

Pre-Study on-line Course
3rd– 28th of August 2020

Topics

BIOLOGY (e-learning)
Biology. A Global Approach.
Urry LA, Campbell NA, Cain ML, Wasserman SA, Minorsky PV, Reece JB,
11th Edition

Nº	Topics
1	Prokaryotes (Chapter 27) <ul style="list-style-type: none">- Concept 27.1- Concept 27.2- Concept 27.3- Concept 27.4- Concept 27.5- Concept 27.6
2	An introduction to Animal Diversity (Chapter 32) <ul style="list-style-type: none">- Concept 32.1- Concept 32.2- Concept 32.3- Concept 32.4
3	Invertebrates (Chapter 33) <ul style="list-style-type: none">- Concept 33.1- Concept 33.2- Concept 33.3- Concept 33.4- Concept 33.5
4	The Animal Body (Chapter 40) <ul style="list-style-type: none">- Concept 40.1- Concept 40.2- Concept 40.3- Concept 40.4
5	Chemical Signals in Animals (Chapter 41) <ul style="list-style-type: none">- Concept 41.1- Concept 41.2- Concept 41.3
5	Animal Digestive System (Chapter 42) <ul style="list-style-type: none">- Concept 42.1- Concept 42.2- Concept 42.3- Concept 42.4- Concept 42.5
6	Animal Transport System (Chapter 43) <ul style="list-style-type: none">- Concept 43.1

	<ul style="list-style-type: none"> - Concept 43.2 - Concept 43.3 - Concept 43.4 - Concept 43.5 - Concept 43.6 - Concept 43.7
7	Animal Excretory System (Chapter 44) <ul style="list-style-type: none"> - Concept 44.1 - Concept 44.2 - Concept 44.3 - Concept 44.4 - Concept 44.5
8	Animal Reproductive System (Chapter 45) <ul style="list-style-type: none"> - Concept 45.1 - Concept 45.2 - Concept 45.3 - Concept 45.4 - Concept 45.5
9	Development in Animals (Chapter 46) <ul style="list-style-type: none"> - Concept 46.1 - Concept 46.2 - Concept 46.3
10	Animal Defenses Against Infection (Chapter 47) <ul style="list-style-type: none"> - Concept 47.1 - Concept 47.2 - Concept 47.3 - Concept 47.4
11	Electrical Signals in Animals (Chapter 48) <ul style="list-style-type: none"> - Concept 48.1 - Concept 48.2 - Concept 48.3 - Concept 48.4
12	Neural Regulation in Animals (Chapter 49) <ul style="list-style-type: none"> - Concept 49.1 - Concept 49.2 - Concept 49.3 - Concept 49.4 - Concept 49.5
13	Sensation and Movement in Animals (Chapter 50) <ul style="list-style-type: none"> - Concept 50.1 - Concept 50.2 - Concept 50.3 - Concept 50.4 - Concept 50.5 - Concept 50.6

Teachers:

- 1. Magdalena Borowska, Ph.D.**
- 2. Magdalena Budzyń, Ph.D.**

CHEMISTRY (e-learning)

Karen Timberlake

An Introduction to General, Organic, and Biological Chemistry with
MasteringChemistry, Global Edition, 13th Edition

Chapter	Topics
4	Atoms and Elements 4.1 Elements and Symbols 4.2 The Periodic Table 4.3 The Atom 4.4 Atomic Number and Mass Number 4.5 Isotopes and Atomic Mass 4.6 Electron Energy Levels 4.7 Trends in Periodic Properties
6	Ionic and Molecular Compounds 6.1 Ions: Transfer of Electrons 6.2 Ionic compounds 6.3 Naming and Writing Ionic Formulas 6.4 Polyatomic Ions 6.5 Molecular Compounds: Sharing Electrons 6.6 Lewis Structure of Molecules 6.7 Electronegativity and Bond Polarity 6.8 Shapes of Molecules 6.9 Polarity of Molecules and Intermolecular Forces
7	Chemical Quantities and Reactions 7.1 The Mole 7.2 Molar Mass 7.3 Calculations Using Molar Mass 7.4 Equations for Chemical Reactions 7.5 Types of Chemical Reactions 7.6 Oxidation—Reduction Reactions 7.7 Mole Relationships in Chemical Equations 7.8 Mass Calculations for Chemical Reactions 7.9 Energy in Chemical Reactions
9	Solutions 9.1 Solutions 9.2 Electrolytes and Nonelectrolytes 9.3 Solubility 9.4 Solution Concentrations 9.5 Dilution of Solutions 9.6 Properties of Solutions

10	Acids and Bases and Equilibrium 10.1 Acids and Bases 10.2 Bronsted-Lowry Acids and Bases 10.3 Strengths of Acids and Bases 10.4 Acid—Base Equilibrium 10.5 Dissociation of Water 10.6 The pH Scale 10.7 Reactions of Acids and Bases 10.8 Buffers
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Teachers:

1. **Bogna Gryszczyńska, Ph.D.**
2. **Magdalena Kasprzak, Ph.D.**
3. **Krzysztof Strzyżewski, Ph.D.**

PHYSICS (e-learning)

**Douglas C. Giancoli, PHYSICS PRINCIPLES WITH APPLICATIONS
Pearson Education International, Global Edition 7e.**

Chapter N°	Topic
MasteringPhysics resources	Mathematics Review Significant digits and rounding numbers Addition, subtraction, multiplication and division of fractions. Arithmetic involving square roots. Powers of 10 and scientific notation. To practice the ability to convert from one system of units to another. Usage prefixes. To understand proportional reasoning for solving and checking problems. To understand and be able to use the idea of a function. To understand the properties of special types of triangle. To understand and apply the Pythagorean Theorem. To use trigonometric functions to find sides and angles of right triangles. To understand and be able to calculate the components of vectors and to learn to add vectors. To understand how to find the equation for a line using the slope-point and two-point techniques and to be able to gain many different types of information from a graph. To calculate the circumference or area of a circle.
2	Kinematics in One Dimension To understand the concept of frames of reference and relative velocity. To acquaint with kinematic vocabulary. To employ concepts of average velocity, instantaneous velocity and acceleration to solve problems. To learn how to use graphs to find quested unknowns. Motion at a constant acceleration. Falling Objects.
3	Kinematics in Two Dimensions To distinguish vectors and scalars. To learn how to add and subtract vectors-graphical methods. To learn how to find the components of vectors and add vectors by components.

	<p>To introduce students to vectors and the use of sine and cosine for a triangle when resolving components. Projectile motion.</p>
4	<p>Dynamics To understand Newton's 1st, 2nd and 3rd law. To understand the relationship between applied force, net force, acceleration, and mass for 1-dimensional motion. The normal force. To gain practice drawing free-body diagrams. To understand tension in a rope. To introduce contact forces: the normal force and the force due to friction. To practice friction.</p>
5 (5-1) – (5.3) 8 (8.1), (8.2), (8.4)	<p>Some aspects of circular motion Kinematics of uniform circular motion: to understand relations between linear and angular velocity, relations between period and frequency. Dynamics of uniform circular motion: to understand the centripetal acceleration and centripetal force. Torque – the definition and practice.</p>
6	<p>Work and Energy To explore the definition of work and learn how to find the work done by a force on an object. Introduction to potential energy. To understand the use of Hooke's law for a spring. Conservation and conversion of energy. To understand power.</p>
9 (9.1) – (9.6)	<p>Static Equilibrium; Elasticity and Fracture. To solve problems of statics. The torque and the lever – some aspects of equilibrium To understand the meaning of Young's modulus, concepts of stress, pressure and strain and to perform some real-life calculations related to the mechanical properties of solids.</p>
11 (11.1) – (11.3), (11-7) – (11.10) (11.13) 12 (12.1), (12.2), (12.4)	<p>Vibrations Waves and Sounds To learn the basic terminology and relationships among the main characteristics of simple harmonic motion. To learn to apply the law of conservation of energy to the analysis of harmonic oscillators. To understand the relationships among the parameters which characterize waves. To understand the nature of a sound wave, including its properties: frequency, wavelength, loudness, pitch, and timbre. To learn the properties of logarithms and how to manipulate them when solving sound problems. To understand standing waves, including calculation of wavelength and frequency, and to learn the physical meaning behind some musical terms.</p>
10 (10.1) – (10.7)	<p>Fluids Density, mass and weight. Pressure and related force. Pascal's principle – hydraulic lift. To understand the applications of Archimedes' principle and the buoyant force.</p>
13 (13-1) – (13-3), (13-6) – (13-10)	<p>Temperature and Kinetic Theory Temperature and thermometers. Thermal equilibrium and the zero-th law of thermodynamics.</p>

	To understand and solve problems with the ideal gas law. Molecular interpretation of temperature.
14 (14-1) - (14-8)	Heat and the first law of thermodynamics To distinguish temperature, heat and internal energy. To understand concepts of specific heat and latent heat. 15 (15-1) - (15-3) To understand different ways of heat transfer. To understand the first law of thermodynamics.
16 (16-5) – (16-9)	Electric Field To understand the concept of electric field. Coulomb’s Law- solving problems. Electric field and conductors- charge distribution.
18 (18-2) - 18-4) 19 (19-1) - 19-3), (19-5)	Electric Currents and DC Circuits To understand the concept of electric current. To use the Ohm’s law to solve problems. To understand electric power. Electromotive force and terminal voltage. Resistivity; resistors in series and parallel, Kirchhoff’s rules. Circuits containing capacitors in series and in parallel.
20 (20-1) – (20-6) 21 (21-1, 21-2)	Magnetism and Electromagnetic Induction Magnets and Magnetic fields. Electric currents produce magnetic fields. Force on an electric current in a magnetic field. Force on electric charge moving in a magnetic field. Faraday’s law of induction; Lenz’s law. Practice with Lenz’s law.
22 22-3 23 (23-1) – (23-7)	Electromagnetic Waves and Geometric Optics Electromagnetic waves and the electromagnetic spectrum. The ray model of light. Reflection – image formation by mirrors. Refraction - index of refraction, Snell’s law, image formation by lenses. Total internal reflection
27 (27-3) – (27-13)	Elements of modern physics: early quantum theory and models of the atom Photon theory of light, photon energy Photoelectric effect Compton effect Early models of the atoms, atomic spectra, the Bohr model: energy levels, transitions, absorption and emission Wave-particle duality: the de’Broglie hypothesis
30 (30-1) – (30.9)	Nuclear physics and radioactivity To understand the notation and basic quantities involved in nuclear physics. Dimensions and composition of nuclei. Binding energy. Alpha, beta and gamma decay The radioactivity decay law. Half-life and rate of decay

Teachers:

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