from her injury, use your prosthetic hand to pick up the fish and place it in the bowl to feed Beauty.

Teacher Materials:

- Paper Engineering Book
- “Beauty and the Beak” book
- 3D Printed fish
- Bowl

Student Materials:

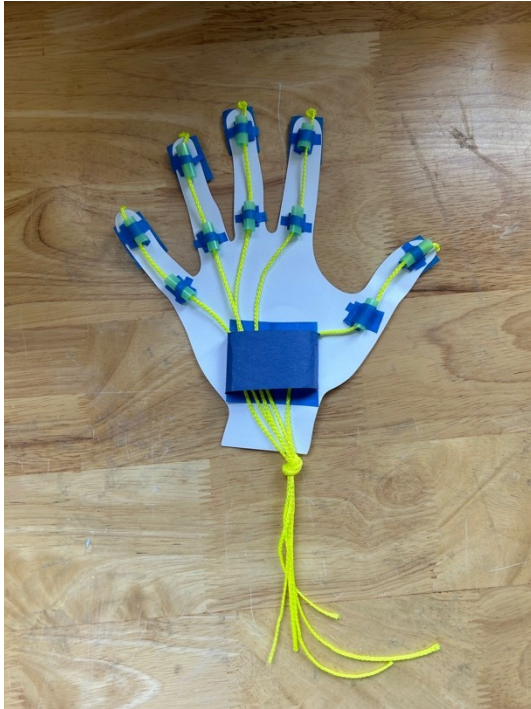
- Laser Cut Hand
- String
- Straws
- Construction Paper
- Tape

Questions:

1. What are the main components of a prosthetic hand, and how do they work together to mimic the movements of a real hand?
2. What are some examples of paper engineering techniques that could be used to create movable parts for the prosthetic hand?

3. What are some potential challenges or limitations we might encounter during the design and construction process, and how can we address them?
4. How can we test the effectiveness of our prosthetic hand design, and what criteria will we use to evaluate its success?

Pictures:



Modification:

- Provide more structured guidance and step-by-step instructions for building the prosthetic hand.
- Use simpler materials and techniques that are age-appropriate, such as pre-cut templates and easy-to-assemble components.

BEAUTY AND THE BEAK

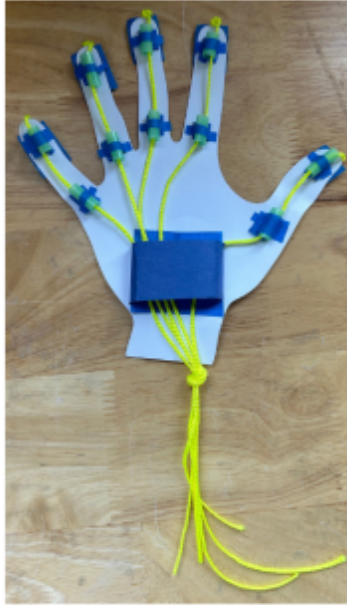
FEATHERS AND FRIENDS: DESIGNING A HELPING HAND FOR BEAUTY THE EAGLE

BIG IDEA!

PROBLEM SOLVING
THROUGH ENGINEERING
DESIGN CAN BE USED TO
HELP OTHERS:
DEVELOPING EMPATHY

MATERIALS:

- LAZER CUT HAND
- STRING
- STRAWS
- CONSTRUCTION PAPER
- TAPE



THE CHALLENGE:
YOUR CHALLENGE IS TO
BUILD A PROSTHETIC
HAND THROUGH PAPER
ENGINEERING THAT CAN
MOVE. BEAUTY THE
EAGLE IS VERY WEAK
FROM HER INJURY, USE
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BEAUTY AND THE BEAK

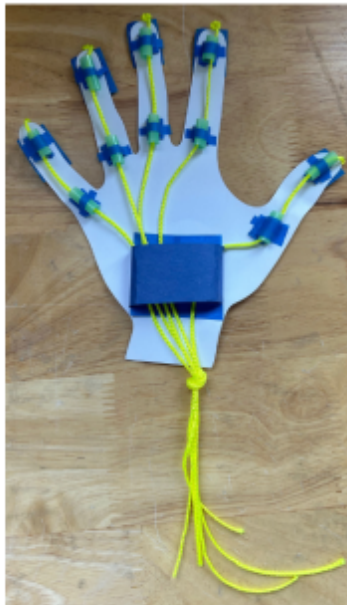
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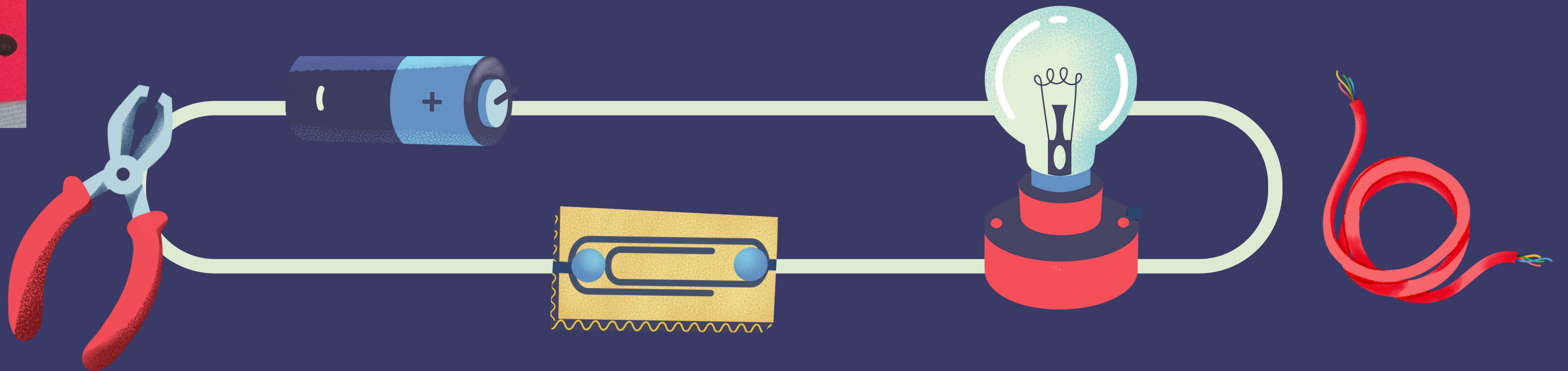
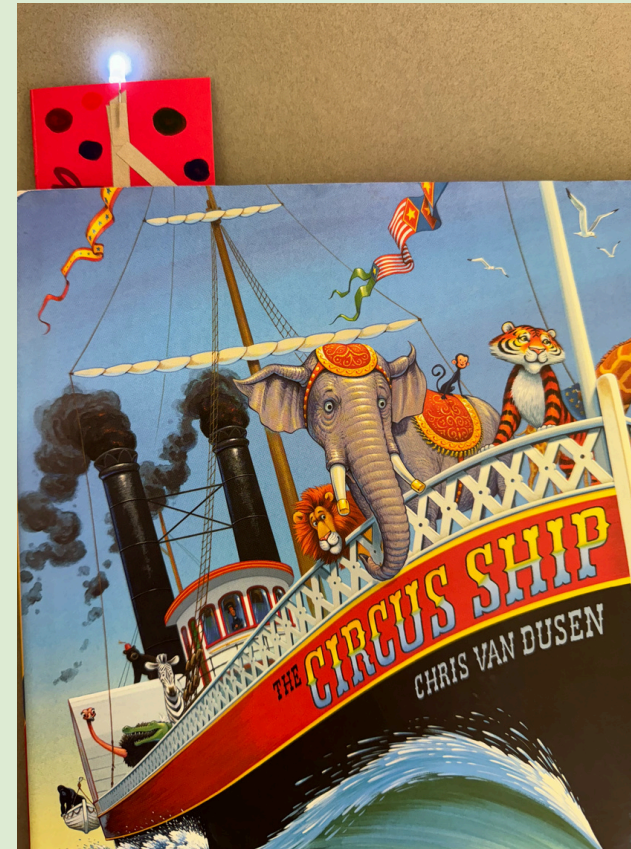
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ILLUMINATE YOUR PAGES





ILLUMINATE YOUR PAGES

Big Idea: Electricity can illuminate our world

PROCEDURES:

1. Collect Materials
2. Attach the long strip of conductive tape on one side of the bookmark with some going over to the other side.
3. On the other side that does not have the strip of copper tape, put a smaller one at the top.
4. Attach the coin cell battery to the bottom with another strip of copper tape.
5. Lastly, Attach the LED at the top.

Challenge:

Design and create a glowing bookmark that lights up when inserted into a book, making it easier to find your place in the dark

MATERIALS:

- Cardstock Paper
- LEDs
- Conductive Tape
- Coin Cell Batteris
- Decorative Materials

ILLUMINATE YOUR PAGES

Big Idea: Electricity can illuminate our world

Materials:

- Cardstock Paper
- LEDs
- Conductive Tape
- Coin Cell Batteries
- Decorative materials: crayons & markers



Procedures:

1. Collect Materials
2. Attach the long strip of conductive tape on one side of the bookmark with some going over to the other side.
3. On the other side that does not have the strip of copper tape, put a smaller one at the top.
4. Attach the coin cell battery to the bottom with another strip of copper tape.
5. Lastly, Attach the LED at the top.
6. Decorate!



Potential assessment questions:

- Describe the process of breathing the paper circuit. What challenges did you face and how did you overcome them?
- How does your bookmark help your reading experience compared to a traditional bookmark?
- What are the roles of each element? (LEDs, Copper tape, coin cell battery)

Make challenges harder: Have students incorporate designs such as patterns and shapes.

Make challenges easier: Have step-by-step instructions.

STORIES IN MOTION

PROCEDURE:

BUILD THE BOX

CUT A 5 1/2 INCH OPENING ON THE BOX

SPLIT PAPER INTO 3 SECTIONS

DRAW 3 SCENES IN YOUR SECTIONS

INSERT THE DOWEL ROD IN THE BOX .

SLIP THE PAPER THROUGH THE CUT
TAPE THE PAPER TO THE DOWEL ROD

INSERT YOUR CHARACTER



STORIES CAN BE BROUGHT TO LIFE USING SIMPLE MATERIALS
& A BIG IMAGINATION!

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STORIES CAN BE BROUGHT TO LIFE USING SIMPLE MATERIALS
& A BIG IMAGINATION!

Stories in Motion



Challenge: Design and construct a background for *The Day the Crayon Came Home* character based off of events in the book.

Big Idea: Stories can be brought to life using simple materials & a big imagination!

Scenario: Students are learning about setting in a story. The teacher wants students to identify three different settings throughout the story *The Day the Crayons Came Home*. The teacher also wants students to incorporate math and creativity, so the students must create a moving background to identify three settings in the book.

Essential Question:

- How can we use simple materials to bring our favorite book to life?

Materials:

- 6 x 6 box
- One 10- inch dowel rods
- One 3-inch dowel rod
- One 5x14 piece of paper
- Crayons, markers, colored pencils, etc.
- Tape
- Character Cutout

Tools:

- Exacto Knife

Limitations:

- Can only use materials provided

Results:

- Physical box
- Sketch & Design Sheets

Make Challenge Harder:

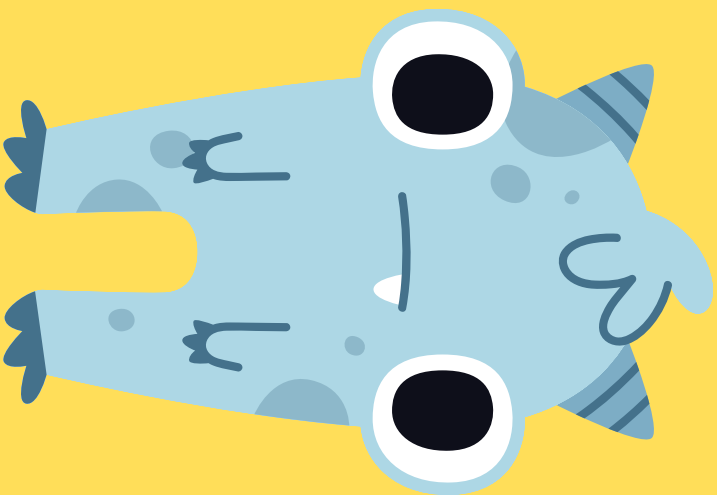
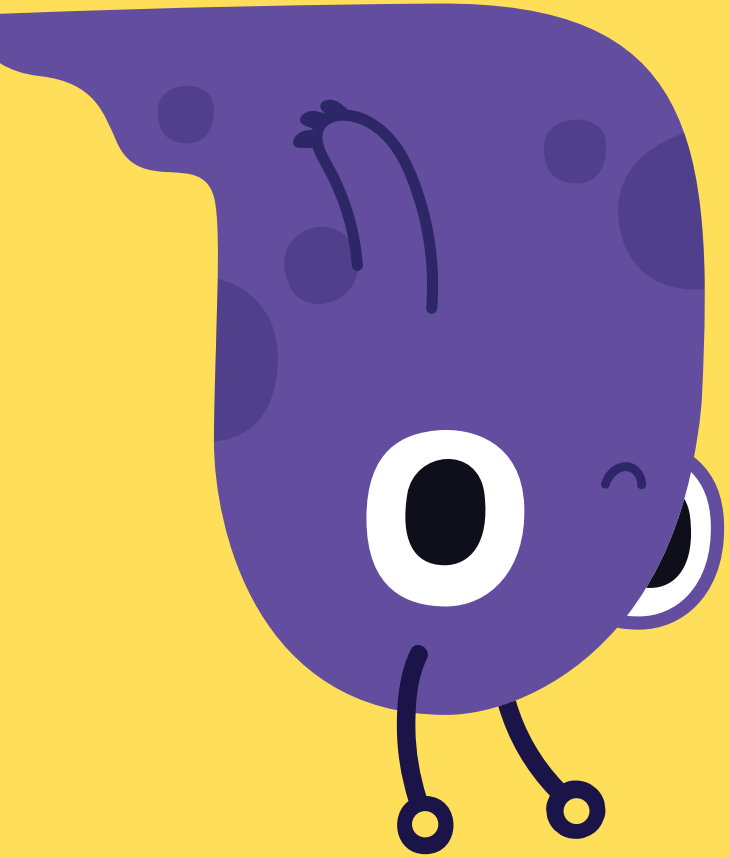
- Cut a longer piece of paper and add extra scenes.

Make Challenge Easier:

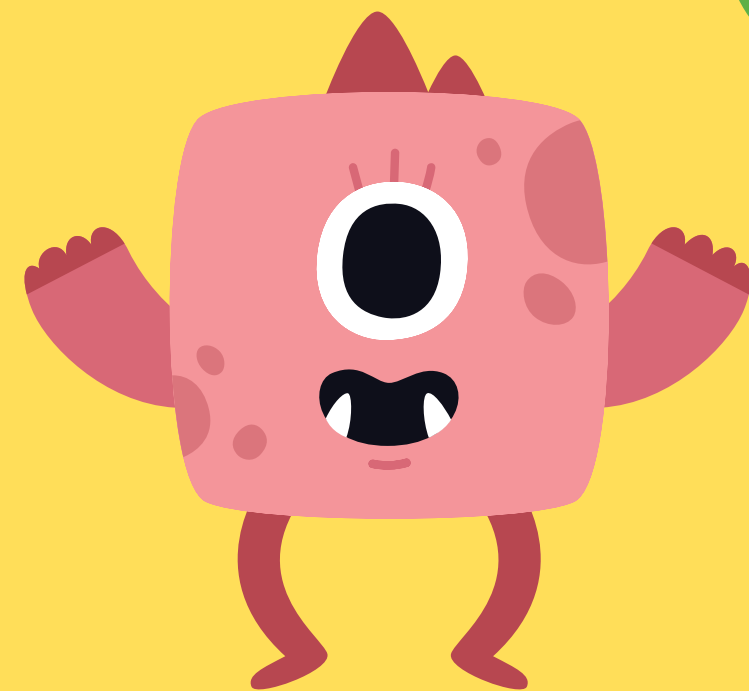
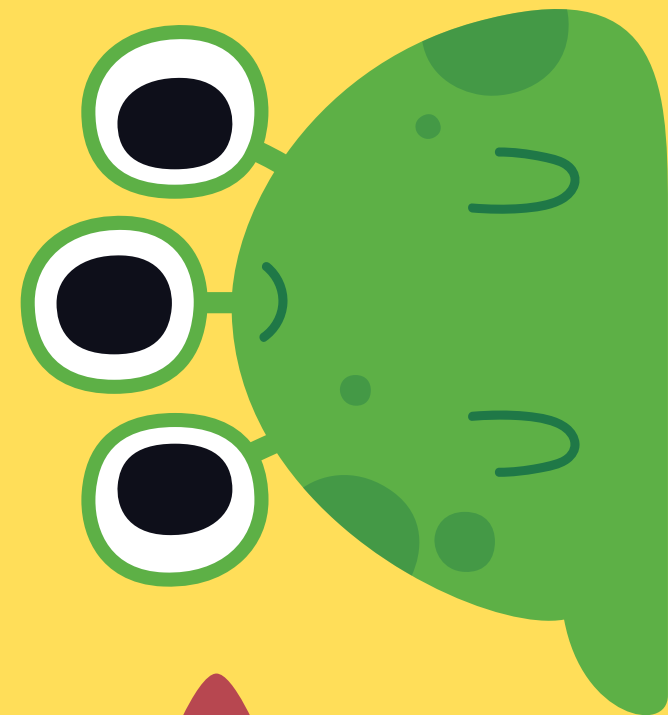
- Have dowel rod in place & all the materials cut & ready.

Procedure:

- Read *The Day the Crayon Came Home*
- Fold 6 x 6 box
- Cut off top four folds using exacto-knife
- Cut 5 ½ inch cut across the right side of the box. Approximately ½ inch from the top.
- Insert 10-inch dowel rod through the top and bottom of the box. Place the dowel rod approximately 1 ½ inches from the left of the box.
- Measure & draw lines to split your paper into 3 sections. Each section will be 5 inches long and will each represent a scene from the book.
- Design, color and create 3 scenes from your book.
- Tape the far left side of your paper to the dowel rod. Have your drawings taped to the top side of the dowel rod.
- Tape your character to the 3 inch dowel rod.
- Stick the dowel rod through the bottom of the box in a position that is centered to your background.
- Roll the dowel rod to see your book come to life.



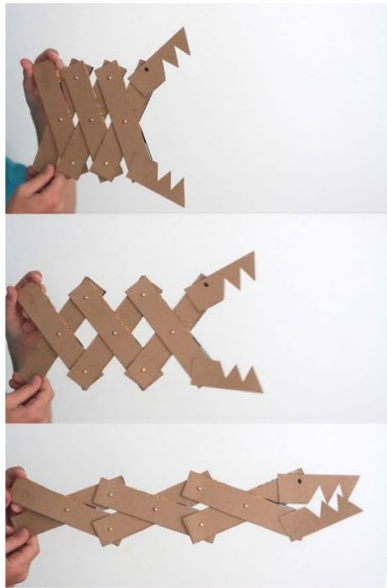
CREATURE GRABBER



CREATURE GRABBER

BIG IDEA : CREATE MOVEMENT USING SIMPLE MATERIALS

DIFFERENTIATION: PIECES CAN BE MADE AHEAD OF TIME OR TEMPLATES COULD BE MADE AND USED DEPENDING ON AGE AND ABILITY.



LITERACY INTEGRATION: WHERE THE WILD THINGS ARE

DETAILED DESCRIPTION OF THE PROCEDURE INCLUDING TOOLS AND MATERIALS:

STUDENTS WILL CREATE A CARDBOARD CREATURE THAT OPENS AND CLOSES ITS MOUTH.

YOU WILL CUT PIECES OF CARDBOARD INTO 7.5 IN X 11.5 IN. THEN YOU WILL CUT THOSE INTO 6, 1.25 IN WIDE PIECES AND WILL CUT THOSE IN HALF. THEN YOU WILL POKE THREE HOLES IN EACH STRIP.

STUDENTS WILL THEN MAKE THREE X SHAPES BY FASTENING THEM WITH A BRAD THROUGH THE MIDDLE HOLE.

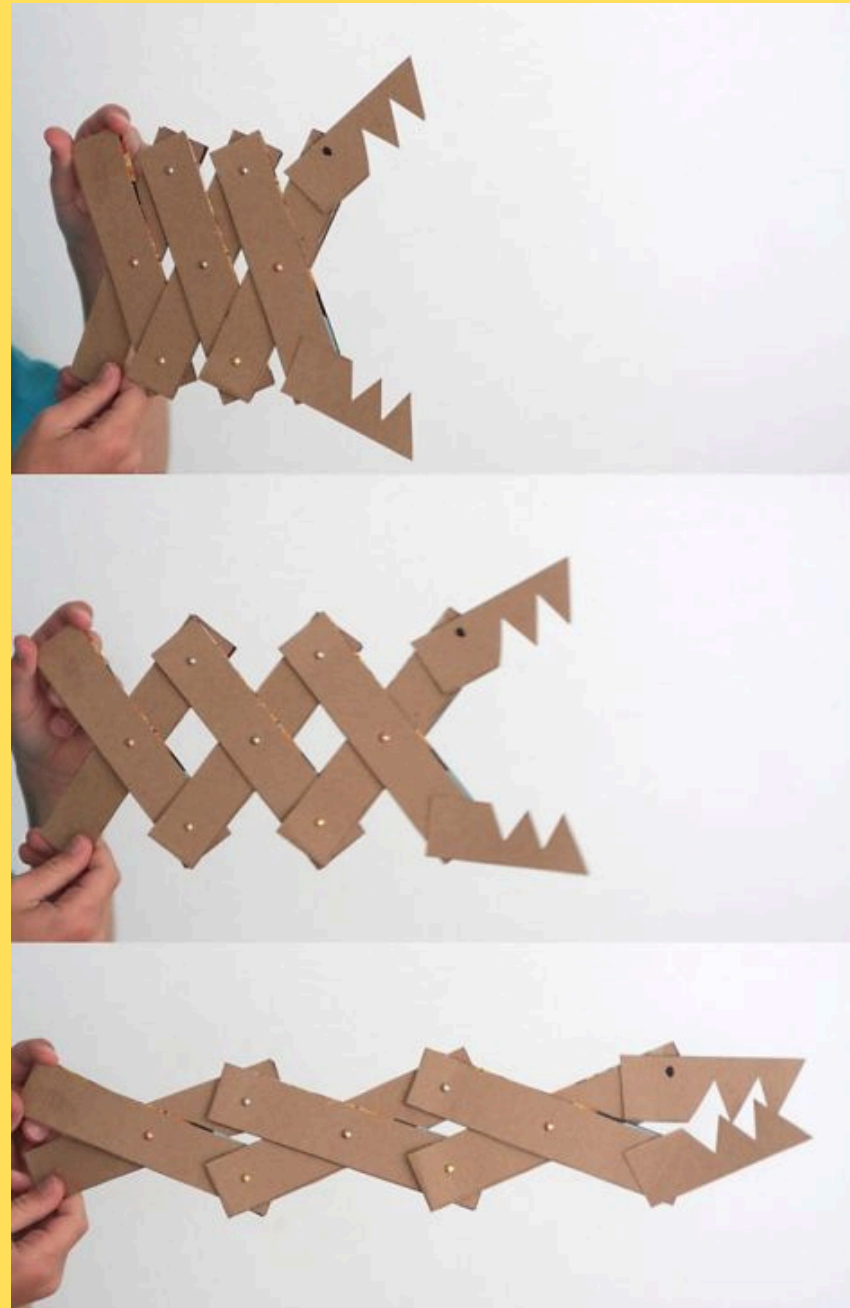
THEY WILL THEN FASTEN EACH OF THE X'S TOGETHER TO FORM A CRISS CROSS SHAPE. STUDENTS WILL THEN DRAW AND CUT OUT THEIR MONSTER OR ANIMALS HEAD (OPTIONS CAN BE LASER CUT AHEAD OF TIME) AND GLUE IT TO ONE END OF THE MOVING PARTS. STUDENTS CAN COLOR AND DECORATE THEIR CREATURES HOWEVER THEY WANT.

POTENTIAL ASSESSMENT: WHAT QUESTIONS WOULD YOU ASK STUDENTS ALONG THE WAY OR FOLLOWING THE CHALLENGE: I WOULD HAVE STUDENTS MAKE A PLANNING PAGE AND PRACTICE MEASUREMENT WHILE CREATING THEIR CREATURE.

Creature Grabbers: Where The Wild Things Are

materials:

- pre cut cardboard pieces- heads and accordian pieces
- brads
- crayons, markers, glue, paper, scissors tape



create a movable creature using cardboard and brads, then design and color your creature however you want!

big idea:
movement can be created using simple materials



literacy connection:
Where the Wild Things Are by Maurice Sendak