

Physics

REDUCTION OF PHYSICS

Seventh year – Intermediate level

Content	Learning objectives (Skills...)	Activities	Remarks
1- Matter <ul style="list-style-type: none"> • Pressure of a gas 	<ul style="list-style-type: none"> - Know that air exerts pressure - Know that a gas exerts pressure on the walls of its container - Know that the pascal (Pa) is the unit of pressure in the SI system - Use other common units of pressure - Know that a barometer measures the atmospheric pressure - Know that a manometer measures the pressure gases - Read the pressure recorded by a barometer and a manometer 	<ul style="list-style-type: none"> - Proving the existence of atmospheric pressure - Construction of a mercury barometer - Using barometers in weather forecast - Observation of a manometer 	The units of pressure are limited to: Pa, atm, and cmHg Demonstration will be done by the teacher
1.3 Constituents of matter	The students should be able to: <ul style="list-style-type: none"> - Know that matter is constituted of particles of very small dimensions. - Comprehend that particles in matter are in continuous motion. - Interpret the diffusion phenomena. - Compare the distances between the particles of matter in its three phases. - Interpret the incompressibility of liquids and solids. 	<ul style="list-style-type: none"> - Observation of a random motion similar to that of gas particles. - Observation of the phenomenon of diffusion. 	Mention that diffusion in solids is very slow.
1.4 - Change of phase and expansion <ul style="list-style-type: none"> • Change of phase • Expansion 	<ul style="list-style-type: none"> - Comprehend that the boiling point of water increases with pressure - Discovers that the pressure of a confined gas increases with temperature 	Verification of the variation of boiling point of water with pressure.	
2.5. Magnets and coils			
<ul style="list-style-type: none"> • Coils 	<ul style="list-style-type: none"> - Comprehend the principle of the alternator - Comprehend the principle of an electric motor 	<ul style="list-style-type: none"> - Observation of a bicycle dynamo - Construction of an electric motor 	

REDUCTON OF THE EIGHTH YEAR - INTERMEDIATE LEVEL

Contents	Learning objectives (skills . . .)	Activities	Remarks
1- Mechanics 1.1- Motion and speed	<p>Determine the position of a body in a given frame of reference</p> <p>Define the motion of a body</p> <p>Define the trajectory of a moving body</p> <p>Distinguish between translational motion and rotational motion</p> <p>Know that earth has a rotational motion about its axis and a translational motion around the sun</p> <p>Explain the apparent motions of the sun and of the moon</p> <p>Distinguish between planets and moons</p> <p>Distinguish between date (instant) and duration</p> <p>Know the unit of time in SI</p> <p>Define average speed</p> <p>Define the instantaneous speed as the indication of a speedometer</p> <p>Know the unit of speed in SI</p> <p>Use the km/h and km/s as practical units of speed Distinguish uniform motion from accelerated and retarded motions</p>	<p>Experimental evidence of the relativity of motion</p> <p>Observation of a familiar object in translational motion</p> <p>Observation of a familiar object in rotational motion</p> <p>Observation of a familiar object in combined translational and rotational motion</p> <p>Observation of the apparent motion of the sun</p> <p>Observation of the apparent motion of the moon</p> <p>Use of a chronomèter</p> <p>Observation of a car's speedometer</p> <p>Measurement of the average speed of a moving object</p>	<p>Reading: motion of earth and planets</p> <p>Mention that the light-year is a unit of distanse used in astronomy</p>

Content	Learning objectives (skills...)	Activities	Remarks
1.3- Work, power, and forms of energy	Distinguish between motive work and resistive work	Experimental evidence of motive work and resistive work	
2- Wave 2.2- Sound waves 2.3- Electromagnetic waves and colors	Identify the physiological qualities of sound Know that color is a physiological sensation		

REDUCTION OF PHYSICS
NINETH YEAR - INTERMEDIATE LEVEL

Contents	Learning objectives (capacities, skills . . .)	Activities	Remarks
1. Optics 1.2 Lenses and eye	<p>Define the vergence of a thin lens Know the unit of vergence in SI Calculate the vergence of two thin lenses in contact</p> <p>Represent, by a diagram, the reduced eye Define accommodation Distinguish between normal eye and a myopic eye and hypermetropic eye Specify the nature the correcting lenses for myopic and hypermetropic eye</p>	Determination of the vergence of a thin lens	
3. Heat 3.1 Quantity of heat and heat transfer 3.2 Thermal equilibrium	<p>Define the quantity of heat Name the different modes of heat transfer Distinguish between thermal conductors and insulators Define the specific heat of a homogeneous substance Know the relation: $Q = m \times c \times \Delta\theta$ Define latent heat of the change of state of a homogeneous substance Know the relation $Q = m \times L$</p> <p>Define thermal equilibrium of two bodies put together</p>	<p>Observation of a calorimeter Comparison of the specific heats of some substances to that of water Proving the existence of latent heat</p> <p>Measurement of the equilibrium temperature of two quantities of water put together</p>	<p>Reading: calorie and BTU as units of energy Reading influence of large areas of water on climate use only the joule as a unit of the quantity of heat</p>

المادة: فيزياء

السنة: الأولى الثانوية

يتماشى عدد الأسابيع السنوية مع كامل المنهج لهذه السنة.
لذلك لا نقترح أي تعليق من المحاور أو الأهداف لهذه السنة
المنهجية.

No Reduction for the physics of the first year secondary

REDUCTION OF PHYSICS

Second year - Secondary Level - Scientific section

Contents	Learning objectives (skills...)	Activities	Remarks
Waves 4. Standing Waves	Explain the phenomenon of standing waves.	Obtaining standing waves using Melde's apparatus.	
4.3 The Doppler effect.	Interpret the Doppler effect.		
Electrostatics 2 Capacitors	Read the graph of the variation of charge with time.		
Electromagnetism 1. Magnetic field 2. Laplace's force 2.3 Applications: loudspeaker and electric motors. 3. Motion of charged particle in a uniform electric field.	Explain the role of the electromagnetic force in the functioning of electric motors. Know the principle of functioning of an oscilloscope.	Measuring the magnetic field produced by Helmholtz coils using a teslameter. Experimental evidence of the role of the electromagnetic force in the rotation of an electric motor. Observation of the trajectory of an electron in a uniform magnetic field.	
4. Motion of a charged particle in a uniform magnetic field with V_0 perpendicular to \vec{B} . Application: cyclotron	Determine the trajectory of a charged particle in a uniform magnetic field with \vec{V}_0 perpendicular to \vec{B} . Describe the functioning of a cyclotron.		Reading: particle accelerators.
Heat 1. Ideal gases 1.1 Ideal gas laws 1.2 Equation of state.	Apply the laws of ideal gases. Know the equation of state of an ideal gas.	Showing the horizontal part of the curve describing the fusion of ice.	Recall the temperature scales

Contents	Learning objectives (skills...)	Activities	Remarks
2. Kinetic theory of gases 2.1 Basic assumptions. 2.2 Expression of the pressure. 2.3 Kinetic energy and temperature. 5. First law of thermodynamics 6. Heat engines 6.1 Carnot's principle. 6.2 Efficiencies.	Mention the assumptions of the kinetic theory of gases. Write the expression of the pressure of a gas Write the relation between the kinetic energy and the temperature of a gas. Apply the first law of thermodynamics. State Carnot's principle. Know the different efficiencies of a heat engine.		Reading: 4 stroke engine Steam engine Steam turbine
Mechanics 4. Kepler's laws 6. Rotational dynamics 6.3 Newton's second law applied to rotation. Applications: uniformly varied rotational motion and domestic appliances.	State Kepler's laws. Apply Newton's second law to a solid in rotational motion.		
Electronics 1. Semi conductors 1.1 Valence band and conduction band. 1.2 Intrinsic semi conductors. Extrinsic semi conductors: p-type and n-type doping. 3. Transistors 3.1 Presentation. 3.2 Principle of functioning: amplification of current. 3.3 Applications.	The student should be able to: Define the valence band and the conduction band. Distinguish between intrinsic conductivity and extrinsic conductivity. Describe the phenomena of n-type and p-type doping. Describe a transistor and identify its terminals. Analyse the double role of a transistor: circuit command and amplification of the current.	Perform experiments in order to become familiar with transistors.	

REDUCTON OF PHYSICS
Second secondary year - Humanities section

Contents	Learning objectives (skills...)	Activities	Remarks
2. Waves and light			
2.7 Lasers: properties	<ul style="list-style-type: none"> - Know the principle of population inversion and electron cascade. - Distinguish between laser light and ordinary light. - Know different types of lasers. 	<ul style="list-style-type: none"> - Observation of diffraction using a laser source. 	<ul style="list-style-type: none"> - Reading: the use of laser in telecommunication
Medical applications	<ul style="list-style-type: none"> - Know the application of lasers to eye surgery. - Know some applications of lasers in industry and entertainment. 		<ul style="list-style-type: none"> - Reading: holograms.

REDUCTION PHYSICS - THIRD YEAR SECONDARY
General Sciences

Content	Learning objectives (capacities, skills,...)	Activities	Remarks
<p>Mechanics</p> <p>4.5 Oscillators with multiple frequencies.</p> <p>5- Fluid dynamics.</p> <p>5.1 Ideal and viscous liquids.</p> <p>5.2 Steady flow</p> <p>5.3 Rate of flow. Equation of continuity</p> <p>5.4 Bernoulli equation. Applications.</p>	<p>Recognize that vibrating strings and tubes as multiple frequency oscillators.</p> <p>Distinguish between an ideal liquid and a viscous liquid.</p> <p>Define a steady flow.</p> <p>Define the rate of flow</p> <p>Write, the continuity equation.</p> <p>Write without derivation, Bernoulli's equation.</p>		<p>Reading: practical applications of Bernoulli's equation.</p>
<p>Electricity</p> <p>1.4 Applications alternators, motors, and transformers.</p>	<p>Explain the functioning of alternators, motors, and transformers.</p>		
<p>4- Linearly polarized light.</p>	<p>Explain the polarization of light waves.</p> <p>Distinguish between polarized light and non-polarized light.</p>	<p>Observation of light through one and two polarizers.</p>	<p>Reading: analyzers and polarizers</p>

Content	Learning objectives (capacities, skills,...)	Activities	Remarks
<p>3- Universe</p> <p>3.1 Constitution of the universe.</p> <p>3.2 Particular case: our galaxy.</p> <p>3.3 Order of magnitude of the dimensions of the universe.</p> <p>3.4 Big bang</p> <p>3.5 Expansion of the universe.</p> <p>3.6 Life and death of stars.</p>	<p>Describe the constitution of the universe (stars, galaxies, interstellar space).</p> <p>Describe, briefly the Milky Way.</p> <p>Give the order of magnitude of the present dimensions of the universe.</p> <p>Describe the scenario of the formation of the universe after the big bang.</p> <p>State Hubble's Law.</p> <p>Know the estimation of the age of the universe.</p> <p>Explain the birth and the conditions for life and death of a star.</p> <p>Know that the evolution of a star depends on its mass.</p>		<p>Reading : neutron stars and black holes.</p>

**Reduction Physics – Third year secondary
Life Science Section**

Content	Learning objectives (capacities, skills,...)	Activities	Remarks
<p>3- Angular Momentum</p> <p>3 1 Definition.</p> <p>3 2 Relation with the torque.</p> <p>3 3 Conservation law.</p> <p>3 4 Applications.</p>	<p>The student should be able to:</p> <p>Define the angular momentum in the case of rotation about a fixed axis.</p> <p>Apply the relation between angular momentum and angular velocity.</p> <p>State the relation between angular momentum and torque.</p> <p>State the law of conservation of angular momentum.</p> <p>Explain some applications using the conservation of angular momentum.</p>		
<p>5- Fluid mechanics</p> <p>5 1 Pressure in a fluid.</p> <p>5 2 Surface tension</p> <p>5 3 Ideal liquid and viscous liquid.</p> <p>5 4 Steady flow.</p> <p>5 5 Rate of flow Continuity equation</p>	<p>State pressure laws in a liquid at rest.</p> <p>Define surface tension.</p> <p>Distinguish an ideal liquid from a viscous liquid.</p> <p>Define steady flow.</p> <p>Define the rate of flow.</p> <p>Write the continuity equation.</p>		

Content	Learning objectives (capacities, skills,...)	Activities	Remarks
5.6 Bernoulli's equation Applications	Write, without derivation, Bernoulli's equation. Explain some practical applications of Bernoulli's equation.		Reading : practical applications of Bernoulli's equation.
5.7 Viscosity	Define the viscosity of a fluid.		
4- Linearly polarized light.	Explain the polarization of light waves. Distinguish between polarized light and non-polarized light.	Observation of light through one and two polarizers.	Reading: analyzers and polarizers.
Atoms and nucleus 4.3 Laser	Distinguish between coherent light and ordinary light. Know the principle of laser emission (stimulated emission, population inversion, metastable state).		Reading : some types of laser and their practical applications

**Reduction Physics – third secondary year
Literary and Humanity section**

Contents	Learning objectives (skills, competencies...)	Activities	Remarks
<p>3- The universe</p> <p>3 3 Evolution and dimensions of universe.</p> <p>3 4 Instruments of observation telescopes.</p> <p>- Radiotelescope</p>	<p>-Recognize that the distances between galaxies are increasing.</p> <p>- know that the number of galaxies in the universe is very large.</p> <p>- Describe Galileo's telescope (Newton's telescope and modern telescopes.</p> <p>- Comprehend how the radiotelescope functions.</p> <p>- understand the existence of radio sources in universe.</p> <p>- comprehend that radiotelescopes allowed us to reach more distant galaxies.</p>		

**Reduction Physics – third year secondary
Sociology and Economics section**

Contents	Learning objectives (skills, competencies...)	Activities	Remarks
<p>3- The universe</p> <p>3 3 Evolution and dimensions of universe.</p> <p>3 4 Instruments of observation telescopes.</p> <p>- Radiotelescope</p>	<p>-Recognize that the distances between galaxies are increasing.</p> <p>- know that the number of galaxies in the universe is very large.</p> <p>- Describe Galileo's telescope (Newton's telescope and modern telescopes.</p> <p>- Comprehend how the radiotelescope functions.</p> <p>- understand the existence of radio sources in universe.</p> <p>- comprehend that radiotelescopes allowed us to reach more distant galaxies.</p>		

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Contents	Learning objectives (skills, competencies...)	Activities	Remarks
4- Energy and Economy 4.1 Petrol 4.2 Transport	<ul style="list-style-type: none">- define petroleum .- describe the extraction of petroleum.- explain the importance of stocking and its relation to offer and demand.- list the factors upon which the prices of petrol depend.- estimate the reserves of different producing countries and their percentage to the national income.- to develop an understanding of the role of the international organizations. - differentiate between means of transportation .- be aware of the pollution that results from the burning of fuel.- realize the importance of saving energy and the search for new sources.		<ul style="list-style-type: none">- Reading: refining of petroleum. - Reading: importance of oil in shaping the world's international politics. - Reading: pollution in large cities. - Reading: saving of energy.