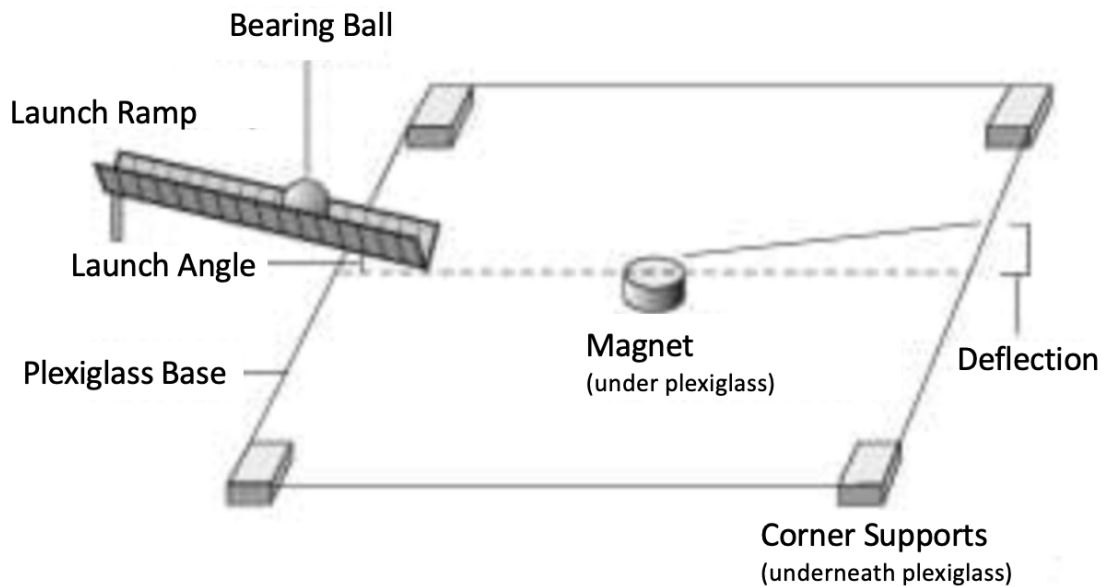


# Explore: Engineering Challenge 1: Speed



This activity was adapted from the “Slingshot to the Outer Planets” activity from [teachengineering.org](http://teachengineering.org).

***The magnet is the planet.  
The ball bearing is the spacecraft.***

## Part A. Experimental Set-up

1. Find some equally sized books or other objects to create the four corner supports for the plexiglass base.
2. Using the dry erase marker, draw a line down the middle of the underside of the plexiglass and tape the magnet to the middle of the plexiglass, under the line.
3. Assemble a launch ramp by folding an index card in half. The angle of the launch ramp represents the energy with which the spacecraft is launched.

## Part B. Experiment

1. Make a prediction: What will happen to the ball when it approaches the magnet?
2. Use the ramp to launch the ball (spacecraft) toward the magnet (planet). This may take a few times to practice and to determine the proper launch angle of the ramp.

3. Trace the path the ball took on the plexiglass, using a dry erase marker. Record your observations; note the size of the magnet you used, the size of the ball, and how high your ramp was.
  - Experiment with different-sized balls (spacecraft) and different-sized magnets (planets), marking the path of the ball for each trial.
  - Experiment with different angles of the launch ramp.

You may want to organize your data in a table. For example:

<b>Trial</b>	<b>Size of Magnet</b>	<b>Size of Ball Bearing</b>	<b>Height of Ramp</b>	<b>How did the ball behave?</b>
<b>1</b>				
<b>2</b>				
<b>3</b>				
<b>4</b>				
<b>5</b>				
<b>6</b>				

## **Part C. Conclusions**

1. Use claim, evidence, reasoning to summarize your results.
  - a. How did the size of the magnet (planet) affect the speed and deflection of the ball (spacecraft)?
  - b. How did the size of the ball (spacecraft) affect the speed and deflection of the ball (spacecraft)?
  - c. How did the launch angle affect the speed and deflection of the ball (spacecraft)?

