STEM at HOME

SCIENCE ★ TECHNOLOGY ★ ENGINEERING ★ MATH

PRESENTED BY: girlstart

Greek Labyrinth

Explore the Law of Conservation of Energy and Newton's Laws of Motion, all while building a challenging maze! Use straws to construct an elaborate marble labyrinth and learn about Princess Ariadne and the Greek hero Theseus.

TEKS:

SCI 4/5.6 A: The student is expected to differentiate among forms of energy, including mechanical, sound, electrical, light, and heat/thermal.
SCI 6.8 A: The student is expected to compare and contrast potential and kinetic energy.
SCI 6.9: The student knows that the Law of Conservation of Energy states that energy can neither be created nor destroyed, it just changes form.
SCI 8.6 A: The student is expected to demonstrate and calculate how unbalanced forces change the speed or direction of an object's motion.
SCI 8.6 C: The student is expected to investigate and describe applications of Newton's three laws of motion such as in vehicle restraints, sports activities, amusement park rides, Earth's tectonic activities, and rocket launches.

Materials:

- Marble
- Marker or pen
- Paper or Styrofoam plate
- Ruler
- Scissors
- 10-20 straws
- Tape

Before you begin the Experiment/How To section, check out the photos on the next page! They are all replicas of a complex Greek maze called the Labyrinth. In Greek Mythology, the Labyrinth was a very elaborate and winding maze that was nearly impossible to solve. Use these photos as inspiration to design and build your own marble maze labyrinth!

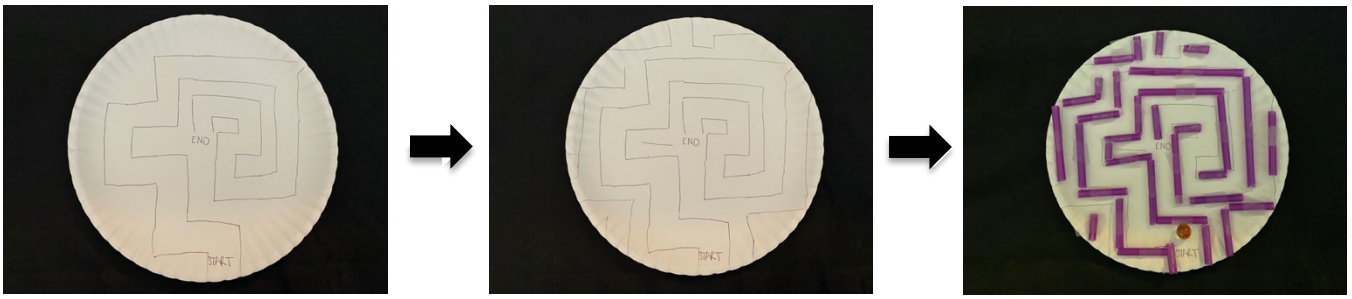
A mosaic of the Labyrinth in Rome.

The Labyrinth built in Minecraft.

The Labyrinth on an ancient coin.

Experiment/How To:

1. Take out your paper or Styrofoam plate. Use a pen or marker to draw out a design for your labyrinth. Make sure to label a start and finish! Also, make sure that your marble will easily be able to fit through the paths that you sketch.
2. Lay out straws along the lines of your labyrinth and use scissors to cut the straws to the correct lengths.
3. Use tape to secure the straws in place until all of the "walls" of your labyrinth have been created.
4. Now, place a marble at the starting point and test out your labyrinth. See if you can get the marble from start to finish just by tilting the plate. Challenge your family or friends to solve your labyrinth!



STEM Connection:

The labyrinth model works because of a few different physics concepts. In physics, if an object causes change, it has energy. This energy can come in many different forms.

Stored energy is called potential energy. To store energy, work must be done, such as winding-up a spring, charging a battery, or, in this case, holding the marble just at the edge of your labyrinth. An object that has potential energy may release its stored energy to be transformed in other forms of energy. Kinetic energy is the energy of motion. Any object that has mass and is moving has kinetic energy. Once the marble is released into the labyrinth and begins rolling around, its potential energy is transformed into kinetic energy.

An important physics law is also demonstrated by your marble labyrinth. Newton's Law of Conservation of Energy says that energy may be transformed from one kind to another, but it cannot be created or destroyed. This means that each marble in the labyrinth has a total amount of energy. It changes between potential and kinetic, but never disappears completely. Take some time to challenge your friends and family to see who can solve your labyrinth using the most kinetic energy!

The Labyrinth in Ancient Greece was built to house a monster called the Minotaur. The Labyrinth's architect, Daedalus, made it nearly impossible to solve! However, one brave hero was able to solve this tricky maze with the help of a very smart princess. You can learn more about this Greek myth in the poem at the end of this lesson called "The Myth of the Minotaur."

Career:

Architects plan and design buildings for various uses. They use their scientific and mathematical knowledge of physics to understand building construction combined with their artistic abilities to design visually appealing structures. Architects are scientists, mathematicians, and artists.

Resources:

http://www.fabdiy.com/make-your-own-marble-maze/
http://www.tackyliving.com/cheap-n-easy-marble-mazes/
http://teachertech.rice.edu/Participants/louviere/Newton/law1.html
https://greece.mrdonn.org/theseus.html
https://raisinglifelonglearners.com/make-a-paper-plate-maze-stem-challenge/

Photo Sources:

https://www.theoi.com/Gallery/Z45.2.html
https://ikmk.smb.museum/object?lang=en&id=18216474&view=rs
https://aminoapps.com/c/minecraft/page/blog/greek-labyrinth/zYux_uZ6XN18qog4XNRJGdKdELZBe

The Myth of the Minotaur

By Paul Perro

There once was a king called Minos,
Who ruled an island known as Crete.
He was the meanest, cruelest king
That you could ever meet.

King Minos had a pet monster,
A man with the head of a bull.
This monster liked to eat people,
Its hunger was insatiable.

The scary creature had a name,
It was known as the "minotaur".
It had sharp teeth that could bite you,
And big pointy horns that could gore.

The monster lived in the labyrinth,
A huge maze of long corridors.
King Minos kept it locked up there
Behind big strong oak doors.

But every now and then, the king
Would give the minotaur a treat.
He'd put some people in the maze
For the monster to eat.

One day, a hero, Theseus,
A very brave young man,
Decided to end the killings,
And came up with a plan.

He offered to be sacrificed
To the monster with the bull's head
But he did not plan to be killed,
His plan was to kill it instead.

Minos's daughter, the princess,
Thought Theseus was cool.
To help him succeed on his quest
She gave him a big ball of wool.

She told him to let out the wool
Behind himself, as he explored,
That way he'd find his way back out.
And she also gave him a sword.

Theseus found the minotaur.
It gave a terrible bellow.
But Theseus was not afraid,
He was a courageous fellow.

It lowered its horns and charged, but
Theseus jumped aside.
He stabbed the monster with his sword
And it fell down, and died.

Then he followed the trail of wool
And found himself once more.
And no-one ever was again
Eaten up by a minotaur.

