Motion

Mr. Skirbst

Weekly Challenge: *A train is travelling from north to south. However, there are parts of the train that are always moving from south to north. What are they?*

Galileo Galilei

February 15, 1564 – January 8, 1642

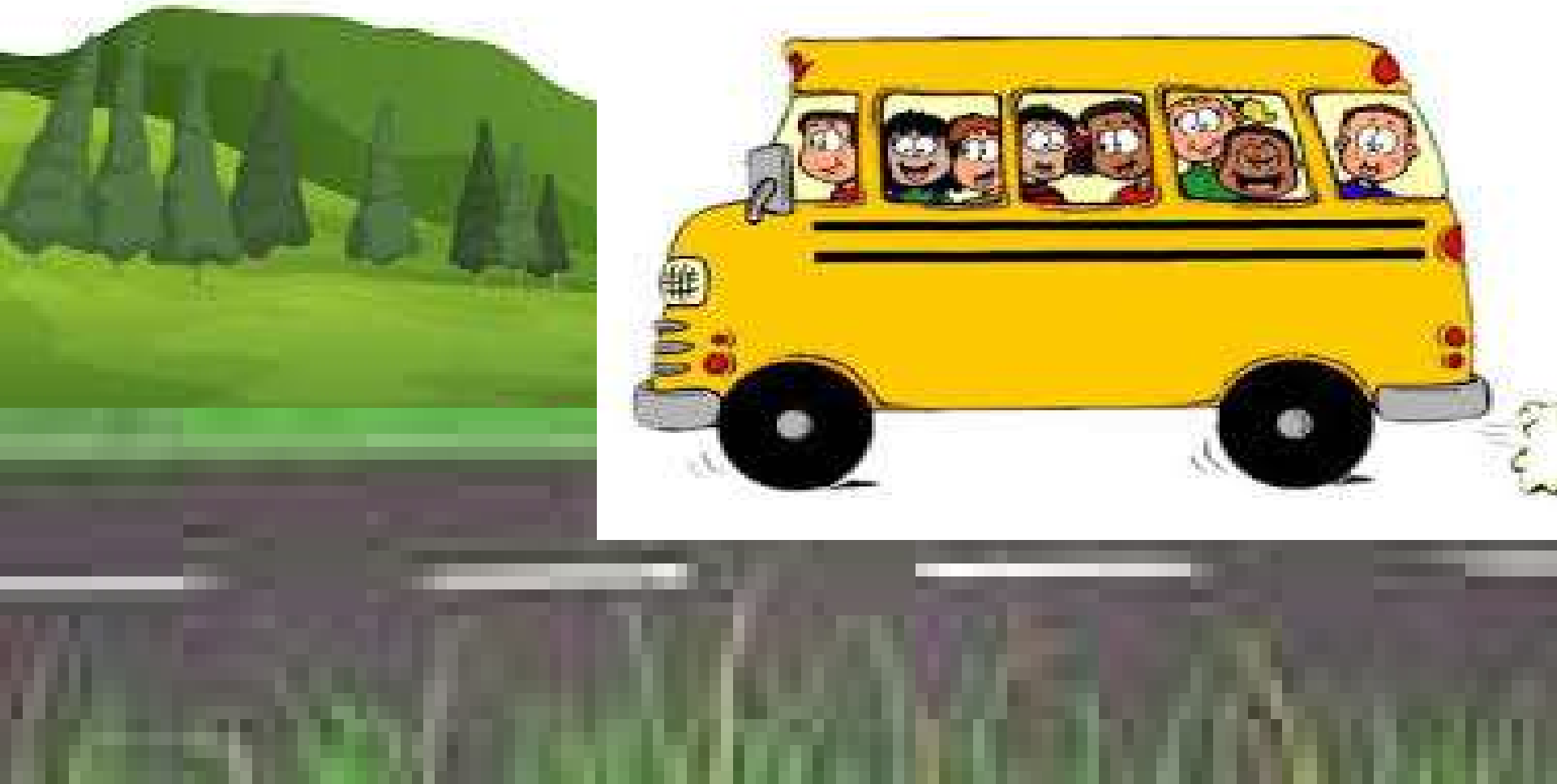
He was an Italian physicist significant in the scientific revolution of the Renaissance. He is credited with being the **first to measure speed** by defining it as the distance over time.

Frame of reference

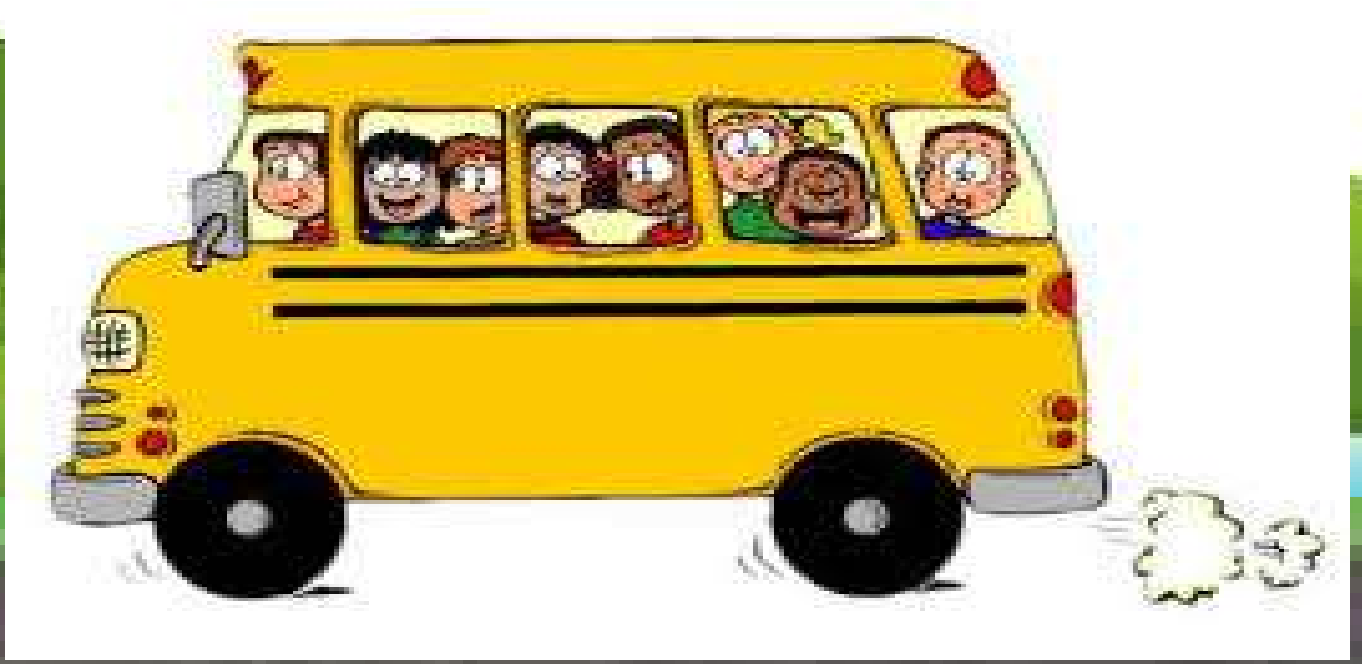
Frame of reference

Object or background with which movement is compared

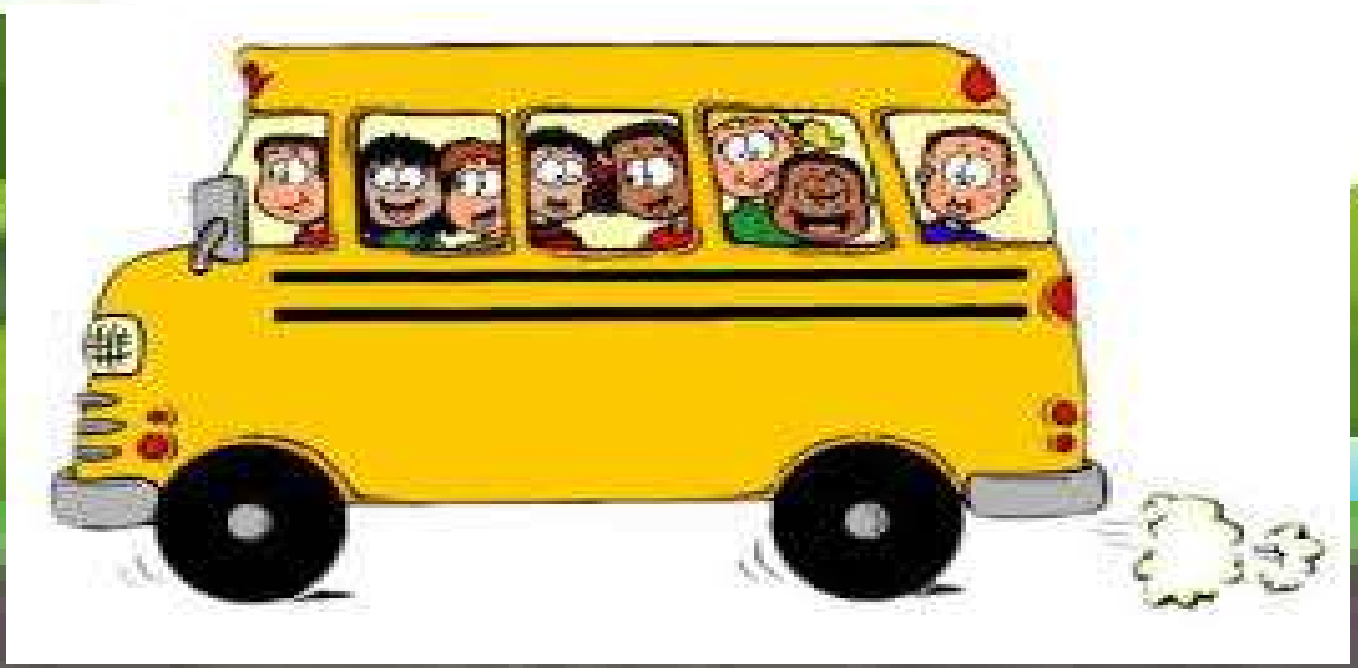
Frame of reference



Frame of reference



Frame of reference



Frame of reference

What is motion?

What is motion?

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Motion

change in position over a period of time

Motion

motion is a change in position over a period of time

Motion

$$\text{motion} = \frac{\text{distance}}{\text{time}}$$

Motion

motion =  distance

---

time

SPEED:

rate at which an object moves

SPEED:

SPEED:

miles per hour

SPEED:

miles per hour

distance per time

SPEED:

miles per hour

distance per time

distance divided by time

SPEED:

miles per hour

distance per time

distance divided by time

Speed = distance / time

SPEED:

rate at which an object moves

$$S = d / t$$

S = speed; d = distance; t = time

SPEED:

$$S = d / t$$

S = speed; d = distance; t = time

Constant speed – does NOT change over time

Average speed = TOTAL distance / TOTAL time

***Example*:**

If an object moves ____ meters in ___ sec,

What is its speed?

***Example*:**

If an object moves __10__ meters in _5_ sec,

What is its speed?

VELOCITY

VELOCITY

speed* in a given *direction

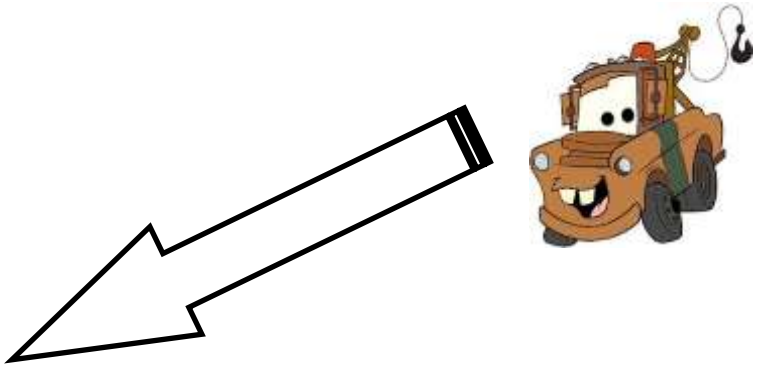
Ex. 10 km/hr **east**

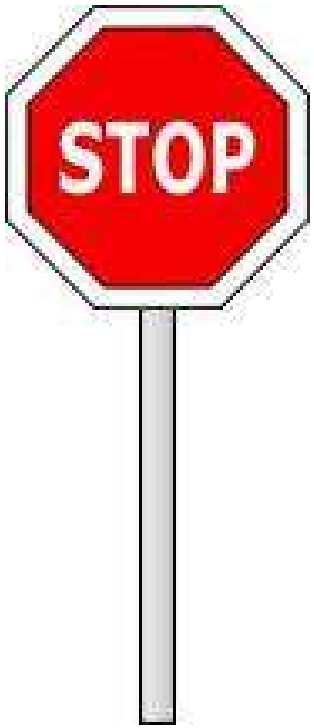
ACCELERATION

ACCELERATION

ACCELERATION

Rate of change in velocity




STOP

ACCELERATION

is the rate of change in velocity

ACCELERATION

is **the rate of change in velocity**

ACCELERATION

is **the rate of change in velocity**

A =

ACCELERATION

is* the rate of *change in velocity

A =

ACCELERATION

is* the rate of *change in velocity

A = velocity(final) – velocity(original)

ACCELERATION

is <u>the rate of</u> change in velocity

A = velocity(final) – velocity(original)

ACCELERATION

is <u>the rate of</u> change in velocity

$$A = \frac{\text{velocity}_{(final)} - \text{velocity}_{(original)}}{\text{time}}$$

ACCELERATION

Rate of change in velocity

$$A = (V_f - V_o) \ / \ t$$

A = acceleration

V_f = final velocity

V_o = original velocity

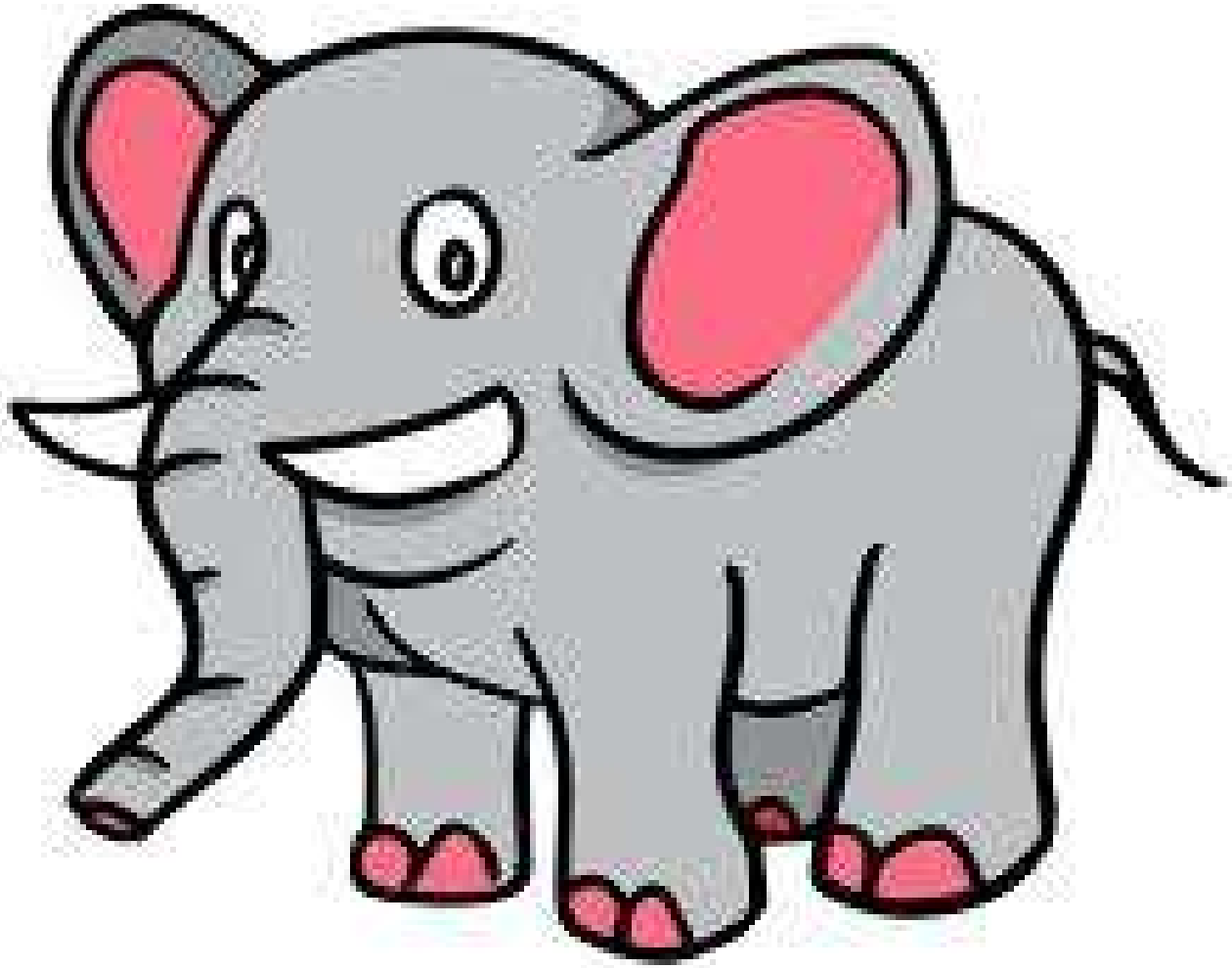
t = time

Example:

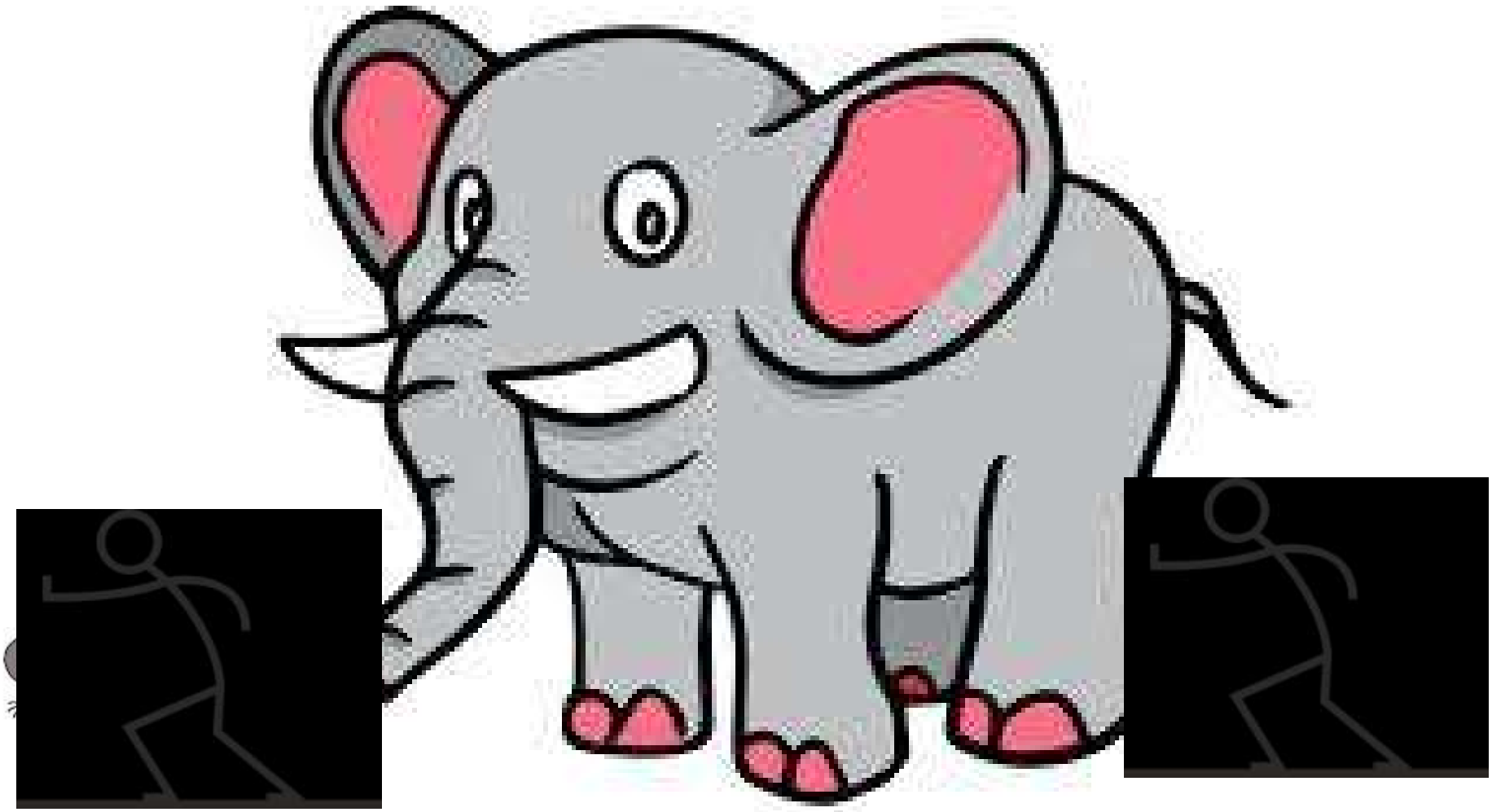
A car is able to reach 100 km/hr (east) in 5 seconds from a starting line. What is its acceleration?

MOMENTUM

MOMENTUM



MOMENTUM



MOMENTUM

how difficult it is to start or stop an object

MOMENTUM

how difficult it is to start or stop an object

MOMENTUM

how difficult it is to start or stop an object

MOMENTUM

how difficult it is to start or stop an object

$$M = (m)\,(v)$$

M = momentum

m = mass

v = velocity

***Example*:**

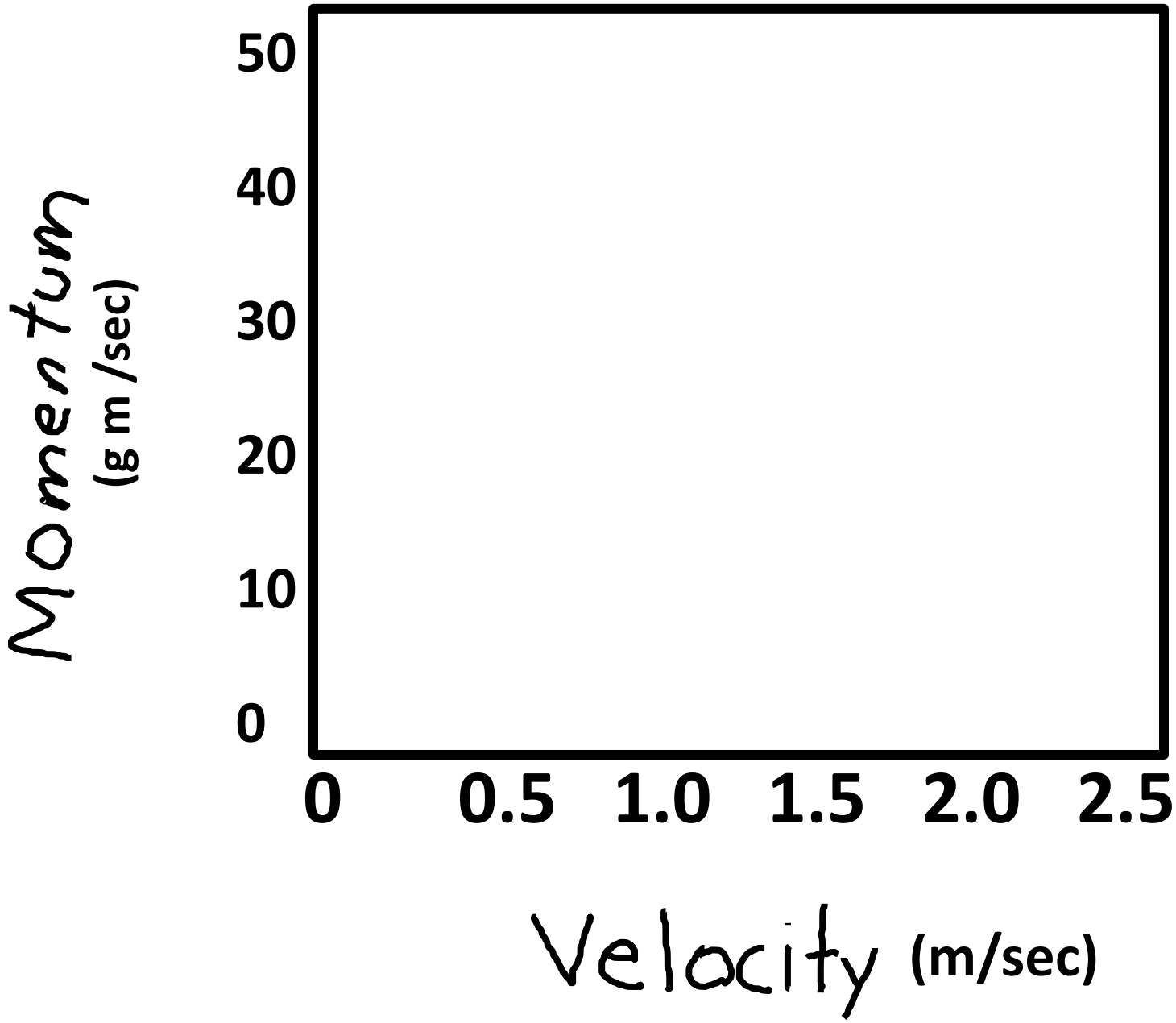
A truck has a mass of 10,000 kg and is moving at a velocity of 100 km/hr. What is its momentum?

LAB

Timekeeper

Driver

Recorder


Momentum
(g m /sec)
50
40
30
20
10
0
0
0.5
1.0
1.5
2.0
2.5
Velocity (m/sec)