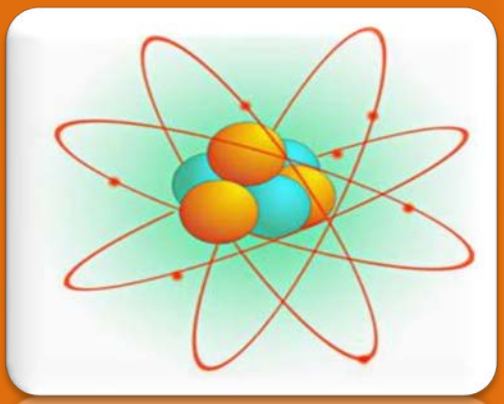
Physics



The Core concepts of Physics for Class VI are as follows:

Class VI

Physical Quantities and Measurement

Force

Energy

Light

Magnetism

Theme 1: Physical Quantities and Measurement

Whenever we make a measurement, we require a number which answers the 'how' part of it and a unit which tells us that we are talking about. The unit that is used for a physical quantity is universally accepted and used so that science is communicated and understood all over the world, without any ambiguities. Length, mass, and time are some of the physical quantities that are discussed in detail. They have their own units and symbols for representation. Different devices are required to make measurements of these quantities. How to use a device properly for measurement is an important aspect of learning physics. Children learn to develop skills of converting the magnitude of a physical quantity from one unit to its other related unit.

Learning outcomes:

Children will be able to:

- define length, mass and time;
- express length, mass, time, and area in proper units with proper symbols;
- measure length of objects using a ruler and a measuring tape;
- measure mass of an object using a beam balance and an electronic balance;
- measure time using a clock, a watch and a stop-watch;
- convert a physical quantity from one unit into other related units.

Physical quantities and measurement

Key Concepts	Suggested Transactional Processes	Suggested Learning resources
▸ Measurement of Length: ☛ Concept of length as distance between two points. ☛ Measurement of length. ☛ Units (with symbol and full name). <table><tr><th>Name of unit</th><th>Symbol</th></tr><tr><td>centimetre</td><td>cm</td></tr><tr><td>meter</td><td>m</td></tr><tr><td>Kilometre</td><td>km</td></tr><tr><td>inch</td><td>inch</td></tr><tr><td>foot</td><td>ft</td></tr></table>▸ Measurement of Mass: ☛ Concept of Mass as matter contained in an object. ☛ Measurement of Mass ☛ Units (with symbol and full name). <table><tr><th>Name of unit</th><th>Symbol</th></tr><tr><td>milligram</td><td>mg</td></tr><tr><td>gram</td><td>g</td></tr><tr><td>kilogram</td><td>kg</td></tr></table>	▸ Providing opportunities to children to: ▸ Explain concepts of length as a distance between two points using objects in classroom like book, table, blackboard, length of classroom, etc. ▸ Explain different units of length like cm, m, km, inch, ft and the relation between them. ▸ Practice how to convert one unit into others. ▸ Explaining the concept of mass as matter contained in an object using objects around us. ▸ Explaining different units of mass like mg, g, kg and the relation between them. ▸ Explaining time in terms of hours, minutes and seconds. ▸ Explaining different units of time like seconds, minutes and hours and the relation between them. ▸ Exercise for developing the skill of conversion of one unit into others.	▸ Objects around us. ▸ Ruler and measuring tape. ▸ Video on measurement of length using a ruler and a measuring tape. ▸ Objects in classroom. ▸ Beam balance and Electronic balance. ▸ Video on measurement of mass using beam balance and electronic balance. ▸ Clock, watch, stop watch. ▸ Video on measurement of time using a clock, watch and stopwatch. ▸ Use of mobile to measure time interval. ▸ A set of objects of regular shapes. ▸ Graph papers. ▸ Pencils.

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- Measurement of Time:
  - Concept of time and explanation in terms of hours, minutes and seconds.
  - Measurement of Time.
  - Units (with symbol and full name).

<table>
<tr><th>Name of unit</th><th>Symbol</th></tr>
<tr><td>Second</td><td>s</td></tr>
<tr><td>Minutes</td><td>min</td></tr>
<tr><td>Hour</td><td>h</td></tr>
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(No distinction of SI, metric, MKS, CGS).

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Life Skills: Health, Communication skills, problem solving, Cooperation and working together.

Integration: Mathematics, Chemistry, Biology, Technology in daily life.

Theme 2: Force

This theme will enable children to understand the terms force and friction. The push or pull of an object is called force. A force can cause a stationary object to move and can change the direction of a moving object. When an inflated football is pressed from all sides causes its shape to change. When a ball is rolled down on a floor, it stops after some time. Children will understand why this happens because the force acting between the surface of the ball and the floor slows down the ball. This force is called Friction. Friction can be static, sliding or rolling. There are situations where friction is advantageous and situations where it is disadvantageous.

Learning outcomes:

Children will be able to:

- define a force;
- explain that a force can change the state of motion;
- explain that a force can change the shape of an object;
- describe force of friction with examples from daily life;
- describe situations where static/ sliding / rolling frictions are in play;
- explain advantage and disadvantage of force of friction in daily life situations.

Force		
Key Concepts	**Suggested Transactional Processes**	**Suggested Learning resources**
▸ Force as a push or pull. ▸ Effects of force on ☛ Mass (No effect) ☛ Speed ☛ Direction (rest and motion) ☛ Change in shape and size ☛ Using real world examples only. ▸ Force of Friction: ☛ Types – Rolling, Sliding and Static. ☛ Advantages and Disadvantages.	▸ Demonstrating to and discussing with children: ☛ force as push or pull. ☛ that a force can change a state of motion. ☛ that a force can change shape of an object. ☛ the play of force of friction in an object in motion.	▸ A couple of tennis balls. ▸ An inflated football, ▸ A toy cart. ▸ Surface of a table. ▸ Video showing force, different types of frictional forces and effect of force.

Integration: Geography, Technology in daily life.

Life Skills: Communication, problem-solving.

Theme 3: Energy

The ability to do work is called energy. Machines help us to do work. For example, a bottle opener is a machine. A needle, a doorknob are also machines. Some machines are more complex than others. A simple machine changes the direction or the magnitude of force applied. The six simple machines are the lever, the pulley, the wheel-and-axle, the inclined plane, the wedge and the screw. On the basis of location of fulcrum (the pivot point), the load and the effort, levers be classified into three types or orders. The aim of this theme is to enable children know and understand about different types of machines and levers.

Learning outcomes:

Children will be able to:

- define what is a machine;
- describe simple machines with examples from daily life;
- describe different types of levers.

Energy		
Key Concepts	**Suggested Transactional Processes**	**Suggested Learning resources**
▸ Simple Machines: ☛ Basic Concept ▸ Types of Simple Machines: ☛ Lever ☛ Pulley ▸ Different Orders of Levers	▸ Identifying simple machines in devices used in daily life. ▸ Explaining the level and location of fulcrum, load and effort with help of diagram. ▸ Explaining and showing videos/pictures of the three types of levers.	▸ Charts of simple machine. ▸ Models of three types of levers. ▸ Interactive videos on simple machines.

Integration: Mathematics, Technology in daily life.

Life Skills: Cooperation and working together, Problem-solving.

Theme 4: Light

Light is an important element that helps in making objects visible and travels in a straight line. when light falls on an object it casts a shadow. The earth and the moon and, in fact, planets cast their shadows in space. Sometimes, on a full-moon day, the moon passes through the shadow of the earth. The Earth casts two shadows that fall on the moon during a lunar eclipse. The umbra is a full dark shadow. The penumbra is a partial outer shadow.

Learning outcomes:

Children will be able to:

- give examples of evidence that light travels in a straight line;
- explain the formation of shadows;
- explain the occurrence of lunar eclipse;
- explain the term umbra and penumbra.

Light		
Key Concepts	**Suggested Transactional Processes**	**Suggested Learning resources**
▸ Rectilinear Propagation of Light. ▸ Shadows: ☛ Umbra ☛ Penumbra ☛ Natural Shadows – Eclipses	▸ Demonstration of activities to show that light travels in straight line. ▸ Demonstration of shadow and eclipse formation.	▸ Candle, a rubber tube, three identical cardboards, moulding clay (Rectilinear propagation of Light). ▸ Video on lunar eclipse.

Integration: Geography, Art

Life Skills: Cooperation and working together, problem solving.

Theme 5: Magnetism

Substances that have property of attracting iron are called magnets. The materials that get attracted towards a magnet are known as magnetic. For example, iron, nickel and cobalt. Materials that are not attracted towards a magnet are non-magnetic-for example, glass, plastic, wood. When a magnet is suspended freely, it always rests in the same direction. The end of the magnet that points toward North is called North pole. The end that points towards south is called South pole. This property of magnets helps us to find directions. Opposite poles of two magnets attract each other and similar poles repel one another. Each magnet is surrounded by a magnetic field. Permanent magnets retain their magnetism for a long time. Temporary magnets behave like a magnet only till they are under influence of a magnetic field.

Learning outcomes:

Children will be able to:

- state characteristics of a magnet;
- distinguish magnetic and non-magnetic substances;
- state the properties of magnets;
- recognise the magnetic field around a magnet;
- distinguish permanent and temporary magnets;
- list care and storage of magnets;
- discuss loss of magnetic property due to heating, hammering and electricity.

Electricity and Magnetism		
Key Concepts	**Suggested Transactional Processes**	**Suggested Learning resources**
▸ Magnetic and non-magnetic substances. ▸ Characteristics of a magnet. ▸ Properties of magnets ▸ Magnetic field around a magnet. ▸ Permanent & temporary magnets and their uses ▸ Care & storage of magnets ▸ Demagnetization by heating, hammering and electricity.	▸ Engaging children in recognizing magnetic fields around a magnet. ▸ Explaining difference between permanent and temporary magnets and their uses. ▸ Explaining demagnetization by heating, hammering and electricity.	▸ Bar magnets. ▸ Iron nails and filings. ▸ Stand and thread to suspend a magnet. ▸ Compass. ▸ Videos about magnets and electromagnets. ▸ Video about Earth as a magnet

Integration: Geography, Technology in daily life.

Life Skills: Cooperation and working together, critical thinking.