Hot Wheels Kinematics Lab 2 Name: _____

Materials: long straight ramp, hot wheels car, stop watch, meter stick, calculator

Hypothesis:

Distance traveled is directly proportional to time^2.

Control Variables:

Angle of Ramp Incline, Initial Velocity

Procedures:

A toy car is released from rest at the top of a ramp. Collect distance and time data using a meter stick and stopwatch. Square the times. Create a distance-time squared graph with distance on the y-axis and time squared on the x-axis. If the shape of the scatter plot has a linear pattern, this hypothesis is supported.

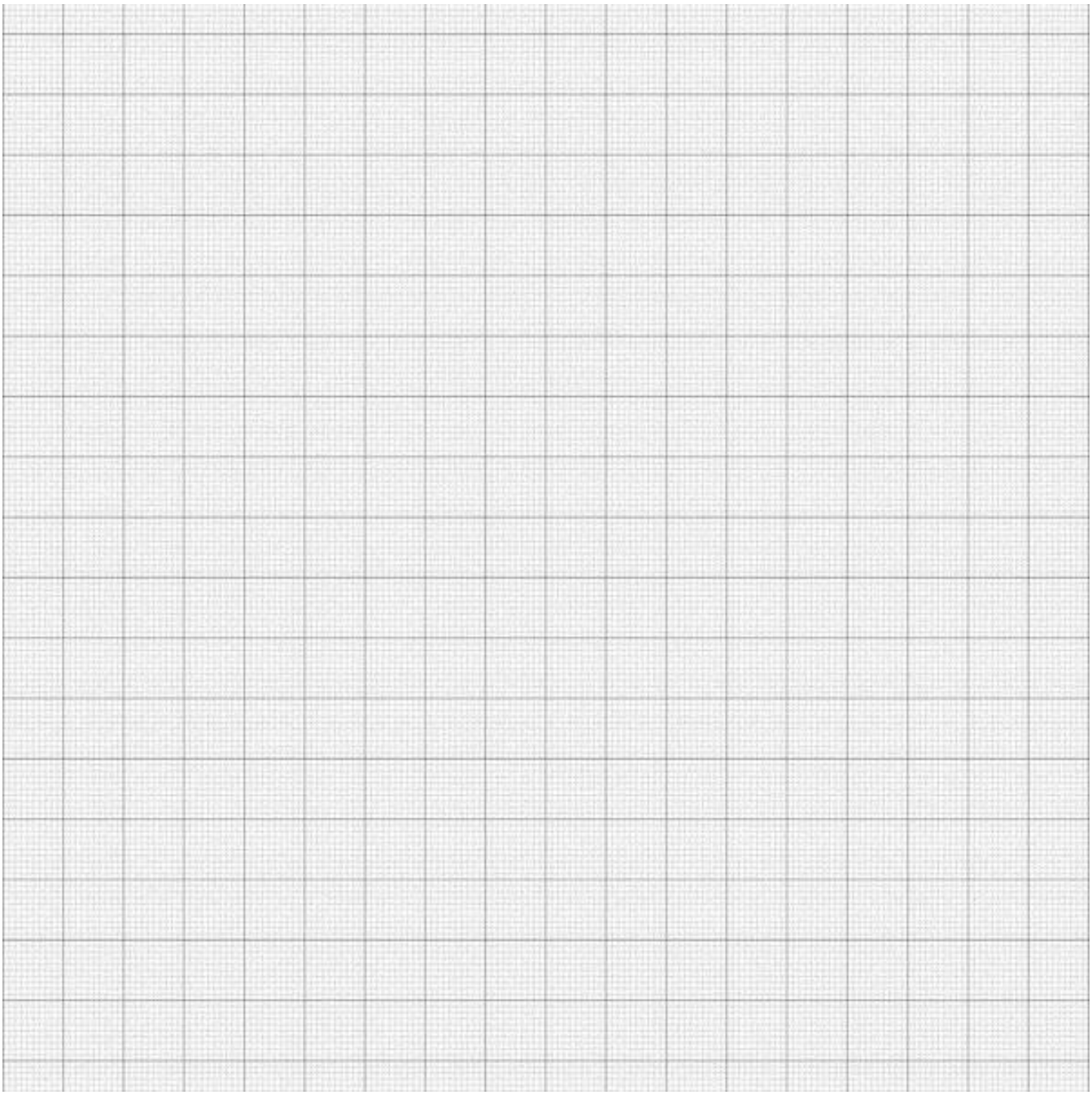
Instructions:

Using the premeasured distances on the ramp (e.g. .5 m, 1 m, 1.5 m, and 2 m) record the time required for the car to travel each of those distances. Fill in the time column below. Square the times and enter those into the table below. Determine the constant acceleration of the car by using the $d = \frac{1}{2}\bar{a}t^2$ formula. Determine instantaneous velocity at the premeasured distances by multiplying acceleration by the time.

Table 1

Distance	time	$time^2$	Acceleration	Velocity
0.5				
1				
1.5				
2				

5. Create a distance v. $time^2$ graph based on the data in your table. Distance should be on the y-axis and $time^2$ on the x-axis. Draw a best fit line.



$time^2$

6.

Complete the following sentences:

a. *"For an object moving at a non-zero constant acceleration, the relationship between distance and $time^2$ is _____ because the two quantities create a straight line, positively sloped diagonal when graphed against one another.*

b. *When two variables (e.g. distance and $time^2$) are directly proportional, they create a graph with a_____ shape.*

Word Options: diagonal, curved, flat, acceleration, velocity, directly proportional

7. Restate the hypothesis of the lab. Provide evidence from you data collection and analysis that could support the hypothesis. You may refer back to the procedures.

8. What were two potential sources of error when you collected data?