



# Force and Motion: Teacher Tips & Helpful Hints

**N.C.S.S:** PS.5.2 Understand force, motion, and the relationship between them.

- The activity is broken up into three different Activities:
  - **Activity 1: Height and Speed** (PS.5.2.1)
  - **Activity 2: Measuring Speed** (PS.5.2.2 )
  - **Activity 3: Mass, Friction, and Motion** (PS.5.2.1, PS.5.2.2 )

## Activity 1: Height and Speed

- There is a *Height and Speed: Student Activity Sheet*
- The meter ruler is in mm too.
- Although there is an example of how to take the average speed, it is encouraged to do an example for the students.
- If the students increase the ramp height too high the weight of the marble will cause the hot wheels track to lift up off the table.

## Part 2: Measuring Speed

- There is a *Measuring Speed: Student Activity Sheet*
- Students can compare the speed of their marbles and discuss possible reasons for differences.
- Students may need assistance in constructing their own graphs based on their data.

## Part 3: Mass, Friction, and Motion

- There is a *Mass, Friction, and Motion: Student Activity Sheet*
- Make sure students know that they are only working with the Ramp A set-up (40mm).
- The foam activity makes for a great **hook** into understanding friction
- Introduce the concept of friction **before** completing the **salt** section of the activity. Students will use the term friction to explain how the salt affects the speed of the marble.
- The salt has the potential to change the direction of the marble allowing for a great discussion about forces and change of direction.

## N.C.S.S Clarifying Objectives

- PS.5.2.1 Carry out investigations to explain how factors such as gravity, friction, and change in mass affect the motion of objects.
- PS.5.2.2 Use mathematics and computational thinking to infer the motion of an object (including position, direction, and speed).