

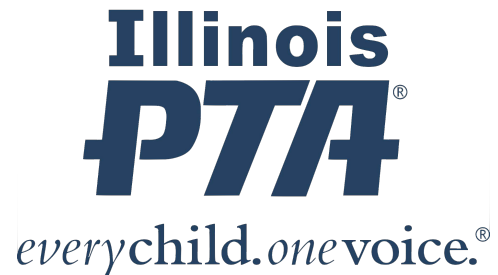


# K-5 READY-TO-GO ACTIVITIES

## This S.T.E.A.M. book is brought to you by:

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# What is S.T.E.A.M.?

STEAM (Science, Technology, Engineering, Art and Mathematics) is a strategy for exploring multiple content areas in a collaborative, inquiry-based activity. Children are presented with a challenge or design concept that encourages inductive (inventive) thinking and deductive (conclusive) thinking. Inductive activities allow children to create products that are unique. Deductive activities allow children to create products that are similar but construction and materials may be different. These skills are not only a part of all children's academic needs, but their social emotional development as well.

The adults will assume the role of facilitator during these challenge problems. Inquiry questions are essential tool to guide children. The goal of these questioning strategies is to facilitate productive struggle--pushing children to think deeper and persevere in problem solving. Adults can then promote the design process thinking without "solving" the challenge for the children.

Engaging in hands-on STEAM activities at home provides opportunities for families to communicate, explore, problem solve, and create together. STEAM challenges are activities designed for children to feel successful. This is especially important for Children who struggle academically or behaviorally as well as English Language learners. Children learn to work together to accomplish a challenge and practice Social Emotional Learning skills they will need for success in school and career. This is a great opportunity for children to apply what they are learning at school and demonstrate their understanding and discoveries to their families.

STEAM components should involve problem-based and performance-based activities. Children learn the steps to solving a challenging activity by asking questions, imagining the solution, planning the design for the solution, creating the design and testing and reflecting to improve the original design.

## Safety Guidelines

**Adults** – Always perform an experiment or demonstration without the children prior to allowing students to replicate the activity. Look for possible hazards. Alert children to potential dangers.

**Children** –

- Stay alert. Stay focused.
- Do not touch anything without an adult's permission.
- Always clean up and return materials to the proper storage place.
- Never use tools for a purpose they were not intended
- THINK before you act.
- Clean up spills as soon as you can.
- Use caution when using tools.

## Inquiry Questions for Families

**What are some different things you could try?**

**What would happen if you...?**

**What might you try instead?**

**What will you do next?**

**How many attempts at the challenge? What did you adjust?**

**Tell me about your choice of materials.**

**Tell me what happened...**

**How could you use this strategy?**

**What will you do next after finishing this part?**



*Science, Technology, Engineering, Art and Mathematics  
Ideas to support STEAM exploration at home.*

# S.T.E.A.M. Challenges

A Day at The Airplane Races.....	3
Design A Boat Challenge.....	4
Cotton Candy Fluffy Slime** .....	5
Drops on A Penny.....	6
Evaporation Art.....	7
Floating A Ping Pong Ball.....	8
Hoop Glider.....	9
Grass Heads** .....	10
Kaleidoscope.....	11
Marshmallow Catapult.....	12
Musical Straws.....	13
Spaghetti Tower** .....	14
Toothpick Bridges.....	15
Zipline.....	16

## RESOURCES

- The BEST of STEM Book List by the National Science Teachers Association (K-12) ....17-18
- Online Resources for additional challenges/activities/grants/interactive simulations ...19

\*\*Supplies are not provided

# A Day at the Airplane Races

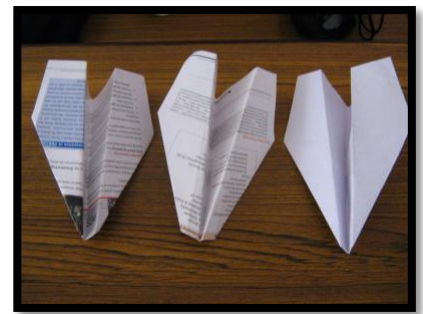
## Materials:

Sheets of white paper (can be various sizes), scissors, colored pencils, crayons or markers, experiment journal and yard stick (or measuring tape), timer for “in-flight” measurement.

## Challenge: Design an airplane that can fly the farthest or stay “in-flight” the longest.

Design and make your paper airplane. Some instructions on many styles can be found at <https://www.origamiway.com/paper-airplanes.shtml>. After Children have built and designed their paper airplane perform 4 test flights.

Use a T-chart in an experiment Child Journal to document each flight (Attempt/Distance or flight time). Each flight should be measured with a yard stick (measuring tape) using inches or centimeters (younger children may use other objects as units of measurement such as their feet or unit cubes or legos). Children can determine if the measurement is to “where the plane lands” or “where the plane stops” ...which can sometimes be two different distances. Children can adjust between test flights, but they need to record what was adjusted in the journal. Once the 4 flights have finished, calculate the average distance that the plane flew for each child. Create a graph showing the different flights.



**Extension:** Choose different sizes, weights, textures of paper. Children can add a “passenger” to the plane (washer, paperclips or Lego person).

## Guiding Questions:

What changes did you make to your original design during the testing?  
Why do you think those changes helped or hindered flight?  
What does the experiment tell you about flight?  
Does it make a difference in distance if the plane is bigger? Smaller? Different shapes?  
Is there a difference between the “longest length” flight and the “longest time” flight?

**Art Activities**  
*Graphic designs added to the airplanes.*

### Suggested Books

#### K-2:

Flight School by Lita Judge

#### 3-5:

First Flight Around the World: The Adventures of the American Fliers Who Won the Race by Tim Grove

# Cotton Candy Fluffy Slime

## Materials:

Elmer's style white glue, saline solution (includes sodium borate & boric acid), foam shaving cream (NOT GEL), baking soda, spoons, measuring cups, bowls to mix, and food coloring for colored fluff.

## Challenge: Observe the feel, smell, texture and how the slime behaves.

Place 3-4 cups of shaving cream into a bowl (adjusting the quantity will change the texture). Add color and  $\frac{1}{2}$  cup of glue and mix. Add  $\frac{1}{2}$  tsp of baking soda and mix. Add 1 tablespoon of saline solution to the mix and start "whipping". Once completely mixed Children can take it out of the bowls with their hands. (Put some saline solution on hands to avoid "sticking").



## Guiding Questions:

- Is slime a liquid or solid?
- When did the mixture "come together"?
- What do you think caused this?
- Where else in our lives do we use polymers?

### Suggested Books

#### K-2:

The Slime Book by Erin Kelly

#### 3-5:

Once Upon a Slime by Andy Maxwell

### Art Activities

*Mix several drops of colors to create new colors on the color wheel. Have students create secondary colors from Primary colors.*

# Design a Boat

## Materials:

Rolls of aluminum foil, pennies or small washers the same size, large tub to hold water or sink, tap water

## Challenge: Can a boat be designed to keep 100 pennies or more afloat?

Provide each child with two .5m x .5m sheets of foil. (Older Children can do the measuring and cutting with an adult checking for accuracy.) Instruct Children that one sheet is for “testing” and the other is for their final boat. The design challenge is to create a “boat” that will hold the most pennies. Children are only allowed to use the foil sheet for their design. Place a large number of pennies near the tub or sink of water. Children brainstorm ideas and then test their design. Children should be able to test without other groups observing their designs. When Children believe their design is ready, have all groups bring them to a testing area to begin the challenge.

Phet Labs in Colorado simulation

<http://phet.colorado.edu/en/simulation/buoyancy>

BrainPOP buoyancy

<https://www.brainpop.com/science/motionsforcesandtime/buoyancy/>



## Guiding Questions:

- Why do some designs hold more pennies?
- Does the method in which the pennies were added make a difference in the float?
- Does the size of the tub contribute to the float?
- Can a model be drawn to show balanced forces acting on the boat?
- Could different boat designs be used for different purposes?

### Suggested Books

#### K-2:

Who Sank the Boat? By Pamela Allen

#### 3-5:

The Real Boat

By MARINA AROMSHTAM

### Art Activities

*Students can create a poem or short story (with or without illustrations) about their boat, i.e.... a pirate boat searching for buried treasure, shipwrecked, vacation voyage, stormy seas...*



# Drops on a Penny

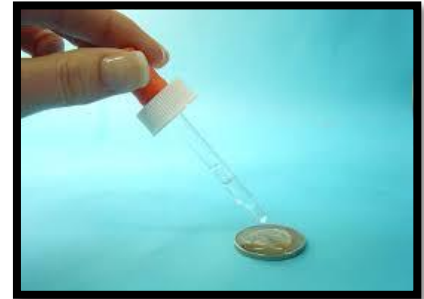
## Materials:

Pennies, water, eye dropper

## Challenge: How many drops fit on a penny?

Wash and rinse a penny in tap water. Dry it completely with a paper towel. Place the penny on a flat surface. The flatter the surface, the better this experiment is going to go. Use an eyedropper or pipette to draw up water. Carefully, drop individual drops of water onto the flat surface of the penny. Keep track of the water drops as you add them, one at a time, until water runs over the edge of the penny.

Do this 5 times and then calculate the average number of drops as the result.



**Extensions:** use different coins to get different counts. Use different liquids – vegetable oil, salt water, soda...etc.

## Guiding Questions:

If done multiple times does the number change? Why?  
Where else have you observed water behave this way?  
Draw a model of what is happening between the water molecules?  
Why did some groups experience different results?  
How did the different liquids behave?

### Suggested Books

#### K-2:

All the Water in the World by George Ella Lyon

#### 3-5:

A Drop Of Water: A Book of Science and Wonder  
by Walter Wick

### Art Activities

*Students can change to dropping colored water on a porous surface – a paper towel. Discuss the texture of the paper towel and how it might affect the colored liquid. Use at least 3 eye droppers of different colors per group. Facilitate a discussion on primary and secondary colors.*



# Evaporation Art

## Materials:

Shallow trays with rims, Cardstock, coffee filters, or heavy paper cut to fit the bottom of the trays, Food coloring in various colors, Cups, Eyedroppers or small spoons

## Challenge: Create a painting without a paintbrush.

1. Fill the cups halfway with water.
2. Place a few drops of food coloring into each cup.
3. Use your eyedropper or small spoon to drop the colored water onto your paper. Try to use different amounts of water each time, so that you'll be able to see the different rates of evaporation.
4. See how your artwork changes as it dries, and the water evaporates!



## Guiding Questions:

- How long did it take for the paper to dry where you placed water?
- Which parts of your paper dried more quickly than other parts?
- What variables affected the intensity of the colors?
- Can primary color drops be changed to secondary colors during evaporation?
- How could the evaporation be sped up?
- Did certain colors dry faster than others?
- What could we do to speed up the drying process?

### Suggested Books

#### K-2:

Water Is Water: A Book About the Water Cycle by Miranda Paul

#### 3-5:

Did a Dinosaur Drink This Water? by Robert E. Wells

### Art Activities

*After the initial artistically created paper, have students adjust the colors, amounts of water, spacing and other variables to create more designs.*

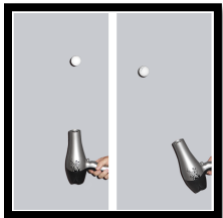
# Floating a Ping Pong Ball

## Materials:

Ping pong balls and hair dryer. (Possibly one or more extension cords for the hairdryer placement.)

## Challenge: Move a Ping Pong ball through an obstacle course. (SPANGLER)

Turn the hairdryer on the highest settings and point it straight up. Gently place the ping-pong ball within the flow of air from the hairdryer and balance it in the air stream. Once Children practice balancing the ball, they can create an obstacle course with stages of barriers to go over and under while balancing the ball. Examples: walk from one side of the classroom to the other, sit down in a chair and then stand up, complete a zig-zag walk around desks.



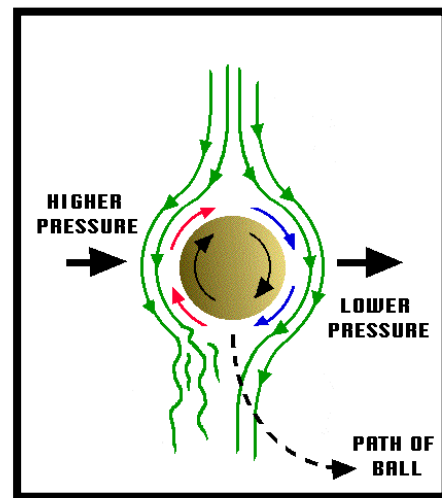
### What's Going On?

The ping-pong ball will fly up with the air from the hair dryer until it reaches a point of balance – this is where the force of gravity (which pushes the ping-pong ball down) is equal to the force of the air (which is pushing the ping-pong ball up).

The ping-pong ball stays within the column of air coming from the hair dryer because of air pressure. The air coming from the hair dryer is moving faster than the air around it, and this means that it also has a lower air pressure than the air around it. (We know this thanks to our old friend Bernoulli, who discovered this relationship back in the 1700's.) So, the ball is kept within the column of lower air pressure because of the higher-pressure air surrounding it.

## Guiding Questions:

- How far can the hairdryer be tilted to the side before the ball falls out of the air stream?
- Why does the ball stay in the air stream?
- Would a smaller / larger ball behave the same way?
- What if the air was moving faster?
- Is the ball spinning?



### Art Activities

*Play with Postures - Students can come up with 3 postures/actions to perform while getting their ball to levitate. (Standing on one foot, dance pose, jumping.)*

### Suggested Books

#### K-2:

Air: Outside, Inside, and All Around by Darlene Ruth Stille

#### 3-5:

The Air We Breathe Picture Book by NASA (digital version available for free)

<https://www.nasa.gov/stem-ed-resources/the-air-we-breathe.html>

# Grass Heads

## Materials:

Old tights/stockings (Knee highs without the reinforced toe will work as well), dirt (planting soil is best), grass seeds, rubber band, a pot for your “head” to sit in, optional googly eyes, and felt for decoration.

## Challenge: Grow “hair” on the created creature.

Place 2-3 tablespoons of grass seed in the “toe” of the stockings. Add dirt until you have a nice size “ball”, should match with the opening size of the pot. Tie the other end of the stockings into a knot. Shape the ball into how the head will look. (Optional- pinch a nose, twist it and tie it off with thread) Decorate your person. Place the head in the pot tied end down. (Yogurt containers work great!) No holes in the bottom of the pots! Add water – if you leave a tail of stocking for inside the pot, just place water in there...or you can give your person a shower with a spray bottle. Use a good amount of water the first time, then not too wet (too much water makes the grass moldy). Place in a sunny location. A good head of hair should be produced within 12 days.



Children can measure the hair growth each week and chart their individual creature. Also compare those growing in “sunlight” with ones in “darkness” ....or other variables.

## Guiding Questions:

- What did the grass need to start growing?
- Will cutting the hair increase the growth? Decrease?
- What do you think is happening inside the stocking?
- What variables are acting on the creatures and what differences are observed?
- What could be added to accelerate the growth?

## Art Activities

*Create a story/animation/cartoon of the adventures that your “person” might be doing.*

## Suggested Books

### K-2:

In the tall, tall Grass by Denise Fleming

### 3-5:

Lawn Mower Magic by Lynne Jonell

# Hoop Glider

## Materials:

Glider- Paper strips, small paper clips, drinking straws, tape, and scissors (optional if pre-cut strips offered).

Test track – Any room that has open space or outdoors. Measure out 5' increments marking them either with tape, rope or anything that will keep its place at the mark. Include a starting line.

## Challenge: Design a Hoop Glider to fly the farthest or stay in flight the longest.

A hoop glider is a homemade paper aircraft that uses the four forces of flight to fly, much like a paper airplane. Curved surfaces on top of the glider help generate **lift**. An aerodynamic shape reduces **drag**. **Gravity** pulls the glider toward the ground and your arm provides **thrust**!

Making a "Prototype" Hoop Glider: Choose one paper strip and form it into a loop. Use a paper-clip to hold the ends of the loop together. Make a second paper loop in the same way. Attach a straw to one of the loops: using the same paper-clip that holds the loop together, maneuver the small end of the paper clip into the end of the straw. Now attach the second loop to the other end of the straw. (Children determine the size of the loops during trials.)

This activity reinforces good science practices by emphasizing the importance of replicating your experiments (i.e. testing each glider multiple times to see if the glider flies the same way in every trial) and controlling variables (i.e. changing only one feature of your hoop glider design at a time).



## Guiding Questions:

- How far does your hoop glider fly?
- Can you design a hoop glider that flies farther?
- What happens when you change: loop shape? straw length? glider weight? loop size? number of loops?
- How are the loops aligned? If you change the alignment, what happens?

### Suggested Books

#### K-2:

I am Amelia Earhart by Brad Meltzer

#### 3-5:

Science Comics: Flying Machines Wilgus, Alison

### Art Activities

*Students can create a fictitious "hoop glider" airline company. The group creates the name for the airline and creates an advertising poster or TV ad to persuade people to fly their airline.*

# Kaleidoscope

## Materials:

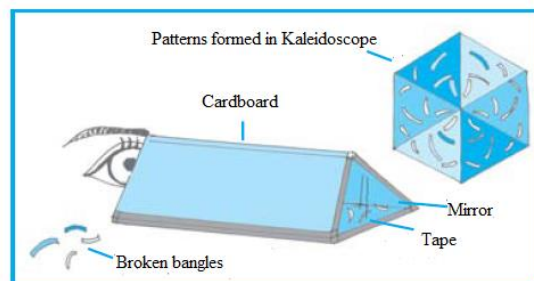
Empty toilet paper tube, mylar sheets (thicker sheets, not rolls of thin), scissors or paper cutter, scotch tape, white cardstock, bendy straw, markers, stickers and other decorating materials (Optional – paint to decorate the tube.)

## Challenge: Create a tool to see multiple views of the same design.



*If painting the tube, do this prior and let dry.* Cut the mylar sheets into strips (length of the tube being used). To make sure of the dimensions, cut a piece of cardstock as a template. Place 3 strips face down (shiniest down) and tape together, leaving a small space between so they can be folded. Fold the strips to make a triangular prism (tape on the outside/shiny inside). Tape along the top to hold in place. Slide the prism into the tube. Cut off the end of the bendy straw at the bottom, leaving the bendy part and about 2-3 inches. Tape the straw onto the tube with the bendy part hanging over the end of the tube. Cut

out circles (3.75" in diameter) from the cardstock. Poke a hole in the center. Use a sharp pencil or similar...small hole, not a hole punch size. Create designs on the circles.... shapes, colors, words...etc. (Placing the cardstock circle on the bendy part allows it to be turned easily.)



## Guiding Questions:

Why are the images multiplied?  
What happens if a "tessellation" is drawn on the circle?  
Draw a model of what is happening within the tube?

## Suggested Books

### K-2:

Reflections by Ann Jonas

Light: Shadows, Mirrors, and Rainbows by Natalie M. Rosinsky

### 3-5:

Reflections of Me by Candance Robertson-James

## Art Activities

*Recreate the kaleidoscope colors/designs that are shown in the challenge project.*

# Marshmallow Catapult

## Materials:

10 craft sticks/popsicle sticks, 4 rubber bands, bottle cap, marshmallows or pompoms, craft paint, foam paintbrush, and hot glue gun (double-sided tape can be substituted for younger grades). (per group)

## Challenge: Build an object/tool to send marshmallows across the room.

If painting the catapult, paint the sticks and let dry prior to building. Stack 8 sticks together and band on each end with a rubber band. Band one end of the remaining two sticks. Place the "8 pack" in-between the two sticks to create a fulcrum. Crisscross the final rubber band over the 8 pack/2 pack connections. Hot glue the bottle cap to the end of one of the 2 pack sticks.

Allow Children to create/build targets to use. Calculate accuracy, distance, height...etc.

Modification – Use "paint stir sticks" from a home improvement store to create a larger model.



## Guiding Questions:

- How does the weight of the "ammunition" effect the outcomes?
- What happens if only the 2 pack sticks are modified?
- What happens when the 8 pack is increased to a 10 / 12 / 14 pack???
- How can the height of the marshmallow launch be increased?
- How can the distance of the launch be increased?
- Is there a connection between the height and the distance of the launch?

## Suggested Books

### K-2:

Fraydo the Dragon: A Very Big Problem by Courtney Spain Aragon

### 3-5:

Forces - (Curious Concepts for Kids) by Andi Diehn

## Art Activities

*Dip the pom pom (or cotton ball) into a small amount of paint. Students can launch several colors onto a target and create a "splatter" painting. Students can even take their painting after it dries and draw characters, buildings...etc. around the "splats".*



# Musical Straws

## Materials:

Straws (unwrapped and various diameters), scissors, and supervision for younger grades

## Challenge: Create a musical instrument out of straws.

Flatten the top inch or so (25 mm) of the straw with your teeth. Avoid curling the end of the straw up or down. You can also lay the straw on the table and press it down firmly with a ruler or spoon along the two edges you created.

Cut off both corners of the flattened portion so that it's narrower in the middle than the sides. These two flaps are where the vibrations will come from that you hear as "music."

Place the cut end of the straw into your mouth, seal your lips around it, and blow until a "sound" is produced. It's tough to do so don't rush or blow too hard and long. The sound will be more of a squawk than music.

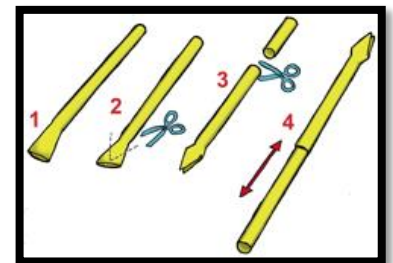
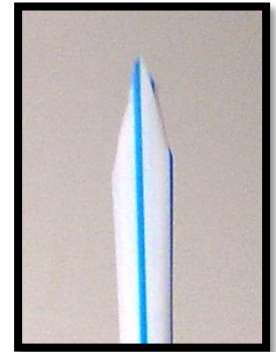
When you get the hang of making noise – uh, that is, music – use scissors to cut short sections off the bottom of the straw while you're making the sound. Listen for rising changes in the pitch as you cut the straw shorter and shorter.

Variation - Use two straws, one narrower than the other and the smaller straw should fit snugly inside the larger straw. On the smaller straw, repeat Step 1 above. Slide the fatter straw over the thinner straw and start blowing. Move the larger straw back and forth to change the pitch of the sound by lengthening or shortening the column of air. It's a straw trombone.

Online Resource: [https://www.sciencebuddies.org/science-fair-projects/project-ideas/Music\\_p016/music/do-re-mi-with-straws?from=Blog#background](https://www.sciencebuddies.org/science-fair-projects/project-ideas/Music_p016/music/do-re-mi-with-straws?from=Blog#background)

Online sound meter: <https://youlean.co/online-loudness-meter/>

iOS App: Decibel X: dB, dBA Noise Meter <https://apple.co/2Ap9twp>



## Guiding Questions:

How is sound made?

How can we make sound higher? Lower? Louder? Softer?

How do we perceive sound?

Draw a model to describe how this works.

### **Art Activities**

*Students can create a SONG or PLAY a tune together as a family.*

### **Suggested Books**

#### **K-2:**

Music, Music for Everyone by Vera B. Williams

#### **3-5:**

Because by Mo Willems



# Spaghetti Tower

## Materials:

25 sticks of spaghetti, 1 yard of masking tape and one marshmallow per team of 2-3 Children.

## Challenge: Construct a tower as high as possible using only spaghetti and masking tape.

Marshmallow must be placed on the top of the tower. The tallest tower still standing unassisted wins.

Directions –

1. No other materials may be used to assist in the support of the tower.
2. Teams will have only 20 minutes. Marshmallow must be on the top of the tower when time is called, and the tower must be standing unassisted.
3. Measurement is a vertical measurement from the table top up.
4. You may stick masking tape to the table top.
5. Spaghetti may be broken into smaller pieces. However, once broken, pieces may not be replaced.

Online Resource:

<https://www.jpl.nasa.gov/edu/teach/activity/spaghetti-anyone/>



## Guiding Questions:

- What worked best? Why?
- What didn't work? Why?
- What do you think engineers have to consider when they suggest which materials would be best for a certain structure?
- What forces cause the tower to tip over?
- What features of the design helped your tower to reach new heights?
- After testing, what changes did you make to your tower?
- How does testing help improve your design?
- What did you learn from watching others?

**Art Activities**  
*Students will sketch out a drawing of what they want the tower to look like prior to the timed building activity. (This can be a set time as well.)*

## Suggested Books

### K-2:

Iggy Peck, Architect by Andrea Beaty

### 3-5:

Architecture According to Pigeons by Speck Lee Tailfeather

# Toothpick Bridges/Towers

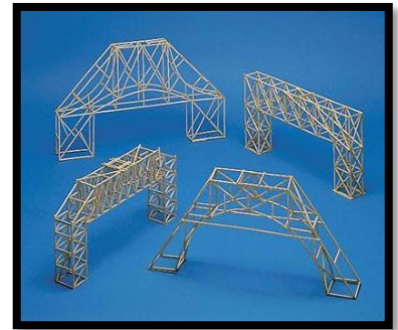
## Materials:

Toothpicks (round uncoated work best), Elmer's glue, graph paper (Can be printed at <http://illuminations.nctm.org/Activity.aspx?id=3509>), wax paper (to build on top of the design), wire cutters (safety concerns with the tools, may need adult help if cutting the toothpicks or use safety scissors.)

## Challenge: Build a structure that can hold a specific amount of weight. (Class can determine weight.)

Children decide on which type of bridge they think will hold up best when weight or pressure is placed on the bridge. (Guide from Elmer's Glue can be found here: <http://elmers.com/docs/default-source/Lessons/bridges-teaching-guide.pdf?sfvrsn=0>)

Children sketch out their design on graph paper making any modifications to the original sample they chose. Once the design is complete, place the wax paper on top of the design. Children can see the design through the paper, but the sticks will not be stuck to the drawing.



Construction help: Children should build the sides first and then join them together. They can add as many pieces that they like to get it ready for testing.

Testing can be done in different ways - Once bridges are dry, they can be placed standing up and have books set on top. Keep adding books until the bridge collapses. Another choice is to create a weighted "pull". (See Elmer's Guide referenced above.) This can be a block of wood with a string (or chain) wrapped around it that is placed inside the middle or on top of the bridge. The string/chain is fed through the structure. Then weights are placed under the at the end of the string. (Tying a bucket or small box and then adding pebbles to it can make a nice way to test.)

## Guiding Questions:

Are there particular shapes or designs that worked better than others?  
What characteristics did the strongest bridges have in common?  
What characteristics did the weakest bridges have in common?

## Art Activities

Diagrams and pre-construction drawings.

## Suggested Books

### K-2:

Pop's Bridge by Eve Bunting

### 3-5:

Twenty-One Elephants and Still Standing by April Jones Prince

# Zipline Challenge

## Materials:

ZIPLINE: 4 feet of smooth line (fishing line or unwaxed dental floss).

Possible carriage materials: Chipboard (cardboard such as cereal box strength.), 2 -4 small paper cups (3oz), ping pong ball, 4 plastic straws, scissors, single hole punch, tape (duct or masking), 4 standard flat steel washers (1 inch in diameter or larger), and 4 wooden skewers. (Materials can be adjusted as challenges change their focus.)

## Challenge: Many challenges – Get an “object” from one side of the line to the other.

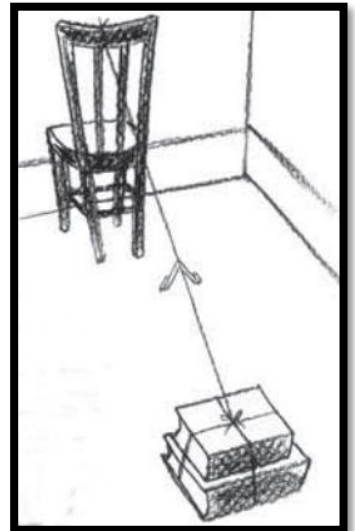
Many challenge themes can be used here....Flat Stanley....Pumpkins, Elves...etc.

Design and build something that can carry a Ping-Pong ball from the top of a zip line string to the bottom in four seconds (or less).

1. How would the materials available carry a ping-Pong ball down the line?
2. How will the carrier stay on the line?
3. What should be in contact with the zip line so that the carrier slides quickly?

(When constructing the “line” make sure the top is at least 2 feet above the bottom end. Construction can be the back of a chair as top and a stack of books as the end.)

**Extension:** Choose other items to “zip”. Flat Stanley, Elf at the holidays, pumpkin candies, Easter Eggs, the ideas are endless. Change up the materials. Have the challenge be the “slowest” to descend.



## Guiding Questions:

- What if the ball drops off while zipping?
- What if the ball stops halfway down?
- What can you change to make the ball travel faster or slower?
- When designing a zip-line for people to use, what are some important things to consider?
- What safety features could be added to the zipline?

## Art Activities

*Students can create a story about why the item “zipping” needed to move in this manner. Where were they going? Slow or fast? Why?*

## Suggested Books

### K-2:

Flat Stanley by Jeff Brown

### 3-5:

Zip---Line Mice: The life and times of Rose Petal the mouse and all her workshop friends. (Volume 1) by Blue Belle Honeymouse

## The BEST of STEM Book List by the National Science Teachers Association (K-12)

Title	Author	Lexile
A Global Warming Primer	Bennet, Jeffrey	985L
Ada Lovelace Sees Red	Calandrelli, Emily	610L
Ada Lovelace Poet Of Science	Stanley, Diane	810L
Ada's Ideas: The Story of Ada Lovelace, the World's First Computer Programmer	Robinson, Fiona	900L
Astronaut-Aquanaut How Space Science and Sea Science Interact	Swanson, Jennifer	650L
Ben Franklin's Big Splash	Rosenstock, Barb	1070L
Breakthrough: How One Teen Innovator Is Changing the World	Andraka, Jack	940L
Cao Chong Weighs an Elephant	Daemicke, Songju	830L
Caroline's Comets: A True Story	McCully, Emily Arnold	AD800L
Champion: The Comeback Tale Of The American Chestnut Tree	Walker, Sally M.	1070L
Countdown: 2979 Days to the Moon	Slade, Suzanne	940L
Counting Birds-The Idea That Helped Save Our Feathered Friends	Stemple, Heidi E.	500L
Crash Boom! A Math Tale	Harris, Robie H.	250L
Curiosity: The Story Of A Mars Rover	Motum, Markus	970L
Cyrus Field's Big Dream	Cowan, Mary M	980L
Disappearing Spoon, The (Young Readers Edition)	Kean, Sam	1210L
Doll-E 1.0	McCloskey, Shanda	300L
Elon Musk And The Quest For A Fantastic Future (Young Readers Edition)	Vance, Ashlee	1150L
Emmet's storm	Rubino, Ann	500L
Fearless Flyer	Lang, Heather	AD700L
Find the Dots	Mansfield, Andy	250L
Finding Wonders	Atkins, Jeannine	970L
Genetic Engineering	Burgan, Michael	1050L
Girl Code: Gaming, Going Viral, And Getting It Done	Gonzales, Andrea	1030L
Google It	Redding, Anna Crowley	870L
Grace Hopper, Queen Of Computer Code	Wallmark, Laurie	730L
Green City	Drummond, Allan	770L
Hello Ruby: Adventures in coding	Liukas, Linda	300L
Hidden Figures Young Reader's Edition	Shetterly, Margot Lee	1120L
How Could We Harness a Hurricane	Vicki, Cobb	1010L
How We Got to Now	Johnson, Steven	1230L
Inga's Amazing Ideas	Rubino, Ann	770L
Izzy Gizmo	Jones, Pip	AD660L
Joan Procter, Dragon Doctor	Valdez, Patricia	AD800L
John Deere, That's Who!	Maurer, Tracy	860L
Maya Lin: Artist-Architect Of Light And Lines	Harvey, Jeanne Walker	800L
Music Of Life	Rusch, Elizabeth	980L
Newton's Rainbow	Lasky, Kathryn	1010L
Nothing Stopped Sophie	Bardoe, Cheryl	1030L
Otis And Will Discover The Deep	Rosenstock, Barb	620L

Red Madness	Jarrow, Gail	990L
Rosie Revere and the Raucous Riveters	Beaty, Andrea	520L
Rosie Revere, Engineer	Beaty, Andrea	AD780L
Sabotage: The Mission To Destroy Hitler's Atomic Bomb	Bascomb, Neal	1070L
Salamander Rescue	McDowell, Pamela	610L
Science Comics: Flying Machines	Wilgus, Alison	770L
Shark Lady	Keating, Jess	730L
Six Dots: A Story of Young Louis Braille	Bryant, Jen	590L
Solving The Puzzle Under The Sea	Burleigh, Robert	750L
Spin the Golden Lightbulb	Yeager, Jackie	635L
Spring After Spring	Roth Sisson, Stephanie	AD790L
Steve Jobs: Insanely Great	Hartland, Jessie	HL650L
Super Gear	Swanson, Jennifer	980L
Swap!	Light, Steve	250L
The Book of Chocolate	Newquist, HP	1120L
The Brilliant Deep	Messner, Kate	830L
The Doctor With an Eye for Eyes	Finley Mosca, Julia	530L
The end of the wild	Helget, Nicole	635L
The Girl Who Thought in Pictures: the story of Dr. Temple Grandin	Finley Mosca, Julia	AD680L
The Girl With a Mind for Math: the Story of Raye Montague	Finley Mosca, Julia	GN460L
The House That Lou Built	Respicio, Mae	660L
The Inventor's Secret	Slade, Suzanne	AD590L
The Most Magnificent Thing	Spires, Ashley	AD380L
The Secret Subway	Corey, Shana	AD810L
The Wright Brothers: Nose-Diving Into History	Slader, Erik	1190L
Ticktock Banneker's Clock	Keller, Shana	720L
Trailblazers: 33 Women in Science Who Changed the World	Swaby, Rachel	1130L
Voyager's Greatest Hits: The Epic Trek to Interstellar Space	Siy, Alexandra	770L
Wangari Maathai	PrĂ©vot, Franck	970L
Warcross	Lu, Marie	810L
Welcome To Mars	Aldrin, Buzz	900L
What Does It Mean To Be An Entrepreneur?	DiOrio, Rana	AD690L
When Sparks Fly: The True Story Of Robert Goddard, The Father Of US Rocketry	Fulton, Kristen	690L
Whoosh!	Barton, Chris	820L
Women of Steel and Stone	Lewis, Anna M.	1190L
Women Who Launched The Computer Age	Calkhoven, Laurie	880L
***Books available on Scholastic Book Clubs		

## Online Resources for Interactive Tools:

- PBS Kids Design Squad - <https://pbskids.org/designsquad/>
- NASA's Kids Club - <https://www.nasa.gov/kidsclub/index.html>
- Engineering Interact from University of Cambridge - <http://www-g.eng.cam.ac.uk/mmg/teaching/peterstidwill/interact/interact.htm>
- Science Kids (Has ads within the webpages) - <http://www.sciencekids.co.nz/gamesac>
- The Kid's Science Challenge - [http://kidsciencechallenge.com/year-four/gv\\_games.p](http://kidsciencechallenge.com/year-four/gv_games.p)
- The STEM collaborative (Corporation of public broadcasting)- <http://www.stemcolla>
- Interactivate (A ton of interactive simulations) - <http://www.shodor.org/interactivate/>
- What Kind of Engineer are you? (simple quiz to find out what kind of engineer you might be.)- <http://tryengineering.org/play-games/what-kind-engineer-are-you>
- Try Engineering games -<https://tryengineering.org/students/games/>
- Calculation Nation (By National Council of Teachers of Mathematics)- <https://calculationnation.nctm.org/>
- Exploratorium Topic based website....many options- <https://www.exploratorium.edu/explore>
- Kinetic City - <http://www.kineticcity.com/>
- Stem Works - <http://stem-works.com/#container>

## Online Resources for More Challenges:

- Science Buddies - <https://www.sciencebuddies.org/>
- Practical Action - <https://practicalaction.org/stem>
- Engineering is Elementary - <https://www.eie.org/eie-curriculum/curriculum-units>
- American Society for Engineering Education STEM BLOG- <http://teachers.egfi-k12.org/>
- Teach Engineering – K-12 Curriculum - <https://www.teachengineering.org/>
- Teach Engineering – Maker Spaces - <https://www.teachengineering.org/curriculum/browse?collection=MakerChallenges>
- Georgia Youth and Science & Technology (STEM challenges) - <http://www.gystcstem.org/stem-challenges.html>
- STEM Playground - <https://stemplayground.org/>

## Video Resources:

- SciShow Kids YouTube Channel- <https://www.youtube.com/user/scishowkids>
- Neok12 – How it works videos - <https://www.neok12.com/How-It-Works.htm>
- Crash Course Kids YouTube Channel - <https://www.youtube.com/user/crashcoursekids>
- Engineering is Elementary – Engineering education videos - <https://www.eie.org/engineering-elementary/engineering-education-videos>

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