

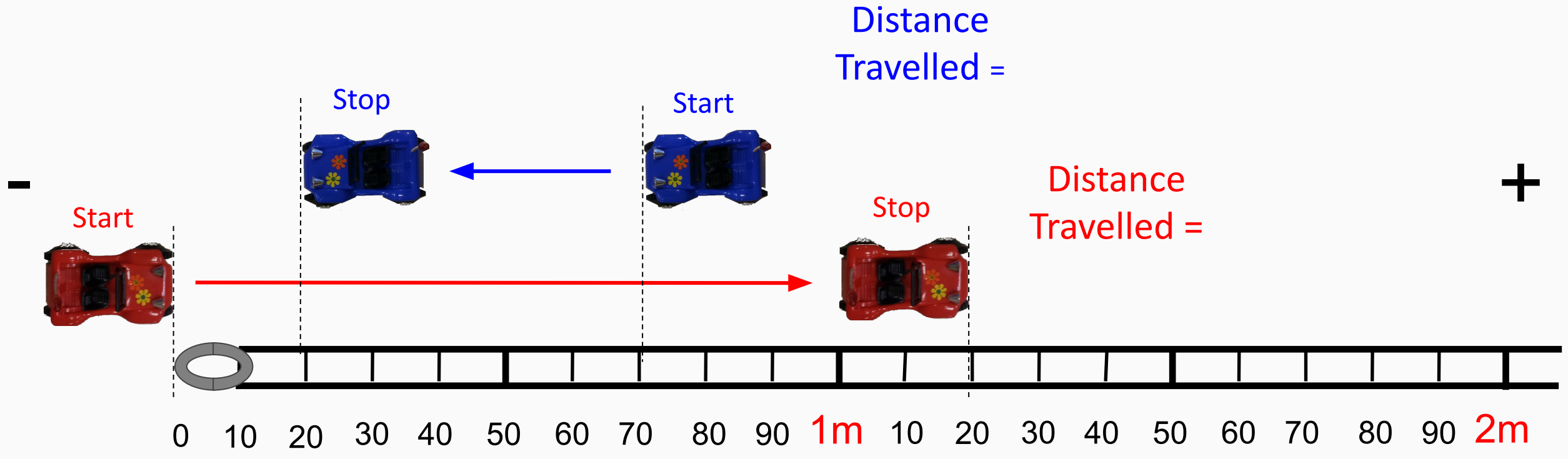


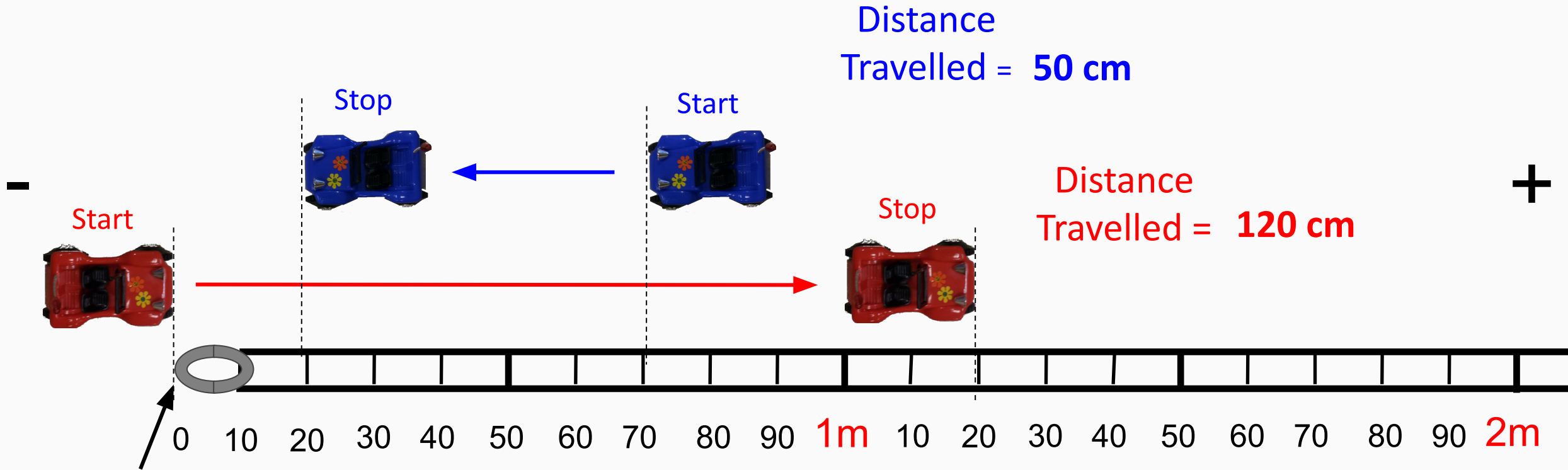
Toy Car



Pre-lab Discussion

What did you observe?	What can be directly measured?	What PAIRS of things might be related?





“Origin” = the zero position on a number line or axis.

Position on number line or axis

“Position” = the location of an object relative to a zero point or “origin” on a number line.

Title: Toy Car Lab



Purpose: To determine the relationship between the **position** and **time** of a car moving at a constant speed.

Procedure: (*only a SAMPLE, your procedure should be your own!*)

1. Mark a "0 cm" position on the floor.
2. Start the moving car at 0 cm and let it run in a straight line, marking its position with tape or a marker every 1 seconds.
3. Collect position and time data for both a red and blue car.

Data:

Independent
Variable

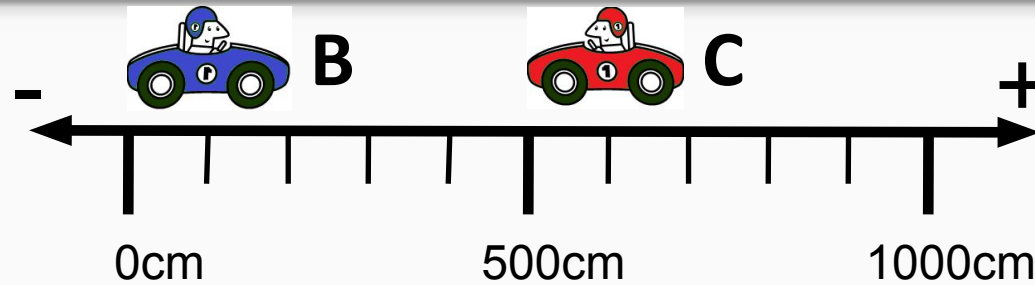
Time (s)	x (cm)
2	10
4	19
...	...

Dependent
Variable

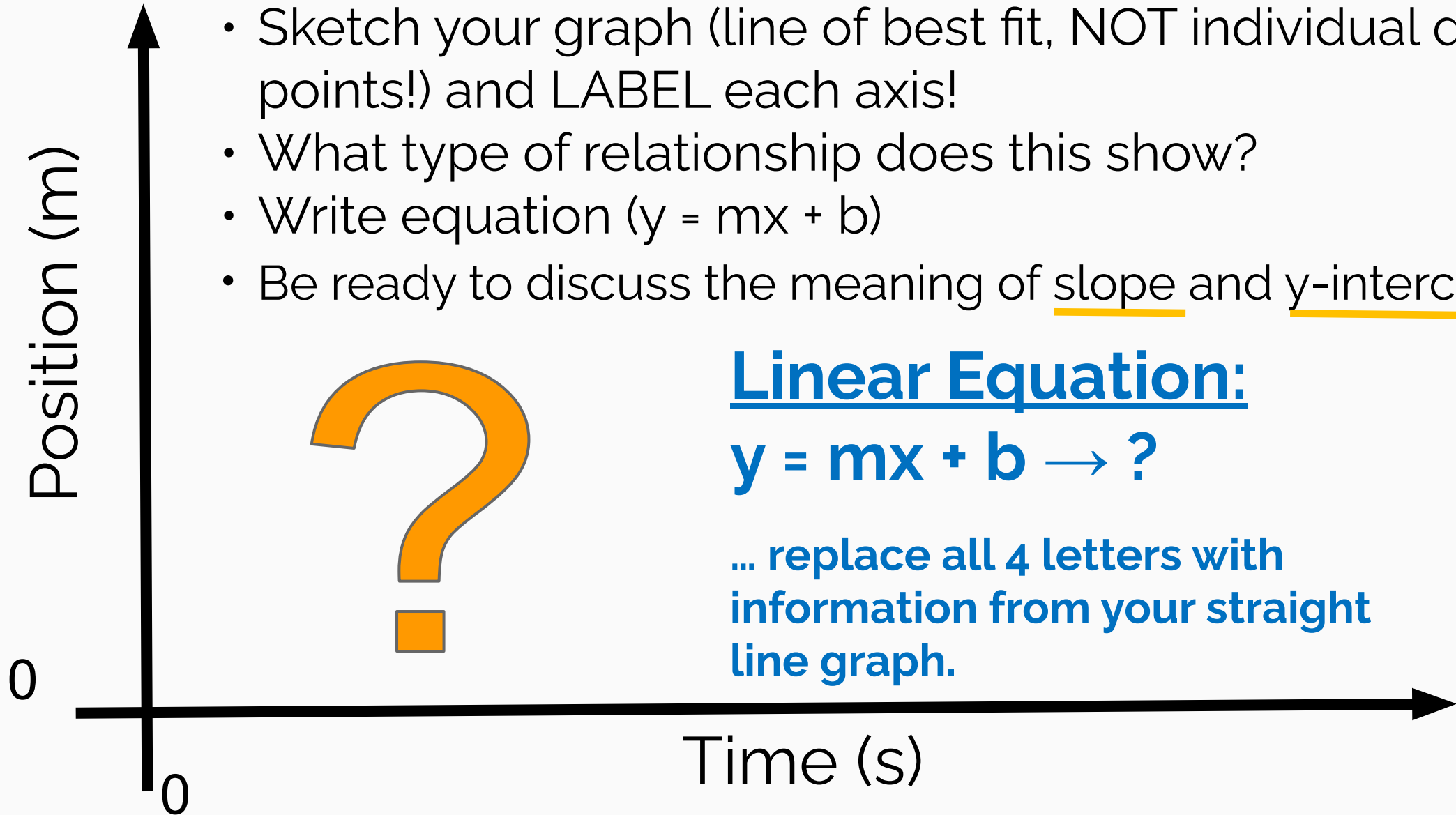
Controlled Variables
(CONSTANTS):

→ speed, mass, type of
surface, incline (flat), etc...

Data Collection Guidelines:



Group #	Initial Position (cm)	Type of Car	Direction
A	100	RED	+
B	200	BLUE	+
C	500	RED	-
D	300	BLUE	-
E	600	RED	-
F	200	BLUE	+
G	200	RED	+



- Sketch your graph (line of best fit, NOT individual data points!) and LABEL each axis!
- What type of relationship does this show?
- Write equation ($y = mx + b$)
- Be ready to discuss the meaning of slope and y-intercept.



Linear Equation:

$$y = mx + b \rightarrow ?$$

... replace all 4 letters with information from your straight line graph.



$$x = \left(-25.9 \frac{cm}{s} \right) t + 92cm$$

Post-Lab Discussion



$$x = \left(-25.9 \frac{\text{cm}}{\text{s}} \right) t + 92\text{cm}$$

“Average Velocity” =
speed & direction

Initial
“Position”

$$x = \bar{V}t + x_0$$

General
Equation

Change in position
OR “Displacement”

$$x - x_0 = \bar{V}t$$

Greek Letter:

“delta” = Δ = “change in...”

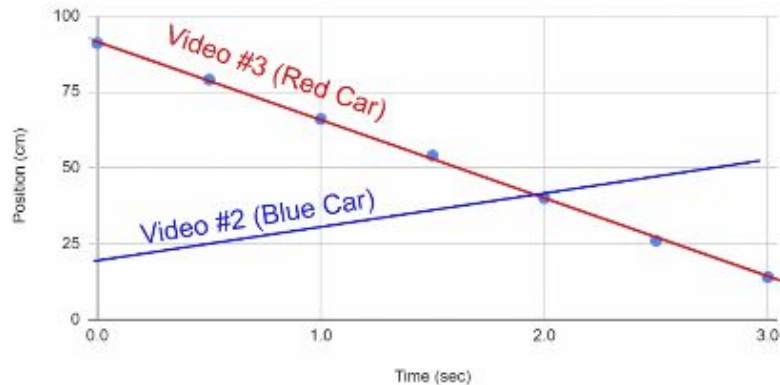
$$\Delta x = \bar{V} \Delta t$$

OR

$$\bar{V} = \frac{\Delta x}{\Delta t}$$

Conclusion Discussion VIDEO:

GRAPHICAL REPRESENTATION (x vs. t graph)



ALGEBRAIC REPRESENTATION (linear equation)

$$x = (11 \text{ cm/s}) t + 20 \text{ cm}$$

$$x = (-25.9 \text{ cm/s}) t + 92 \text{ cm}$$

Conclusion Questions:

****Need for Consensus****

What does the *trend* of the graph represent?

What does the *slope* of the graph represent?

What does the *y-intercept* of the graph represent?

What is the General Form of an equation to describe the motion of the toy car?

[Click Me for Video](#)

- This video summarizes the consensus we reached about the relationship between the position and time for an object which moves with a constant speed.