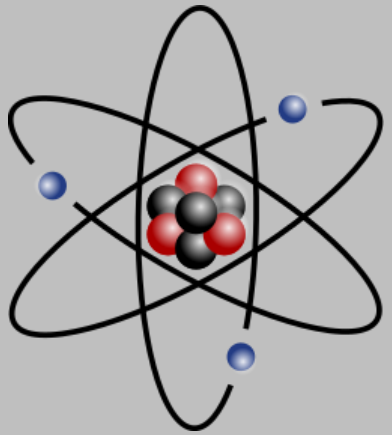
International House Tashkent
Subject: Physics
Department: ES, Course 1
Lesson 1. Introduction to physics. Types of motion



What is physics?

Physics is the branch of science which deals with matter and its relation to energy.

It involves study of physical and natural phenomena around us. Examples of these phenomena are formation of rainbow, occurrence eclipse, the fall of things from up to down, the cause of sunset and sunrise, formation of shadow and many more.

Physics as a subject is divided into six broad branches as discussed below.

1) Mechanics

This branch deals majorly with motions under the influence of forces. Under this branch, we look into details the aspects of linear, circular and oscillatory motions as well as motion of fluids

2) Geometrical Optics

This branch takes a keen look at the behavior of light in various media.

3) Electricity and magnetism

This branch looks at the interaction between electric fields and magnetic fields and the applications of such interactions.

4) Thermodynamics

This branch looks at how heat as a form of energy is transformed to/from other forms of energy.

5) Atomic Physics

This area of study is targeted at the behavior of particles of the nucleus and the accompanying energy changes.

6) Waves

It deals with the study of the propagation of energy through space.

Relationship between physics and other subjects

Physics does not only relate the remaining two science subjects but also enjoys a relationship with other subjects as well.

1. PHYSICS AND MATHEMATICS

Physics relates strongly with mathematics, Many physics concepts are expressed mathematically. Many physics formulae are expressed mathematically.

2. PHYSICS AND BIOLOGY

Knowledge of lenses in physics is used in making microscope used in study of cells in biology. Physics formulae are used in calculation of magnification by microscopes. The knowledge of levers helps to explain locomotion in Biology.

3. Physics and Chemistry.

Physics has helped in explaining forces within atoms and therefore atomic structure. It is this structure of the atom that then determines the reactivity of the atom as explained in chemistry.

4. Physics and Geography

Accurate use of instruments and physics concepts can establish weather patterns and explain formation of rainfall, pressure variations. Use of magnetic properties of lodestone and other materials help navigators to determine direction.

Physics and Technology.
Some areas of technology that requires knowledge of physics are:

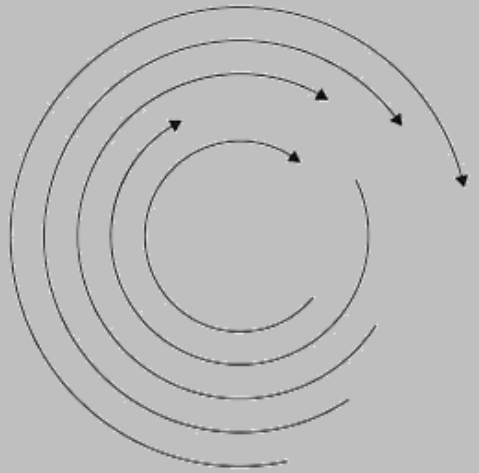
In medicine.
X-rays, lasers, scanners which are applications of physics are used in diagnosis and treatment of diseases.

Communication
Satellite communication, internet, fibre optics are applications of internet which requires strong foundation in physics.

In industrial applications
In the area of defense, physics has many applications e.g. war planes, laser-guided bombs which have high level accuracy. In entrainment industry, knowledge of physics has use in mixing various colours to bring out the desirable stage effects

Everything naturally wants to move and change. In the world of mechanics, there are four basic types of motion. These four are rotary, oscillating, linear and reciprocating. Each one moves in a slightly different way and each type of achieved using different mechanical means that help us understand linear motion and motion

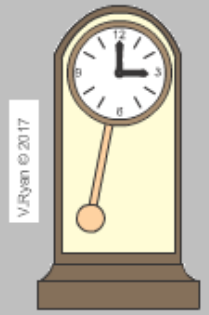
ROTARY MOTION



Rotary motion is anything that moves in a circle. This type of motion was among the first discovered in ancient times. Think of a spinning wheel on which people spun wool. A car's engine works the same way. Like linear cylinders, rotary actuators are used across a wide range of industries and come in electric, pneumatic and hydraulic options.

OSCILLATING MOTION

OSCILLATING



PENDULUM CLOCK

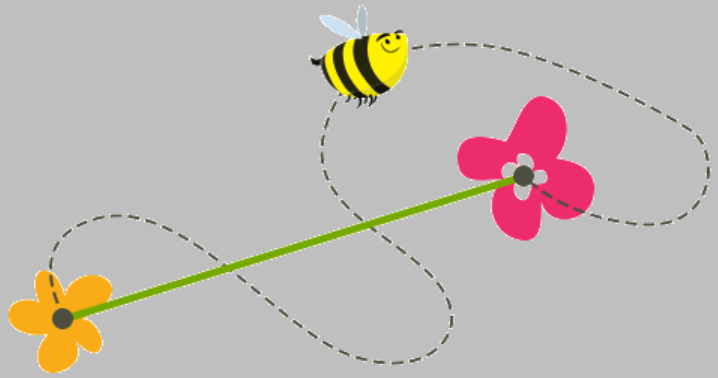
Something that oscillates moves back and forth. Anything that repeats the motion cycle after a certain period is considered to be oscillating. This type of motion is found everywhere in our world: a sprinkler system, the pendulum of a clock or even sound waves.

You may be thinking that a rotary actuator functions as an oscillating device, and for that matter, so does a linear one when it repeats a continuous movement. When it comes to actuators, linear and rotary can be viewed as oscillating.

LINEAR MOTION

Simple enough, linear motion is anything that moves in a straight line, like our linear actuators. Time, as far as we know, moves in a linear fashion. Just like rotary devices, you can find linear cylinders in electric, pneumatic or hydraulic options. They have driven the field of automation, manufacturing, robotics, and others into a new age because, in the past, rotary motion was the only means to create motion.

ONE MORE TYPE



There are actually five types of motion, but the last one doesn't count as an actual type. It is known as **irregular motion**, which means any motion that has no fixed pattern. Bees fly in an irregular motion.