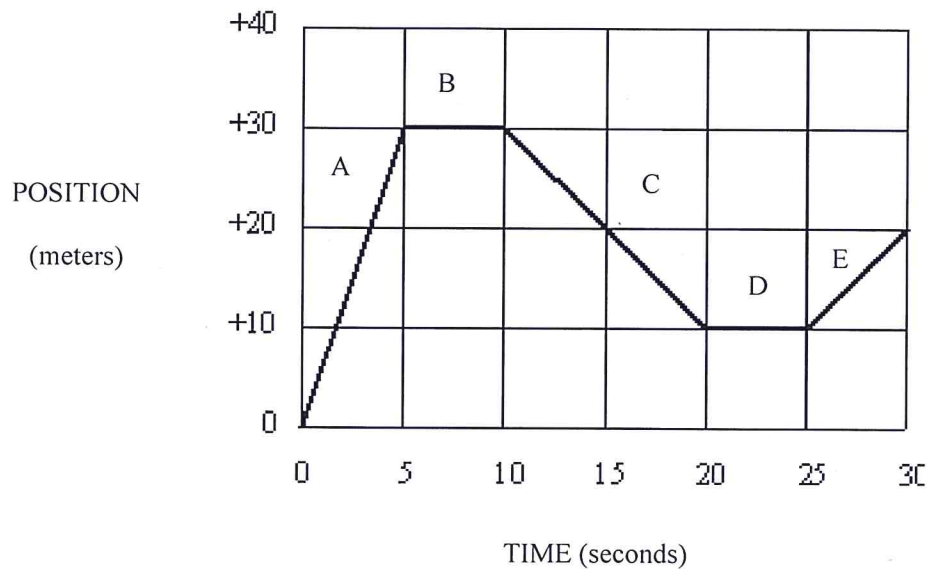


U1L3: HOW TO GRAPH

Position- Time graphs show the relationship between an object's position over a certain interval of time.

IE: The graph below represents a car's motion.

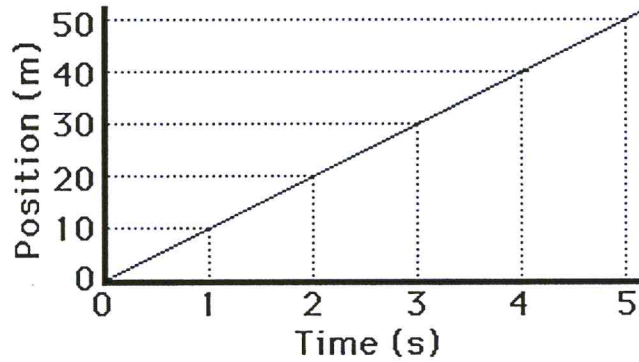


What is the car's position at:

- 1) $t = 5s$: +30 m
- 2) $t = 15s$: +20 m
- 3) $t = 25s$: +10 m

Describe the motion of the car during each section:

- a) fast +
- b) stopped
- c) slower -
- d) stopped
- e) same speed as c +



Position-Time graphs measure the change of position over a certain time interval. Thus, Position-

Time graphs measure the velocity Δd of an object.

For example, the graph above tells us that at 0s an object was at a position of 0 meters. After 1s, the object moved to a position of 10 meters.

What is the displacement?

$$\Delta d = 10 - 0$$

$$\Delta d = 10\text{m}$$

What is the displacement of the object from $t_0 - t_3$?

$$\Delta d = 30 - 0$$

$$\Delta d = 30\text{m}$$

What is the displacement of the object from $t_1 - t_3$?

$$\Delta d = 30 - 10$$

$$\Delta d = 20\text{m}$$

What is the displacement of the object from $t_0 - t_5$?

$$\Delta d = 50 - 0$$

$$\Delta d = 50\text{m}$$

HOW TO GRAPH

a) Calculate the scale to be used on the x-axis.

- The x-axis should be the independent or manipulated variable
- The ratio of the number of units in the data to the number of squares on the grid / paper will yield the minimum number of units per square on the axis.

$$600 \text{ g} \div 50 \text{ squares} = 12 \text{ g/square (minimum value)}$$

- The ratio of the number of squares on the graph paper to the number of units in the data will yield the maximum number of squares per unit on the axis

$$30 \text{ squares} \div 12 \text{ seconds} = 2.5 \text{ squares/sec (maximum value)}$$

b) Calculate the scale to be used on the y-axis.

- The y-axis should be the dependent or responding variable
- The ratios of squares and data will be collected the same as for the x axis.

c) Draw the x and y axis lines on your graph paper and mark off the scale

- Leave a margin of about an inch (4-5 squares on .5 cm grid paper)
- It is not necessary to number each square grid line
- Mark each numbered grid line with a hashmark mark.

d) Label each axis with the quantity being graphed and the units of measurement.

- Example: Time (s) – “time in seconds”

e) Plot the data points

g) Include a title for the graph

- The title should include both the independent and dependent variables.
- The best wording is just like in the statement of the problem in an experiment.
- Example: How does the depth of water in a lake affect the water temperature?

EXAMPLE:

