

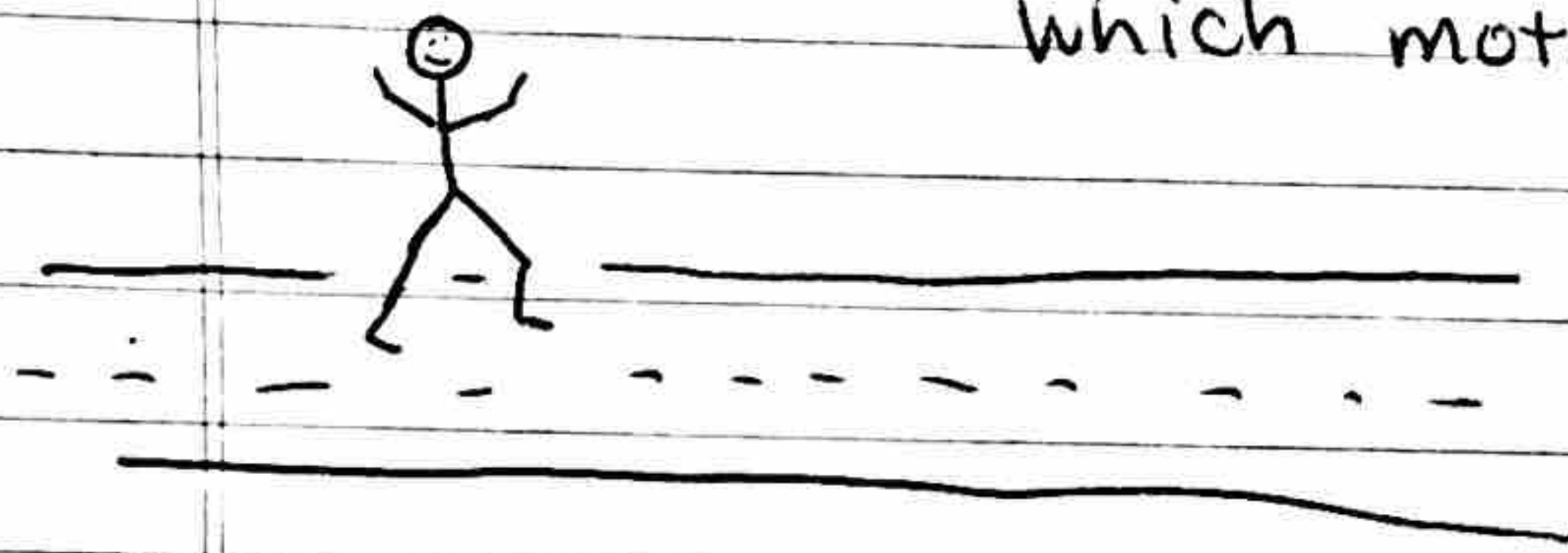
Unit 2: Mechanics

Motion

Change in position in relation to a reference point

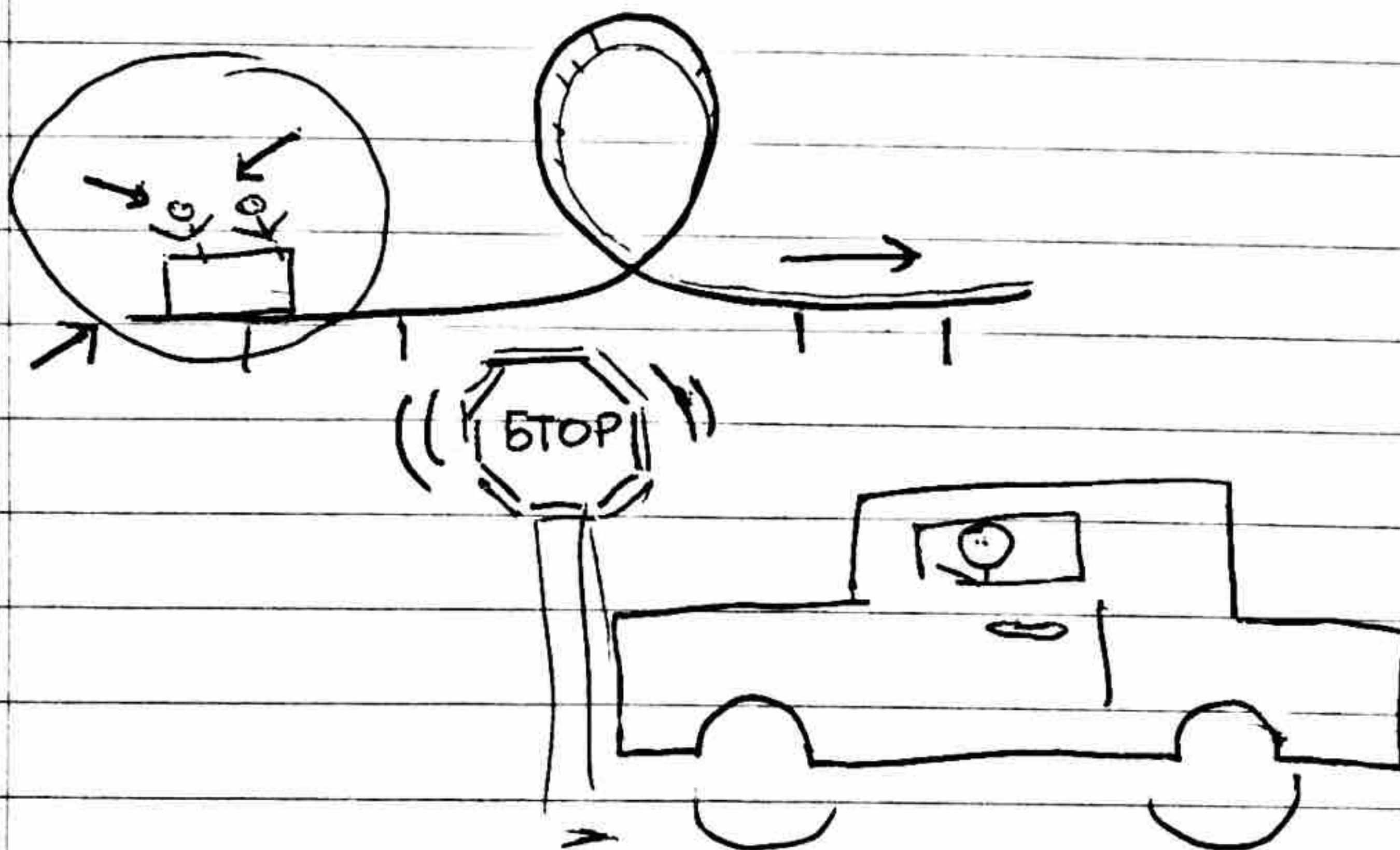
To define motion, we need a FRAME OF REFERENCE

- A nonmoving point from which motion is measured



RELATIVE MOTION

- Movement in relation to a frame of reference



★ MUST CHOOSE A MEANINGFUL FRAME OF REFERENCE

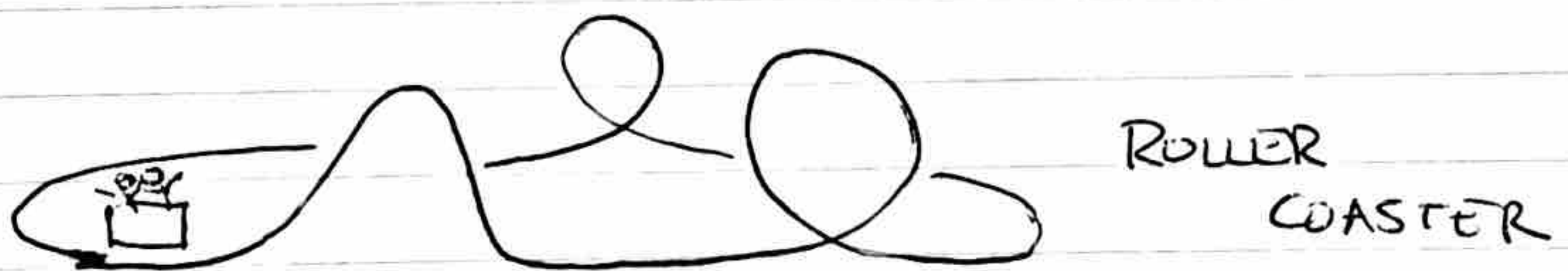
DISTANCE

- SCALAR QUANTITY
 - only has magnitude (quantity)
- Length of a path
- Units:
meter (m)

Long distances \rightarrow km
Short lengths \rightarrow cm, m

DISPLACEMENT

- VECTOR
 - MAGNITUDE AND DIRECTION
 - USE VECTOR ADDITION
- DISTANCE AND DIRECTION FROM STARTING POINT



DISTANCE \rightarrow 5,000 ft?

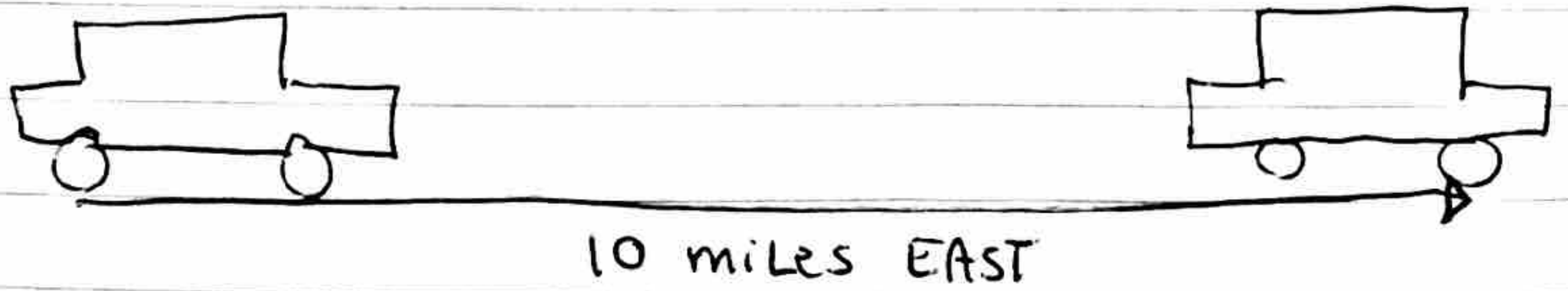
VS

DISPLACEMENT \rightarrow 0 ft

TOTAL DISPLACEMENT IS ZERO!

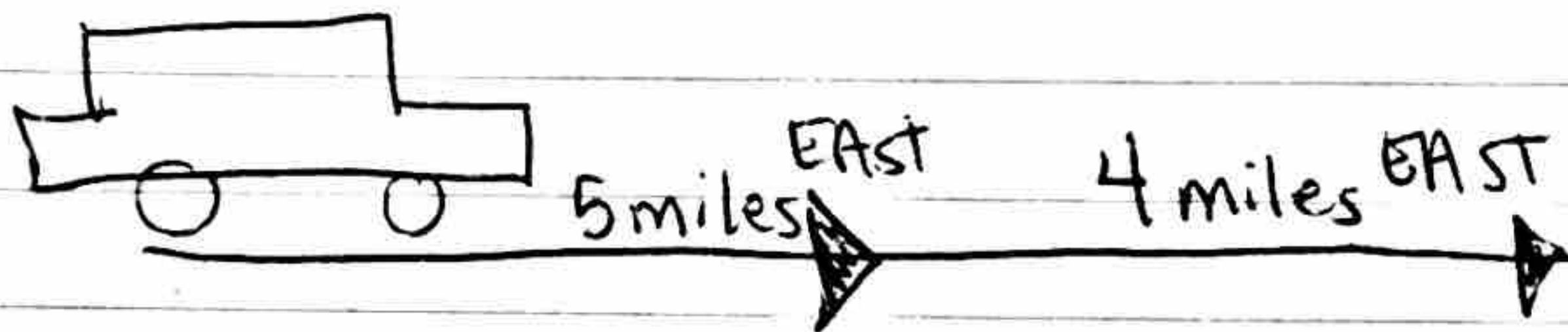
★ VECTORS HAVE MAGNITUDE AND DIRECTION!

VECTOR EXAMPLES:



Distance: 12 miles

Displacement: $10 \text{ mi} - 2 \text{ mi} = 8 \text{ miles EAST}$



Distance: 9 miles

Displacement: 9 miles EAST

SPEED

- RATE OF MOTION
- Distance traveled per unit time
- SCALAR QUANTITY

$$\text{SPEED} = \frac{\text{DISTANCE}}{\text{TIME}}$$

