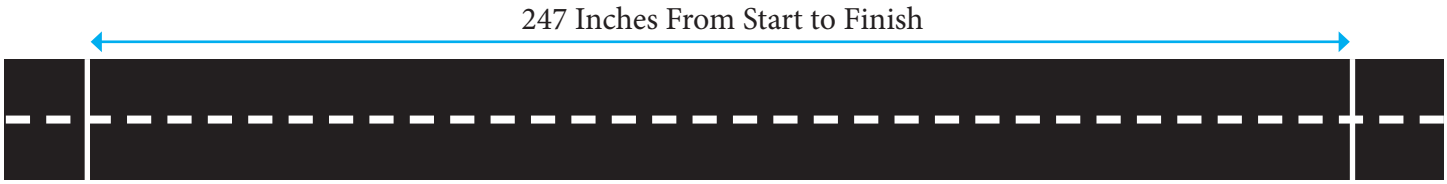
RACING TO THE FUTURE™
MATH LESSON #3 WORKSHEET
TIME, DISTANCE AND SPEED

In this worksheet you will learn about how to determine the speed of your slot car from the time it takes to run the distance of your drag strip. This will help you tune your car and to see how fast it is moving.

As you learned in the earlier lessons, we race HO scale slot cars in Racing to the Future™. We also race on a 1:64th scale quarter mile drag strip that measures 20 feet 7 inches. That is equal to 247 inches in length. There are 12 inches in 1 foot. So 20 feet multiplied by 12 (to get the number of inches) equals 240, plus the 7 inches that make up the rest of the scale quarter mile, for a total of 247 inches.

$$(20 \times 12) + 7 = ?$$
$$240 + 7 = 247$$



Now that we have converted our measurements to inches, it will make the math easier to determine how fast we go. Out next step is to time our cars beginning from when they leave the starting line to when they cross the finish line. Some drag strips have sensors that will display the time in seconds. For this exercise, we will use a watch with a second hand or simply count (1 Mississippi, 2 Mississippi) from when the car starts until it crosses the finish line.

For our example, Jill wants to know how fast her car will go over the scale quarter mile. She wants to know how many feet per second (ft/sec) her car travels at. She already knows the track is 247 inches long, so now she starts her car and watches the second hand on her watch or stop watch on her cell phone to see how many seconds it takes her car to get to the finish line. She makes three passes on the track to make sure she is getting close to the same time on each to be more accurate. After three passes, her best time is 2.14 seconds on her cell phone's stop watch app. So how does she figure out how fast that is?

Jill can take the Distance (d) and divide it by the Time (t) and get the Rate or speed (r).

$$d \div t = r$$

-or-

Distance ÷ Time = Rate or Speed

So let's take Jill's numbers and figure out how fast her car is moving.

247 inches = Distance (d)
2.14 Seconds = Time (t)
??? Inches per Second = Rate or Speed

$$247 \div 2.14 = (r)$$

115.4 Inches per Second = (r)

How many feet per second is this speed?

115.4 divided by 12 (number of inches in a foot) will equal the feet per second (ft/sec) number.

$$115.4 \div 12 = \text{ft/sec}$$
$$9.61 = \text{ft/sec}$$

Jill's car travels at 9.61 feet per second.

How many Miles per Hour is Jill's car moving?

There are 3600 seconds in an hour (60 seconds in a minute times 60 minutes in an hour = 3600).

There are 5280 feet in a mile.

The formula for converting feet per second (ft/sec) to miles per hour (MPH) is:

ft/sec X 3600 ÷ 5280 = MPH

So Jill's car was traveling at 9.61 ft/sec.

(9.61 X 3600) ÷ 5280 = MPH

34596 ÷ 5280 =MPH

6.55 = MPH

Jill's car was traveling at 6.55 Miles per Hour (MPH)

So how many "scale" mile per hour was Jill's car traveling? We can figure that out by multiplying the MPH number by the scale number. Since Jill was racing an HO scale car at 1:64th scale we would multiply 6.55 MPH by 64.

6.55 X 64 = Scale MPH

419.2 = Scale MPH

Jill's car was traveling at 419.2 Scale MPH.

How Fast Are the Cars ?

Pat is wanting to know how fast her new slot car drag racer is moving. She is running on a 1:64th scale quarter mile, so the track length is 20 feet 7 inches or 247 inches from starting line to finish line. Use the formulas below to help answer the questions about Pat's car.

$$d \div t = r$$

-or-

Distance ÷ Time = Rate or Speed

Rate (r) ÷ 12 (inches in a foot) = Feet per Second (ft/sec)

ft/sec x 3600 ÷ 5280 = MPH

MPH x Scale Size = Scale MPH

Pat used her cell phone's stop watch and timed her new car at 2.09 seconds. She cleaned and oiled the car and made another pass at 1.98 seconds.

1.) Using Pat's time recorded on the first pass (2.09 seconds), how fast was the car running in feet per second (ft/sec)?

2.) Using Pat's time recorded on the second pass (1.98 seconds), how fast was the car running in feet per second (ft/sec)?

3.) How fast was Pat's first pass in Miles per Hour (MPH)?

4.) How fast was Pat's second pass in Miles per Hour (MPH)?

5.) How fast was Pat's second pass in Scale Miles per Hour (Scale MPH)?

Answer Key

1.) 247 ÷ 2.09 = 118.18 Inches per Second.

118.18 ÷ 12 = 9.84 Feet per Second (ft/sec).

2.) 247 ÷ 1.98 = 124.74 Inches per Second.

124.74 ÷ 12 = 10.39 Feet Per Second (ft/sec).

3.) (9.84 x 3600) ÷ 5280 = MPH

35424 ÷ 5280 = MPH

MPH = 6.70

4.) (10.39 x 3600) ÷ 5280 = MPH

37404 ÷ 5280 = MPH

MPH = 7.08

5.) 7.08 x 64 = Scale MPH

Scale MPH = 453.12