

Name: Period 5

# Physics In Motion

## Pt. 1 - Notes

- Introduction
- Unit Conversions
- Time and Time Intervals
- Scalar vs. Vector
- Distance
- Displacement
- Speed
- Velocity
- Position-Time Graphs
- Velocity-Time Graphs
- Acceleration



# In Motion: Introduction

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## Motion

- Defined as the movement of an object, or any of its parts, from one place to another.
- The study of the motion of objects and the forces that affect their motion is called mechanics.
- Mechanics is divided up into two distinct categories:
  - i. kinematics
  - ii. dynamics

## Kinematics

- Description of the motion of objects without considering the cause of the motion.
  - Kinematics answers the following questions:
    - Is it moving fast or slow? Is it moving at a constant speed? Is it at rest?
    - What direction is it travelling? Moving?
- ↳ not need to know the Forces*

## Dynamics

- Examination of the causes of the motion and an explanation of why the objects move as they do.
  - Dynamics answers the following questions:
    - Why is the object speeding up or slowing down?
    - How does something turn?
- ↳ FORCES!*

In order to describe motion accurately we will study relationships between aspects of motion.

**Relationships in physics can be described using:**

1. **Pictures (Diagrams)** - a visual representation of what has happened
2. **Words** - a written statement of what has happened
3. **Numbers** - a table of values obtained from an investigation of the relationship.
4. **Graphs** - plotted points
5. **Equations (symbols)** - mathematical representation showing how one variable affects the other.

# Unit Conversions

In this unit you will be working with various units. You will need to know how to convert between these units. To do this, we will use conversion factors.

## Distance

$$1000\text{m} = 1\text{km}$$

$$100\text{cm} = 1\text{m}$$

$$1000\text{mm} = 1\text{m}$$

### Examples:

Convert 36m to km.

$$\frac{1000\text{m} \div}{1\text{km}} = \frac{36\text{m}}{0.036\text{km}}$$

$$36 \times 1 = 36$$

$$36 \div 1000 = 0.036$$

$$\frac{1\text{km}}{1000\text{m} \div} = \frac{0.036\text{km}}{36\text{m}}$$

$$36 \times 1 = 36$$

$$36 \div 1000 = 0.036$$

Convert 1.2m to cm

$$\frac{100\text{cm}}{1\text{m} \div} = \frac{120\text{cm}}{1.2\text{m}}$$

$$100 \times 1.2 = 120$$

$$120 \div 1 = 120$$

## Time

$$1\text{min} = 60\text{s}$$

$$1\text{hr} = 60\text{min}$$

$$1\text{hr} = 3600\text{s}$$

### Examples:

Convert 35min to seconds.

$$\frac{1\text{min} \div}{60\text{s}} = \frac{35\text{min}}{2100\text{s}}$$

$$35 \times 60 = 2100$$

Convert 4.5hr to seconds

$$\frac{1\text{hr} \div}{3600\text{s}} = \frac{4.5\text{hr}}{16200\text{s}}$$

$$4.5 \times 3600 = 16200$$

## Convert- Distance

Remember that 1 km has 1000 m in it. Show your work.

1.)  $15.25 \text{ km} = \underline{15250} \text{ m}$

2.)  $29 \text{ m} = \underline{0.029} \text{ km}$

3.)  $8.6 \text{ km} = \underline{8600} \text{ m}$

4.)  $5850 \text{ m} = \underline{5.85} \text{ km}$

5.)  $2.232 \text{ km} = \underline{2232} \text{ m}$

6.)  $43250 \text{ m} = \underline{43.25} \text{ km}$

7.)  $64.248 \text{ km} = \underline{64248} \text{ m}$

8.)  $350 \text{ m} = \underline{0.35} \text{ km}$

9.)  $56.2 \text{ km} = \underline{56200} \text{ m}$

10.)  $81654 \text{ m} = \underline{81.654} \text{ km}$

## Convert- Time

Remember that 1 minute has 60 seconds and 1 hour has 60 minutes. Show your work.

1.)  $145 \text{ s} = \underline{0.04} \text{ hr}$

2.)  $3600 \text{ s} = \underline{60} \text{ min}$

3.)  $1 \text{ hr} = \underline{3600} \text{ sec}$

4.)  $4.6 \text{ min} = \underline{276} \text{ sec}$

5.)  $6 \text{ min } 36 \text{ s} = \underline{0.11} \text{ hr}$

6.)  $13 \text{ hr} = \underline{46800} \text{ sec}$

7.)  $2395 \text{ s} = \underline{39.917} \text{ min}$

8.)  $84 \text{ min} = \underline{1.4} \text{ hr}$

9.)  $84 \text{ min} = \underline{5040} \text{ sec}$

10.)  $14.947 \text{ s} = \underline{0.004} \text{ hr}$