Gas Laws:

1. Boyle’s Law: Pressure is inversely proportional to volume.

P1V1 = P2V2

1. Pressure’s Law: Pressure is proportional to temperature.

P1 = P2

T1= T 2

To convert ⁰C to K = ⁰C + 273

1. Charles’s Law: Volume is proportional to temperature.

V1 = V2

T1= T 2

1. All Laws:

P1 V1 = P2 V2

 T1 = T 2

Speed and Acceleration:



Velocity is proportional to time. This graph shows *acceleration.*

**

This graph shows *non-constant acceleration.*

Distance-time Graphs:

Distance stays *constant* and time *increases.*



*Constant* velocity or speed.



Accelerating uniformly (constantly).

Speed-time Graphs:



*Constant* speed.



*Constant* acceleration.

Speed: Speed in any direction.

Velocity: Speed in a specific direction.

s = ut + *½* at*2*

$$acceleration=\frac{change in speed}{time taken}$$

**Symbols:**

**s →** displacement in *m*

**u →** initial velocity in *m/s*

**v →** final velocity in *m/s*

**a →** acceleration in *m/s2*

**t →** time in *s*

Waves:



Longitudinal waves are perpendicular to the direction of propagation.



Transverse waves are parallel to the direction of propagation.

|  |  |
| --- | --- |
| **Primary Waves** | **Secondary Waves** |
| These are *longitudinal waves*. | These are *transverse waves.* |
| They only pass through *solids and liquids.* | Only pass through *solids.* |
| They go faster through *more dense material.* | They go faster through *more dense material.* |
|  | *Slower* than *primary waves.* |

Seismic Waves:



Momentum:

Momentum is a product of *mass* and *velocity* of an object.

**Symbols:** **Units:**

**P →** momentum kgm/s **or** Ns

**m →** mass

**v →** velocity

**The Principle of Conservation of Momentum:** for a system of interacting objects, the total momentum remains constant, provided no external resultant force acts on the system.

**Formula for Conservation of Momentum:**

**Total Initial Momentum Before Collision = Total Final Momentum After Collision**

m1 u1 + m2 u2 = m1 v1 + m2 v2

Elastic Collisions:

An elastic collision is defined as one in which there is no loss of kinetic energy in the collision.

An inelastic collision is defined as one in which the kinetic energy is changed to some form of other energy in the collision.