

Daisy Board Game Design Challenge- STEM

Goal: Create a board game and learn about being an inventor.

Notes:

To complete the entire badge, gather these supplies ahead of time:

- Cardboard
- Paper
- Glue
- Tape
- Markers or crayons
- Brads, paperclips, twist ties, pipe cleaner, toothpicks or other fasteners
- Popsicle Sticks
- Clay or Playdough
- A board game testing crew (made from family members!)

Vocabulary Words:

Look up these words and find out what they mean and how you will use them during your project:

Inventor

Engineer

Brainstorming

Features

Objective

Friction

Step 1: Research Board Games

What I'll Do:

Explore different types of board games from your own home and around the world.

What I'll Need:

- Board games from my house
- Paper to record my observations and a pen or pencil
- Supplies to make my own board game
- An online connection to research different board games around the world

How I'll Do It:

Research some different board games. Look around your house to see what you already have, or you can make your own board for some classics like Chutes and Ladders. What kinds of games are your favorite? Which ones are the most fun to play? Can everyone play the games?

Sometimes engineers and inventors take notes to help them with their designs. You may want to grab a notebook or a piece of paper to write down a few observations. What helps the players move through the game? If it is a spinner, take a look at the design of the spinner itself. How does it work?

If you don't have any games in your home or if you'd like to expand your research, ask an adult if they can help you use the internet to research different types of board games around the world. Find out about games like:

Mancala (<https://www.coolmathgames.com/0-mancala>)

Chinese Checkers (<https://www.coolmathgames.com/0-chinesecheckers>)

Fanorona (<http://www.mindsports.nl/index.php/the-pit/528-fanorona>)

and more. Some of these you can make at home and test them out to learn different games played around the world.

Step 2: Plan Your Game

What I'll Do:

In this step, you'll think about the story behind your board game and plan out the design.

What I'll Need:

- Paper or a notebook to plan your ideas
- A pen or pencil
- Cardboard
- Paper
- Glue
- Tape
- Markers or crayons

(This list is just a suggestion. Feel free to use whatever you have to make your board game fun!)

How I'll Do It:

Think of how your board game will work. What is the objective of the game? How will someone win? What are the rules of the game? How do players move around the board? Are you playing as yourself, or are players turned into characters?

Usually, board games come with an instruction sheet or a book of rules. Design one for your game that helps players know what to do. Be sure to describe the rules of play as if the person has no idea how to play your game.

Map out your plan on a piece of paper and create a template for the board and the pieces. Figure out a list of materials you will need to make your board game and gather them around the house. What will you use to make the playing pieces? Don't forget to check the recycling bin!

Step 3: Design an Idea for Your Spinner

What I'll Do:

Every board game needs something to tell players how to move forward in the game. Design a spinner to help players move their pieces around your board.

What I'll Need:

- Cardboard
- Paper
- Glue
- Tape
- Markers or crayons
- Brads, paperclips, twist ties, pipe cleaner, toothpicks or other fasteners
- Popsicle Sticks
- Clay or Playdough

(This list is full of suggestions. Feel free to get creative and make up your own supply list!)

How I'll Do It:

What materials could you use to design a spinner? How will your spinner tell players how to move forward? Your design will need to be sturdy enough to last through the game while also telling players how to move forward. Don't forget to take a look at the notes that you made during your research.

One of the things to think about when designing your spinner is friction. Try spinning around on your toes on a wood or tile floor in your socks. Now put on your shoes and try the same thing. Which one makes it easier to spin? Why?

Here is a short video to help explain friction:

What is Friction in Physics? - Science for Kids | Educational Videos by Mocomi

<https://www.youtube.com/watch?v=C7NPD9W0kro&vl=en>

Think about how friction impacts your spinner. Are the surfaces of your spinner working together to create a smooth spin? Or are they working against each other and creating too much friction? How can you change your design to make less friction?

(Want to learn more about friction? Try this fun Friction Racing activity from PBS Kids:

<https://cptv.pbslearningmedia.org/resource/friction-racing-ruff-ruffman/science-crafts-for-kids/>)

It is important to remember that engineers (even the ones who do it for their job) RARELY get their new invention right on the first try. They often create a prototype, or a first draft, of their invention and then make a lot of changes to get it right. Don't be afraid to test your design and make changes! You may come up with something even better on the next try.

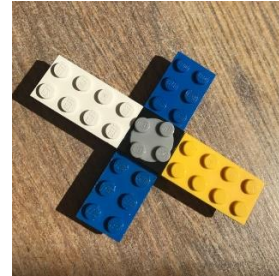
Here is a video to better explain the engineering process. Take a look and see how you are using the engineering process in your project!

The Engineering Process: Crash Course Kids #12.2

<https://www.youtube.com/watch?v=fxJWin195kU>

{ADULTS ONLY:

Most of the time we like to keep the activities girl-led, but sometimes girls need a little inspiration. Here are a few examples of spinners if your girl needs a little extra inspiration to help with her project. Feel free to adapt plans to use the materials you have on hand.



Make a Cardboard Spinner:

https://www.youtube.com/watch?v=o--fjol_Ehc

Make a Spinner Card:

<https://www.youtube.com/watch?v=zBU8A4fAYKg> }

Step 4: Test Your Design

What I'll Do:

Test my board game with my Board Game Testing Crew (aka my family).

What I'll Need:

- A Board Game Testing Crew (made up of family members)
- Snacks (Optional, but keeps the Board Game Testing Crew happy)

How I'll Do It:

Engineers sometimes decide to test a new invention or product on a test group before making their item available to the public. When they test their new product on the test group, they have a piece of paper handy to write down things that need to be fixed or tweaked.

Assemble a group of testers (otherwise known as your family) who will help you try out your design. Give them your rule book and see if they can figure out how to play the game without telling them anything.

Do the pieces hold up to players using them? How well does your spinner work? Is everyone having fun with your design or are there changes to make it more fun for everyone in your test group?

If you need to make changes, don't be afraid to leave your test group with a bowl of snacks and tell them you'll be back in a few minutes after you tweak your design.

Where I Can Purchase the Badge:

When you have completed all of the steps, have an adult visit the Girl Scouts of Connecticut shop online and purchase the Daisy Board Game Design Challenge. Here is the direct link to the badge at the store:

<https://www.girlscoutshop.com/Daisy-Board-Game-Design-Challenge-Badge>

Follow-up Questions

- 1) How did you act like an inventor and an engineer?
- 2) How did you come up with your idea? Did it come from a favorite book or movie?
Engineers often get their inspiration from the world around them.
- 3) What was your worst spinner design? What was your best? Why?
- 4) What materials worked best for your design?
- 5) What was your favorite feature of your game? What is your least favorite feature? Can you make it better?
- 6) Can everyone play your board game? How could you adapt your game so that someone who can't see or someone who can't hear could still have fun playing?
- 7) Did you have fun playing your game with your test group? Are you ready to put it in a box and let other people play your game? Share it with a family from your troop!

Congratulations! Now you're officially an engineer and an inventor.