

DIY Marble Madness



FUN FACT

Before roller coasters were even invented, mountain-side railway cars carried coal in the mornings and provided joy rides for human passengers in the afternoon. The Mauch Chunk Switchback Railway was built in 1827 and could carry its passengers 50 miles per hour!

MATERIALS

- Marbles
- Straws
- Tape

DIFFICULTY



POTENTIAL AND KINETIC ENERGY

Energy stored in an object due to its position is potential energy. Energy that a moving object has due to its motion is kinetic energy. We can observe potential and kinetic energy conversions in many different places. Roller coasters, sledding, and even playing with dominos are familiar examples of potential and kinetic energy.

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Why is wind energy becoming so popular?

*Answer on the next page

DIY *Marble Madness*

EXPERIMENT

- Step 1:** Build a track that allows a marble to roll across the straws. Try to make a track 10 feet in length.
- Step 2:** Build a ramp for your track. This is where your marble will start and get its energy.
- Step 3:** Release your marble onto the track and observe the distance and speed your marble is able to reach.
- Step 4:** Did your marble make it the entire length of the track? How long did it take? Record your data into your science notebook.
- Step 5:** Redesign your track and ramp to increase the speed and distance the marble can travel.

WHY IT WORKS

Marbles have mass, and when you lift mass up off the ground, you increase the potential energy that mass has because of gravity. By adjusting the height of your ramp, you are able to increase or decrease the potential energy of the marble. Once the marble is released, it rolls down the track and the potential energy is converted into kinetic energy. If your ramp is tall enough and your track is built well, the marble may be able to successfully travel the entire track. With some simple adjustments, you can increase and decrease the speed of the marble.

EXTEND YOUR LEARNING

- What's the longest track you can build?
- Does the size of your marble change the distance that it can travel?
- Can you add hills to your track? How does that impact how the marble travels?
- Try building a second track and race a friend.

WORKFORCE CONNECTION

Hydroelectric power plants use gravitational potential energy to turn the blades of a turbine to generate electricity. A hydroelectric power plant has a water reservoir that sits above the turbines, giving the water potential energy. Scientists precisely regulate the flow of the water down and out of the reservoir, directing it across energy generating turbines. These scientist must precisely calculate the amount of water speed necessary to get the turbines moving to generate electricity.

*Joke Answer -
Because it has so many fans!

