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SCIENCE CIRCUS

Marble Maze

This cardboard maze activity will explore Newton's First Law as you navigate a marble through the maze.

Research Question:

How does the shape and angle of the maze's walls affect the speed and path of a marble as it travels through the maze?

Materials

- Cardboard tray
- Marble
- Tape
- Paper Straws
- Markers

Directions

Step 1: Select a cardboard tray to work with. If you don't have access to a cardboard tray, you can make your own by taping pieces of cardboard together into a rectangular box. Be sure you leave the top of the box open.

Remember!!
Put your name on your cardboard maze.
You may decorate your maze using the materials provided. You can decorate your maze before or after you make it.

Step 2: Use straws to build your maze. Putting the straws onto the cardboard tray and tape them down in different directions *You can also bend the straws in different directions.

Step 3: Draw a circle on the inside of your cardboard tray. This will be the starting point. Then draw another circle on where you want your finished point to be.

Step 4: Test your marble in your maze! By using two hands on the cardboard tray and tilt it side to side to move the marble.

This activity is intended for use by adults and children who can read and follow directions and warnings. Marbles can be a choking hazard

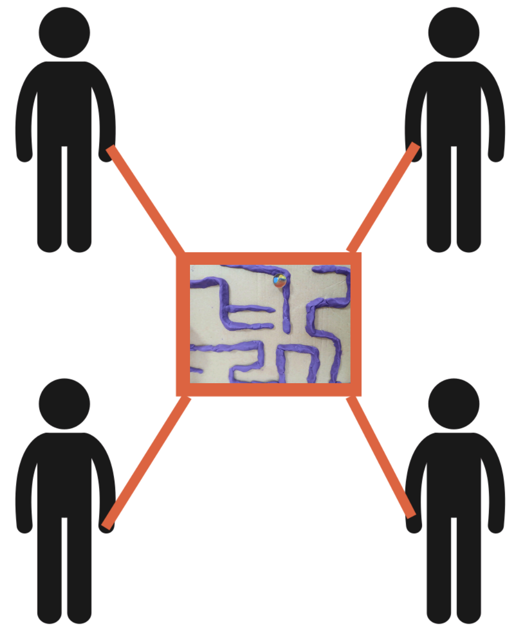
Marble Maze

Want a bigger challenge?

You and a group of 2-3 more people can further explore Newton's First Law of Motion by creating a bigger maze using a cardboard lid or box and play dough.

Materials:

- Cardboard lid or the bottom of a cardboard box
    - If using a cardboard box: Make sure there are still some "walls" to the maze so the marble does not fall out.
- Marble
- Tape
- String
- Markers
- Play-Doh



Directions

Step 1: Work with your team to design a maze that can fit within the cardboard lid/box.

Step 2: Use the Play-doh to construct the maze. As you construct the maze, remember to think about how much Play-doh you need so you don't run out before you are finished.

Keep Play-doh on the cardboard at all times!

Step 3: Once your maze is complete, attach a string on each corner of the maze. Each member will hold one string.

Step 4: Work together to get your marble from one end of the maze to the other by lifting your strings in different directions.

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Marble Maze

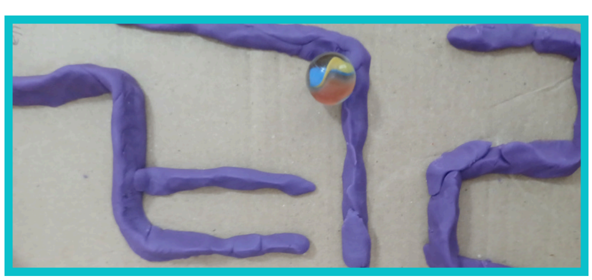
Science of Cardboard Maze: Newton's First Law of Motion

Newton’s First Law: An object at rest remains at rest. An object in motion remains in motion at a constant speed and in a straight line unless acted on by an unbalanced force.

How does a marble traveling in a cardboard maze demonstrate Newton’s 1st law?

If you gently release the marble at the start of the maze and there are no bumps, inclines or other obstacles in its path, the marble will continue to roll in one direction at a pace. The marble won't stop or change its speed on its own. When the marble roles at a constant speed, this is due to the forces acting upon the marble, which include gravity and friction from touching the cardboard, balancing each other out.

However, if the marble speeds up, slows down, or changes direction, this is due to forces no longer being balanced. As your marble moves through your maze, the maze’s obstacles (the straws) and inclines (how you tip cardboard maze) will exert additional forces on the marble.



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