

# Objectives of Physics for Grade Nine

## Optics

### **Refraction of Light**

- Define refraction.
- Define the index of refraction of a transparent medium.
- Represent by a diagram the deviation of a luminous ray when it passes from air to water or to glass and when it passes from water to air from glass to air.
- Define total reflection.

### **Lenses**

- Define a thin lens.
- Distinguish between a converging lens and a diverging lens.
- Characterize a thin lens.

### **Formation of images**

- Distinguish between real image and virtual image.
- To determine the size, the direction and the distance from the lens of an image.

## Electricity

### **DC voltage**

- Measure a DC voltage using a digital voltmeter.
- Measure an electric current using a digital ammeter.
- Know the laws of voltages and currents in an electric circuit.
- Measure a DC voltage using an oscilloscope.

### **Alternating voltage**

- Distinguish between a DC voltage and an alternating voltage.
- Relate the effective voltage to the maximum voltage of a sinusoidal alternating current.
- Know that in the AC mode, a voltmeter measures the effective voltage.

### **The voltage of the mains**

- Characterize the voltage of the mains.
- Know the risks (dangers) of using the voltage of the mains.
- Know the role of the fuse and the circuit-breaker in the protection of persons and appliances

### **Resistors**

- State Ohm's law for a resistor.
- Know the unit of resistance in SI.

- Know the ohmmeter is used to measure the resistance of a resistor.
- Know the formulas for determining the equivalent resistance of a grouping of resistors.

### **Electric power and energy**

- Know the relations giving the electric power of a DC current.
- Know the unit of power in SI.
- State Joule's law.
- Know the relation between the Joule (J) and the kilowatt hour (KWh).
- Know the advantages and the inconveniences of Joule's effect.

### **Mechanics**

#### **Mechanical actions**

- Give a list of the forces acting on a body.
- Distinguish between a contact force and force acting at a distance.
- Know the characteristics of the weight.

#### **Equilibrium of a body**

- State the principal of interaction.
- Know the condition of equilibrium of a solid acted upon by two forces.
- State Hooke's law.
- Draw and read out the curve describing the elongations of a spring.

#### **Pressure in Liquids**

- Define pressure as force per unit area.
- State the fundamental principle of hydrostatics.
- State Pascal's theorem.

#### **Archimedes up-Thrust**

- State Archimedes principle.
- Define the apparent weight.
- Explain the floatation of a body in a liquid.