

## Speed Racer

### The Plan

#### Materials:

- Hot Wheels® car with mast attached
- Colored index cards
- Scissors
- Tape measure
- Stop watch
- Painter's tape
- File Folder

#### To make your speed racer

1. Cut out a sail from an index card. You may try different shapes if you would like or leave it rectangular.
2. Use the included metal rods to poke a hole near the bottom of the sail. This hole should be as centered as possible. Poke another hole the same distance from the top.
3. Without creasing the paper, bend the paper into an arc. Slide the paper onto the mast of the car through the two holes you just created.
4. Push the tube over the top of the mast to keep the sail on the mast to adjust the height of the sail by raising or lowering the tube along the mast.
5. Your speed racer is now finished.

#### How to race your speed racer:

1. Set up the race course. On the ground, mark out a 6 ft length using masking or painter's tape. The tape marks the start and finish lines. Also place markers at the 2 ft and 4 ft marks.
2. Use a file folder or something else to use as a fan to make your racer go. You will also need a stop watch and someone to record your split times.
4. Place your racer at the start line. When the person timing you says go, start fanning your racer.
5. The timer will record the times as the car reaches the 2 ft, 4 ft, and 6 ft marks as you race your speed racer down the course. Record these values on the attached chart.

#### How you win:

1. The winner will be the person who has the fastest speed. There are three intervals, so the winner will be the one who wins two out of the three intervals.
2. How do we find out who has the fastest speed at each interval? Discuss this with your other speed racer buddies before moving on.
3. You should have found that the equation that you need is distance ( $d$ ) = speed ( $s$ ) multiplied by time ( $t$ ) or simply  $d = st$ . This equation is often written as  $d = vt$  where  $v$  stands for velocity or  $d = rt$  where  $r$  stands for rate.
4. Plot the points that you recorded on a graph. See the attached graph for help. You should plot four points, your time at each distance starting with 0 seconds at 0 feet.

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5. Look at your graphs. How can you tell in which intervals your car traveled fastest? How can you tell in which intervals your car traveled slowest?
6. Check your answers to the above question by calculating your average speed for each interval. Since each interval is 2 ft long, we will use 2 ft for  $d$ . How can you find the amount of time your car traveled for each 2 ft interval?

### Adaptations:

- Depending upon the surface which the speed racers are racing, the intervals can be adjusted to produce better graphs.
- It is recommended that each racer uses the same scale for easy comparison.
- Instead of using the binders to continuously move the racer, have only one wave be allowed and see how far the racers go.
- Use your breath to blow the racers instead of using binders (this can be especially fun)