

Challenge #1: Styro-Copters in Flight

In this activity, you will have fun creating simple helicopters from a piece of Styrofoam. Enjoy watching your helicopters spin to the ground and learn the basic science of how air causes drag.

Challenge Objective

The objective of this challenge is to create a simple helicopter following the instructions provided below and using the pattern provided.

When you complete your helicopter and drop it from a height (maybe the top of a staircase), the leading edge weighted by the paper clip, and air rushing past will cause it to spin and the air hitting the lower side will produce drag slowing its fall to the ground.

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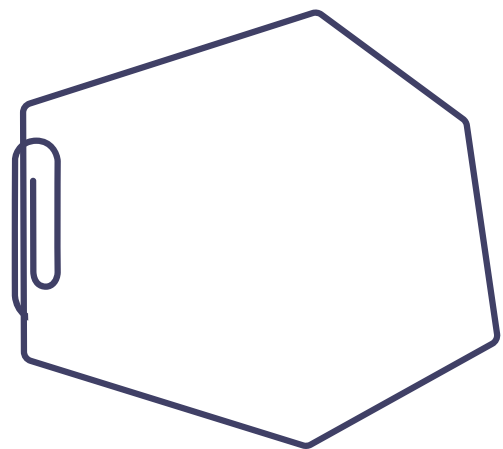
What You'll Need

- A flat piece of Styrofoam or Styrene (like a meat tray)
- Scissors
- A ruler
- Jumbo paper clips
- A pencil and markers/crayons

Instructions

1. Using a pencil and ruler as a straightedge, copy the pattern provided here onto the piece of Styrofoam or Styrene.
2. Using a pair of scissors, cut out the shape.
3. Attach a large paper clip to the straight edge of the cut-out spinner shape.
4. Use your markers or crayons to design your helicopter however you want (be creative)!
5. Standing on stairs or another high but safe spot, toss your styro-copter into the air and watch it spin in a spiral fashion as it falls to the ground.
6. You can also try making more styro-copters in different sizes and shapes to see how they spin to the ground – what changes if they are bigger or different shapes?

STYRO-COPTER SHAPE:



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Challenge #2: Design a Paper Plate Marble Maze

In this activity you will practice designing and creating a simple marble maze. You'll have so much fun creating your simple maze that you won't even realize you are using science, technology, engineering, art and math.

Challenge Objective

The objective of this challenge is to design and create a simple maze using the materials provided to guide your marble from the start to the end.

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What You'll Need

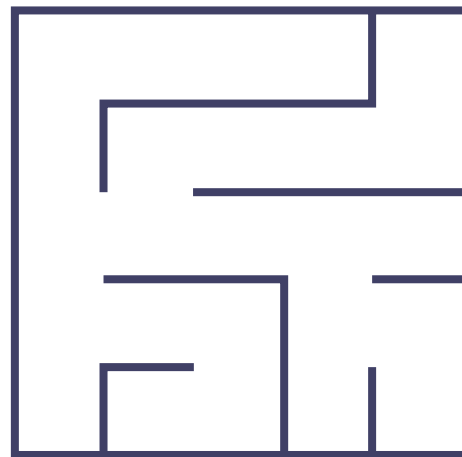
- A paper plate
- A pencil
- A Ruler
- Straws
- Scissors
- Glue
- A marble

Instructions

1. Using your ruler and pencil, draw out your maze on the paper plate and mark the start and the end points.
2. Following your drawing, cut and glue down the straws where you want them (be sure that there is room for the marble to fit).
3. Once the glue has dried, have fun getting your marble through the maze. Challenge your friends and family to see if they can do it.

WHAT IS A MAZE?

A maze is a complicated network of paths or passages which are often designed to confuse those who travel through them. Check out the example below for inspiration!



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Challenge #3: Create a Flying Saucer

Inspired by Book 3 - "Let The Games Begin!"

In this activity you will have fun creating your own flying saucer using paper plates. Decorate your spacecraft while learning about the engineering behind aircrafts.

Challenge Objective

The objective of this challenge is to follow the directions below to create a flying saucer (much like a Frisbee®). You will be able to decorate it as your own spacecraft.

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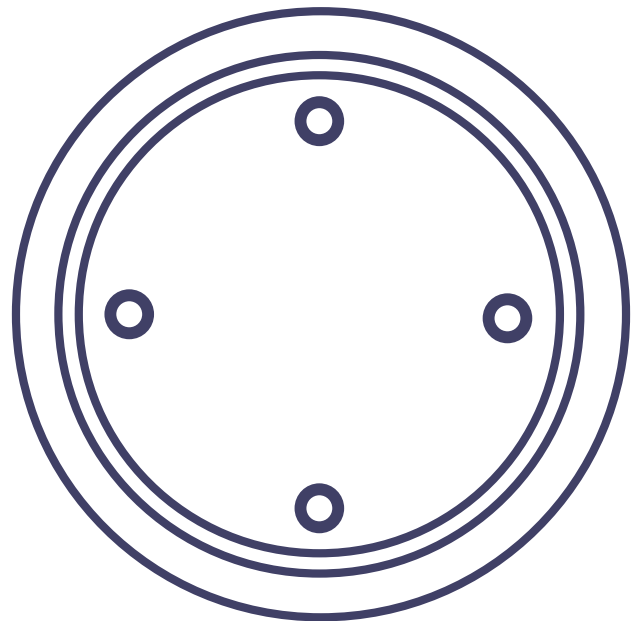
What You'll Need

- 2 paper plates
- Pennies or washers
- Glue
- Markers or crayons
- Construction paper
- Any other art supplies you may need

Instructions

1. Turn one paper plate inside out.
2. Place a second paper plate on the table upside down.
3. Mount the first (inside-out) plate atop the second plate and glue them together.
4. Glue four evenly spaced pennies or washers around the top edge.
5. Your flying saucer is ready to fly!
6. Before you send it for a spin, be sure to decorate it. Be creative!

EXAMPLE:



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Challenge #4: Make Your Own Kite!

In this activity you will get to make your own simple diamond shape kite and take it out to test it. By decorating it with your own creative touch, you will make it your own unique kite.

Challenge Objective

The objective of this challenge is to follow the directions below to design and build a kite that you can enjoy flying with your family and friends.

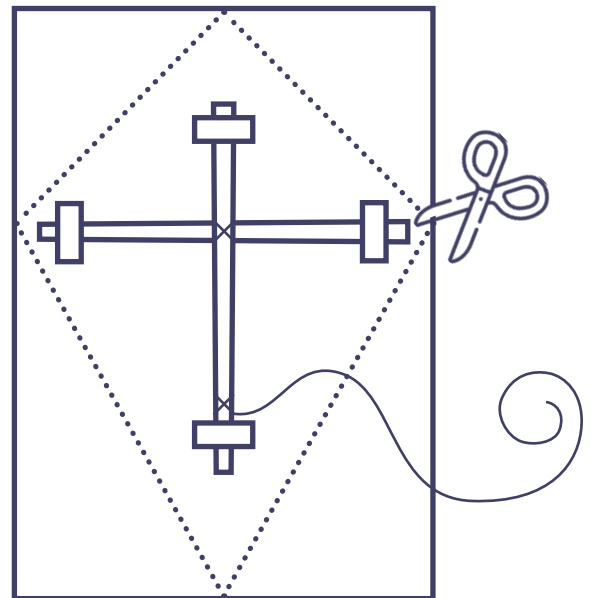
What You'll Need

- A couple sheets of construction paper
- Chopsticks (or similar length sticks)
- Scissors
- Markers
- Tape
- String
- Markers
- Ribbon
- Glue

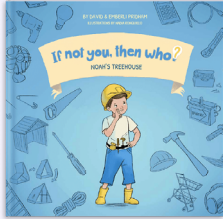
Instructions

1. Draw a diamond shape on a piece of paper (see below).
2. Cut out the diamond.
3. Decorate the diamond using the other materials you have (colored paper, markers, ribbon, glue, etc)
4. Tie your chopsticks together with string in a plus sign.
5. Tape the chopsticks to the back of the kite.
6. Tape a long piece of string to the back of the kite (or you can tie it around the bottom of the chopstick)
7. You are ready to take it for a spin!

EXAMPLE:



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Challenge #5: Straw Towers

Inspired by Book 2 - "Noah's Treehouse"

In this activity you will use only straws and masking tape to build a tower as high as you can build it. Have fun creating your tower while also learning about measurements and geometric shapes.

Challenge Objective

The objective of this challenge is to build a tower out of straws as tall and sturdy as you can! It needs to be able to stand up on its own so you may need to do some trial and errors to see what works to make it tall!

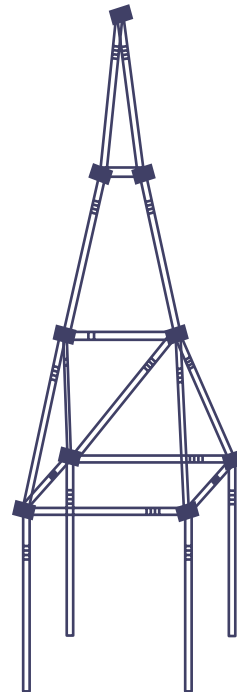
What You'll Need

- Paper
- A pencil
- Masking tape
- Straws
- Scissors

Instructions

1. Start by drawing a picture of a skyscraper or tower. How tall is your building? How many floors does it have?
2. Now that you have some inspiration it's time to build! Using only straws and tape build your tower as tall as possible! You can cut the straws into different sizes if you need to.
3. Once you've made your tower as tall as possible. Using a measuring tape or yard stick measure how tall it is from the floor to the very top! How many straws did you use?

STRUCTURE EXAMPLE:



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Challenge #6: A Solution-Seeking Mission

In this activity you will be on a quest to find out what family and friends think are problems in their everyday lives. Through a series of interviews, you will improve your communication skills while learning how inventors discover problems that need solutions.

Challenge Objective

The objective of this challenge is to interview as many people as you can to find out what everyday problems they encounter and the tools they use to help them solve the problem.

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What You'll Need

- Paper
- A pencil
- People to interview

Instructions

1. Start by making a list of people you can interview (parents/guardians, grandparents, friends, siblings).
2. Next, make a list of questions you might ask them. Some suggestions are listed below.
3. During each interview, take notes about the problems and the tools they use.
4. Finally, after you have completed your interviews, see if you can come up with a new tool or an improvement on something that will help them solve the problem. You can use the sheet provided.

SAMPLE QUESTIONS:

1. What problem would you like to see solved?
2. Is there something that you do at school or at home that you find difficult or frustrating?
3. Would a new product or tool help you? If so, what would it be?
4. Are there any tools or products that you use that don't work as well as you would like?
5. If you could invent something to make your life easier, what would you invent?



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Person You Interviewed:

Problem they had:

What Device or tool could possibly help this person?

Your notes and ideas about this:

Person You Interviewed:

Problem they had:

What Device or tool could possibly help this person?

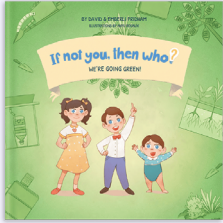
Your notes and ideas about this:

Person You Interviewed:

Problem they had:

What Device or tool could possibly help this person?

Your notes and ideas about this:



Challenge #7: Invent A Car Of The Future

Inspired by Book 4 - "We're Going Green!"

In this activity you will have fun imagining what the future will be like! You will come up with your concept for a car that you might be driving (or flying) your future children around in. And... it needs to be good for the environment!

Challenge Objective

The objective of this challenge is to use your imagination and creativity to invent a car of the future! What will it look like? How will it run? Remember, we want it to be good for the environment too.

What You'll Need

- Paper
- Colored pencils or markers
- Pictures of cars cut out from magazines

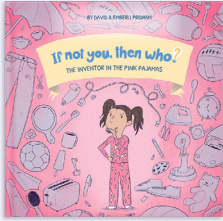
Instructions

1. Start by looking at all the various designs of current cars.
2. Make a list of the things you like in cars. Do you like a certain shape? Do you like a certain size?
3. Working with your classmates and/or your parent/guardian find out what are some of the best ways to power a car that help the environment (hint: electric cars, solar powered cars).
4. Now its time to use your imagination! In 25 years from now, what do you think the car of the future will look like? And... how will it work?
 - Will it travel on the ground ?
 - Will it fly?
 - Maybe it will be able to travel over water like a boat.
 - Will it fit a whole family or will each person have their own?
 - Will you need to learn to drive the car or will the car do it all on its own?
5. Make notes of what you think the car of the future will look like and then draw a picture of it. Be creative! Have fun!

DID YOU KNOW?

It costs less, around half, to refuel an electric car than it does to refuel a car with an internal combustion engine (gas-powered).

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Challenge #8: Game Time!

Inspired by Book 3 - "Let The Games Begin!"

As an inventor you will need to take time to observe the world around you. Inventors are problem-solvers. They see a problem or a challenge and come up with ways to make it better. In this activity you will have a chance to identify a problem and come up with some of your own solutions.

Challenge Objective

The objective of this challenge is to take an existing sport or game and make it better! Using your problem solving skills come up with some solutions on how you can re-invent what has already been done.

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What You'll Need

- A scrap piece of paper to answer the questions provided.
- A pencil

Instructions

1. What is your favorite sport or game?
2. List two problems you have while playing that game.
3. Once you have completed the list, prioritize your items in order of importance.
4. Now, you are the inventor. How could you solve the problems you have identified above? Using the worksheet on the next page, come up with 2 possible solutions for each problem.

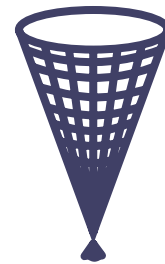
DID YOU KNOW?

Basketball was originally played with peach baskets (Figure A) nailed to 10 foot poles. The peach basket was later swapped out for a metal rim and a hammock-style net (Figure B). However, the nets did not have openings for the ball to fall through so players would have to climb and get the ball from the basket every time a point was scored. In 1906, open-ended nets (Figure C) were invented to put an end to this problem and make the game more enjoyable and fast-paced.

A.



B.



C.



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