Name_____ **Hot Wheels Physics...**

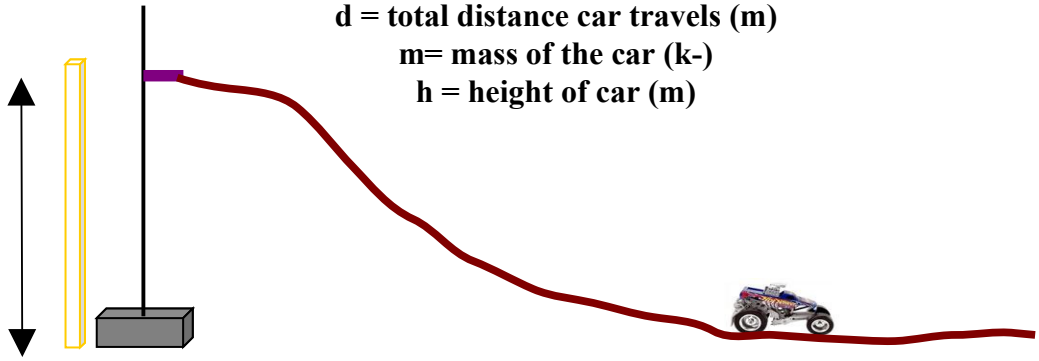
INTRODUCTION:

Gravitv does work on the car accelerating it down the ramp giving the car **kinetic energy**. On the otherhand, the **force of friction** does work to slow the car. As the car comes to a stop, the original gravitational potential energy ($P.E._{gravity}$), which became kinetic energy, is converted to heat energy by friction. To find the force of friction, you must find the initial $P.E._{gravity}$ of the car and from this find the force of friction used in <u>stopping</u> the car. To determine the $P.E._{gravity}$, you must determine the height above the floor that the car starts from. The formulas are as follows:

W (friction) = Potential Energv (@start)

F * d = m * g * h or F = (m g h) / d

F = force of friction (N)
d = total distance car travels (m)
m= mass of the car (k-)
h = height of car (m)



OBJECTIVE:

The purpose of this experiment is to calculate the force of friction on a hot wheels car and to determine if this force is at all related to velocity and the mass of the car.

MATERIALS:

Hot wheels car and track, meter sticks, ring stand, spring clamp, additional masses.

PROCEDURES:

1. Set up the track as shown in diagram.

<u>VELOCITY</u>

2. Start the car from a height of 0.30 m (30 cm) and release it. MAKE SURE THE CAR DOES <u>NOT</u> RUN OFF THE END OF THE TRACK! Record the total distance traveled by the car for this height in TABLE 1.

Repeat by decreasing the height in three centimeter increments (at least 8 measurements) until the car reaches the end of the track. Record all measurements in the m.k.s. system in TABLE 1.

3. Calculate the force of friction between the car and the track (use information in INTRODUCTION) and also record this value in TABLE 1.

MASS

4. Set the height of the track at 10 cm (0.1 m) and leave it there. Release and record the distance traveled by a car of varying mass. (*You can tape 6 different masses **to** the roof of the car.*) Calculate the frictional force present. Record all data in TABLE 2.

DATA & RESULTS.-

TABLE 1

Release height (m)	Distance traveled (m)	Frictional force (N)

TABLE 2

Mass of car (kg)	Distance traveled (m)	Frictional force (N)

INTERPRETATION-.

1. Plot a graph of force of fiction (on the y-axis) as a function of release height (on the x-axis). START EACH AXIS AT ZERO! Draw a smooth curve or your best line to fit your data.

2. As you raised the height of the car the velocity of the rolling car increased. What effect did this height (velocity) increase have on the frictional force?

3. Plot a graph of the force of friction (y-axis) as a function of the mass of the car (x-axis). Draw a smooth curve or your best line to fit your data.

4. What effect did the increase in mass of the car have on the frictional force.,

5. From what you have seen explain how the force of friction is either dependent or independent of the velocity and mass of the object in motion.