

# Design Challenge: Marble Labyrinths

In this activity your child will create a marble maze out of large straws and other materials. This challenge allows for open exploration time with the materials and then provides challenges for your child to complete based on how they respond to being able to first create a maze without restrictions. This activity gives your child room to try a challenge multiple times and many different ways, and gives your child the opportunity to solve a problem creatively.



## What You Need

- 1-2 marbles
- Large milkshake straws
- Any other recycled materials that your child would like to use in their maze
  - Bottle caps
  - Popsicle sticks
  - Cardboard
  - Construction paper
  - Paper towel rolls
- Box lid (a shoebox works well; collect a few of these to make multiple mazes)
- Scissors
- Tape or glue
- Pen and paper for brainstorming and notetaking

## What You Do

1. To begin, talk to your child about what makes a maze fun or challenging and how they can create their own. Ask your child if they have played games with mazes or seen mazes before.
  - a. What made the mazes difficult or easy?
  - b. What made the mazes fun?
  - c. Did the mazes use one kind of material or shape or multiple kinds of materials or shapes?
2. After discussing with your child, show them all of the items they will use to create their mazes and allow them to explore the materials.
  - a. Ask your child to create a maze for a marble to go through. If your child needs help cutting more straws, assist them with this step. However, try to let your child play with creating different mazes on their own.
  - b. Remind your child that they can use any of the materials available to make their maze.
3. Once your child has had sufficient time to make a first maze, have your child test it. Instruct your child to place a marble at their maze's entrance and have them solve their maze. Ask your child what they noticed while making and solving their maze.
  - a. What made the maze easy or difficult to solve?
  - b. How did the marbles interact with the different materials?
  - c. How long did solving the maze take?
  - d. What were the steps used in designing their first maze?
  - e. How could using the design process help create more complex or well thought out mazes?
4. Now, introduce the design challenge to your child. Tell them that they will use what they've already learned by making their first maze to solve different maze challenges. Give your child a challenge to start. Challenges could include:
  - a. Make a maze using three different kinds of materials.

- b. Make a maze using only four straws.
  - c. Make a maze that looks like a smiley face, heart, or other shape.
  - d. Make a maze that uses only straws or another type of material.
  - e. Make a maze that takes a friend or family member over 30 seconds to solve.
  - f. Make a maze in under 1 minute.
  - g. Use every material on the table to make a maze.
  - h. Make a maze that has pieces cut out of the base box lid, which make the maze more difficult to solve. (You might have to assist your child with cutting the lid).
  - i. Make a maze with no sides to keep the marble inside of the maze. (You might have to assist your child with cutting cardboard or their box lid).
5. Ask your child to brainstorm different ways to create a maze for one of the challenges. Have your child draw or write their ideas on a piece of paper. Your child could also lay pieces in their maze box without taping or glueing anything down.
6. After your child has several ideas, ask them to choose the design that they think will work best. Remind your child of the goal of the maze: to complete the challenge assigned to them.
  - This is an important step of the design thinking process, because it teaches your child to prioritize the functionality of their prototype (design) over their personal preferences. This also prevents them from getting too emotionally attached to one design.
7. Now, it's time for your child to build their maze! Give your child space to experiment, but step in to help if necessary. Allow your child's ideas to evolve as they try out different ways of making their maze and encourage your child to write down what works and what doesn't work.
8. After your child has finished their maze, have them test it.
  - a. If your child's maze has successfully completed the challenge, congratulate them on their work!
  - b. If your child's maze does not complete the challenge, ask them what they think went wrong. Discuss what worked and didn't work in the building process and ask your child to go back to the brainstorming stage and try out a different design.
9. Once your child has successfully completed a challenge, give them another one to complete or allow them to make up their own challenges, restrictions, and requirements for their mazes.