

Rockin' Roller Coasters

Spins, loops and drops! Roller coasters take us on crazy rides with high speeds and big adrenaline rushes! What causes them to travel so fast and who is in charge of designing them? Create your own roller coaster to discover the different types of energy they use and what is involved in getting people from start to finish safely.

TEKS:

6.8A The student knows force and motion are related to potential and kinetic energy.

How To

Materials:

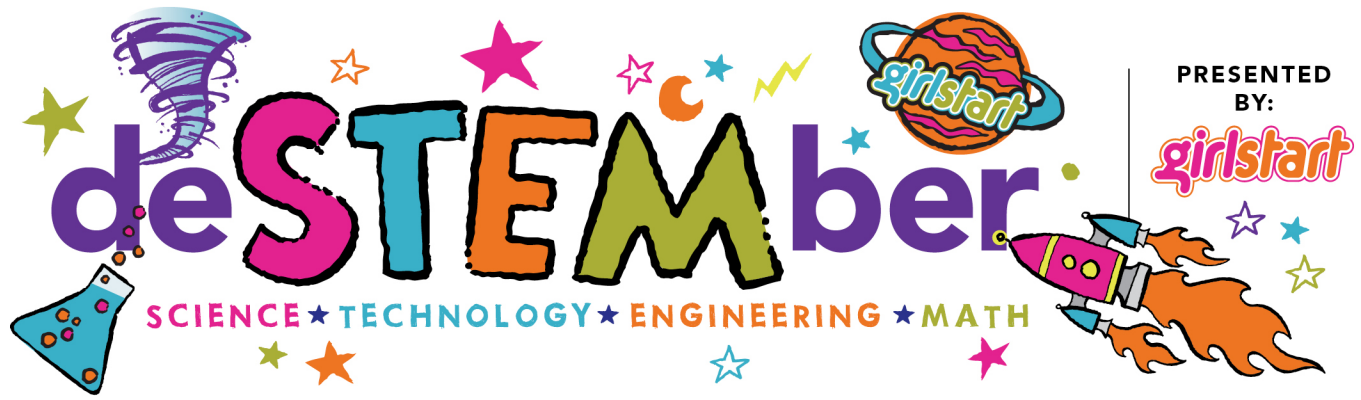
- Cup to catch marble
- Household objects with different heights
- Marble
- Paper Towel Rolls
- Tape (Blue painters tape or duct tape works best)
- Toilet Paper Rolls

1. *Optional* Begin by cutting your toilet paper and paper towel rolls in half across the diameter of the roll. This will create the open track for your roller coaster. You may want to leave some pieces as the whole tube if you want your coaster to have some tunnels.
2. Place the first piece of your track at a higher elevation (on a chair, bookshelf, etc). This will create a bigger drop for your roller coaster and higher speeds.
3. Connect more pieces of track by taping them end to end.
4. Use your own creativity to create turns, loops, and drops as you add each piece.
5. After designing, your rollercoaster from start to finish, tape the cup to the very last piece of track. This will catch your marble after each run.
6. Drop your marble from the beginning of the roller coaster and watch it drop, loop and turn!

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Why Does it Work?

In physics, objects have energy if they can cause changes to occur. 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 about the start of the rollercoaster track. 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 onto the rollercoaster track and begins rolling, its potential energy is transformed into kinetic energy as it moves down the track.

Career Connection:

Roller coaster engineers combine several types of engineering to create the thrilling coasters that so many people line up to ride. They use mechanical engineering to design the famous loops and drops using calculations to understand all of the different forces that will act upon the riders, cars, and track. Then, roller coaster engineers use structural engineering to understand how to actually build the coaster, from what types of material will be used to how will the coaster be supported at such high speeds. The third piece of being a roller coaster engineer is electrical engineering. They design computer programs to model their roller coasters and calculate the safe amount of time between each run of the track.

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