

Leonardo V. Academy



Leonardo
V. Academy

**Curriculum Leonardo V. Academy
(Grade 10, Year 11)**

Framework for the Leonardo V. Academy Curriculum

Grade 10/Year 11 (Key Stage 4)

Contents	Page Number
1) Contents	(1)
2) Disclaimer	(2)
3) Subjects of Study:	(3)
* English	(4 – 9)
* Mathematics	(10 – 17)
* Biology	(18 – 21)
* Chemistry	(22 – 26)
* Physics	(27 – 32)
* Geography	(33 – 35)
* Global Perspectives	(36 – 38)
* History	(39 – 42)
* Information Technology	(43 – 45)
* Business Studies	(46 – 48)
* Modern Languages	(49 – 52)
* Physical Education	(54 – 55)
* Economics	(56 – 59)
References	(60 – 61)

Disclaimer

To ensure the very best standards of learning and a quality education for our students, Leonardo V. Academy, aims to offer an up-to-date, comprehensive, unique, as well as a thoroughly modern curriculum. Combining the high level of British academic standards with a forward-thinking, international outlook, our curriculum intends to be innovative and challenging, whilst also being accessible in addition to making a challenging learning environment enjoyable for any student that is already enrolled or is thinking of joining our school.

In keeping with these high academic standards, the Leonardo V. Academy curriculum for Grade 10 has been developed from the following national government and private educational authorities:

- ❖ Her Majesty's Government Department for Education
 - <https://www.gov.uk/government/organisations/department-for-education>
- ❖ National Curriculum in England (Secondary Education)
 - <https://www.gov.uk/government/publications/national-curriculum-in-england-secondary-curriculum>
- ❖ Cambridge International Examinations (Secondary)
 - <http://www.cie.org.uk/programmes-and-qualifications/cambridge-secondary-2/>
- ❖ Czech Republic Ministry of Education, Youth and Sports – Framework Educational Programme for Basic Education
 - <http://www.msmt.cz/areas-of-work/basic-education-1>

Subjects of Study

During Grade 10, students at Leonardo V. Academy focus on the following subjects of study.

* English	(4 hours)
* Mathematics	(5 hours)
* Biology	(4 hours)
* Chemistry	(4 hours)
* Physics	(4 hours)
* Geography	(2 hours)
* Global Perspectives	(2 hours)
* History	(2 hours)
* Information Technology	(2 hours)
* Business Studies	(2 hours)
* Modern Languages	(3 hours)
* Physical Education	(2 hours)
* <i>Economics</i>	<i>(2 hours)</i>

Each subject is taught in full compliance with the National Curriculum of England.

* *Economics classes are held outside of regular classroom hours*

English (Course Description)

By the beginning of Grade 10, pupils should be able to read and confidently analyze a wider range of contemporary and classic fiction and nonfiction texts with accuracy. During Grade 10, teachers should continue to emphasise pupils' enjoyment and understanding of language, especially vocabulary, to support their reading and writing.

They should be able to read and understand most words effortlessly and determine unfamiliar vocabulary using linguistic and contextual clues. Pupils' knowledge of language, gained from stories, plays, poetry, non-fiction and textbooks, will support their increasing fluency as readers, their facility as writers, and their comprehension. Teachers should show pupils how to understand the relationships between words, how to understand nuances in meaning, and how to further develop their understanding of, and ability to use, figurative language. It is important that pupils learn the correct grammatical terms in English and that these terms are integrated within teaching.

Pupils should be reading frequently, outside as well as in school, for pleasure and information. Pupils should be able to summarise and analyze multiple readings of extended lengths accurately and in their own words. They should be able to read independently, with clear understanding, inferring the unstated nuances within the texts based on personal observations, and then discuss their findings in a coherent written and verbal manner.

In Grade 10, pupils should be reading a wide range of high-quality, challenging, classic literature and extended literary non-fiction, such as essays, reviews and journalism. Pupils should understand how language, including figurative language, vocabulary choice, grammar, text structure and organisational features present meaning within and across these texts.

Pupils should be taught to write accurately, fluently, effectively and at length for pleasure and information through by adapting their writing for a wide range of purposes and audiences: to describe, narrate, explain, instruct, give and respond to information, and argue. They should be able to plan, write, and revise their own writing for extended academic writings. These synthesized writings should include independent academic research and reflection. They should be able to use and analyze academic primary sources for neutrality and validity. They should continue making critical comparisons, referring to the contexts, themes, characterisation, style and literary quality of texts, and drawing on knowledge and skills from wider readings.

Teachers should build on the knowledge and skills that pupils have been taught at Key Stage 3. Decisions about progression should be based on the security of pupils' linguistic knowledge, skills and understanding and their readiness to progress to the next stage. Pupils whose linguistic development is more advanced should be challenged through being offered opportunities for increased breadth and depth in reading and writing. Those who are less fluent should consolidate their knowledge, understanding and skills, including through additional practice. By the end of Grade 10, pupils' confidence, and mastery of language should be demonstrated through formal assessments of public speaking, collaborative discussion, and debate in addition to reading and writing. Pupils should use linguistic and literary terminology accurately and confidently in discussing reading, writing and spoken language. They should be able to communicate effectively and expressively by choosing and adjusting tone and style of speech to audience and purpose in addition to appropriate vocabulary and grammar. Pupils should understand nuances in vocabulary choice and age-appropriate, academic vocabulary. This involves consolidation, practice and discussion of language.

Teachers should prepare pupils for key stage 4 by ensuring that they can consciously and coherently express themselves in their writing and speech. Pupils should be able to confidently read and make critical comparisons across texts and create and develop personal opinions with detailed supporting evidence rooted in academic research.

English (Course Objectives)

i) Reading – Word Reading:

- Apply their growing knowledge of root words, prefixes and suffixes (morphology and etymology), both to read and to understand the meaning of new words that they meet.

ii) Reading – Comprehension:

- Maintain positive attitudes to reading and understanding of what they read by:
 - Continuing to read and discuss an increasingly wide range of contemporary and classic fiction, poetry, plays, non-fiction and reference books or textbooks from all over the world
 - Reading texts that are structured in different ways and reading for a range of purposes
 - Increasing their familiarity with a wide range of books, including short stories, extended modern fiction, fiction from our literary heritage, and books from other cultures and traditions
 - Recommending books that they have read to their peers, giving reasons for their choices
 - Identifying and discussing themes and conventions in and across a wide range of writing
 - Make detailed comparisons within and across multiple texts
 - Learn and recite a wider, more complex range of poetry keeping in mind intonation, inflection, and dialect
 - Preparing poems and plays to read aloud and to perform, showing understanding through intonation, tone and volume so that the meaning is clear to an audience
- Understand what they read by:
 - Checking that the book makes sense to them, discussing their understanding and exploring the meaning of words in context
 - Asking questions to improve their understanding

- Drawing inferences such as inferring characters' feelings, thoughts and motives from their actions, and justifying inferences with textual evidence
 - Predicting what might happen from details stated and implied
 - Summarizing the main ideas drawn from more than one text, identifying key details that support the main ideas
 - Identifying how language, structure and presentation contribute to meaning
- Discuss and evaluate how authors use language, including figurative language, considering the impact on the reader
 - Distinguish between statements of fact and opinion in reading and in speech
 - Retrieve, record and present information from non-fiction
 - Participate in discussions about texts read independently and as a group, building on their own and others' ideas and challenging views courteously
 - Explain and discuss their understanding of what they have read, including through formal presentations and debates, maintaining a focus on the topic and using notes where necessary
 - Provide reasoned justifications for their views.

iii) Writing – Composition:

- Write legibly, fluently and with increasing speed and dexterity
- Plan their writing by:
 - Identifying the audience for and purpose of the writing, selecting the appropriate form and using other similar writing as models for their own
 - Noting and developing initial ideas using purposeful organization tools and drawing on reading and research where necessary

- In writing narratives, considering and emulating how authors have developed characters and settings in other texts
- Draft and write by:
 - Selecting appropriate grammar and vocabulary, understanding how such choices can change and enhance meaning
 - In narratives, describing settings, characters and atmosphere and integrating dialogue to convey character and advance the action.
 - Continuing to use figurative, poetic, and rhetorical language techniques in both persuasive and expository writings
 - Using a wide range of transitional and structural devices such as spacing, headings, and transition words and phrases to build cohesion and fluidity within and across paragraphs
 - Using further organizational and presentational devices to structure text and to guide the reader through a text
- Evaluate and edit by:
 - Assessing the effectiveness of their own and others' writing in a formal and constructive manner
 - Proposing and accepting changes to vocabulary, grammar and punctuation to enhance effects and clarify meaning
 - Ensuring the consistent and correct use of tense throughout a piece of writing
 - Ensuring correct subject and verb agreement when using singular and plural, distinguishing between the language of speech and writing and choosing the appropriate register
- Proof-read for spelling and punctuation errors.
- Orally perform their own compositions, using appropriate intonation, volume, and movement so that meaning is clear.

iv) Writing – Vocabulary, Grammar and Punctuation:

- Develop their understanding and continue successful usage of the concepts set out in Key Stage 2. In particular, pupils should master the following grammatical objectives by the end of grade 10:
 - Recognizing vocabulary and structures that are appropriate for formal speech and writing
 - Identifying and analyzing the elements of a sentence (parts of speech, subject, object, complement etc.)
 - Continuing to diagram sentences of increasing difficulty
 - Expand knowledge of morphology, particularly with regard to prefixes, affixes, and suffixes which stem from Greek and Latin
 - Recognizing types and purposes of phrases and clauses within a sentence
 - Recognizing the varying degrees of register within and across texts and purposefully implementing these variations in writing
 - Identify and analyze the etymological origin of modern English vocabulary
 - Understand how cultures, languages, and dialect can affect both meaning and pronunciation of modern English
- Use and understand the grammatical and literary terminology accurately and appropriately in discussing their writing and reading.

Mathematics (Course Description)

The aims of the curriculum are the same for all candidates. The aims are set out below and describe the educational purposes of a course in mathematics for the Cambridge IGCSE examination. The aims are to enable candidates to: develop their mathematical knowledge and oral, written and practical skills in a way which encourages confidence and provides satisfaction and enjoyment; read mathematics, and write and talk about the subject in a variety of ways; develop a feel for number, carry out calculations and understand the significance of the results obtained; apply mathematics in everyday situations and develop an understanding of the part which mathematics plays in the world around them; solve problems, present the solutions clearly, check and interpret the results; develop an understanding of mathematical principles; recognise when and how a situation may be represented mathematically, identify and interpret relevant factors and, where necessary, select an appropriate mathematical method to solve the problem; use mathematics as a means of communication with emphasis on the use of clear expression; develop an ability to apply mathematics in other subjects, particularly science and technology; develop the abilities to reason logically, to classify, to generalise and to prove; appreciate patterns and relationships in mathematics; produce and appreciate imaginative and creative work arising from mathematical ideas; develop their mathematical abilities by considering problems and conducting individual and co-operative enquiry and experiment, including extended pieces of work of a practical and investigative kind; appreciate the interdependence of different branches of mathematics; and acquire a foundation appropriate to their further study of mathematics and of other disciplines.

Mathematics (Course Objectives)

Course Objectives

i) Number

Demonstrate an understanding of ratio and proportion.

- Record relationships using ratio notation.

Increase and decrease a quantity by a given ratio.

- Find one quantity when the other is given.
- Divide amounts in a given ratio.

Use common measures of rate.

- Read and interpret rates.
- Calculate average speed.
- Solve problems using distance-time and speed-time graphs.
- Understand what is meant by direct and inverse proportion.
- Solve problems involving proportionate amounts.
- Use algebra to express direct and inverse proportion.
- Increase and decrease amounts by a given ratio.

Calculate using money and earnings by using calculator.

- Calculate earnings (wages and salaries) in different situations.

Rearrange a formula to calculate simple interest and compound interest.

- Use and manipulate a formula to calculate simple interest payable and due on a range of loans and investment.

- Solve problems related to simple and compound interest.
- Apply what you already know about percentages to work out discounts, profit and loss in everyday contexts.
- Use a calculator effectively to perform financial calculations.
- Read and interpret financial data provided in tables and charts.

ii) Algebra

Solve simultaneous linear equations in two unknowns.

- Solve simultaneous linear equations graphically and algebraically.
- Solve linear inequalities algebraically.

Solve quadratic equations by factorisation, completing the square or by use of the formula.

- Solve simultaneous linear equations graphically and algebraically.
- Solve linear inequalities algebraically.
- Find regions in a plane.
- Solve quadratic equations by completing the square.
- Solve quadratic equations by using the quadratic formula.
- Factorise quadratics where the coefficient of x^2 is not 1.
- Simplify algebraic fractions.

Construct your own equation and form composite functions.

- Make your own equations and use them to solve worded problems.

- Construct and transform more complex formulae.
- Use function notation to describe simple functions and their inverses.
- Form composite functions.

Understand what hyperbola and parabola are and how it is constructed.

- Construct a table of values to draw graphs called parabolas.
- Construct a table of values to draw graphs called hyperbolas.

Interpret curved graphs.

- Interpret curved graphs.
- Use graphs to find the approximate solutions to quadratic equations.
- Construct tables of values to draw graphs in the form of ax^n and $\frac{a}{x}$
- Estimate the gradients of curves by drawing tangents
- Use graphs to find the approximate solutions to associated equations.

iii) Measurement

Convert between units.

- Convert between units in the metric system.

Find appropriate upper and lower bounds of numbers.

- Find lower and upper bounds of numbers that have been quoted to a given frequency.
- Solve problems involving upper and lower bounds.

Use exchange rates to convert currencies.

- Use conversion graphs to change units from one measuring system to another.
- Use exchange rates to convert currencies.

iv) Geometry

Read and make scale drawings.

- Make scale drawings.
- Interpret scale drawings.

Interpret and use three-figure bearings.

- Calculate bearings.

Apply the sine, cosine and tangent ratios for acute angles to the calculation of a side or of an angle of a right-angled triangle.

- Calculate sine, cosine and tangent ratios for right-angled triangles.
- Use sine, cosine and tangent ratios to calculate the lengths of sides and angles of right-angled triangles.
- Calculate sine and cosine values between 90 degrees and 180 degrees.

Solve trigonometrical problems in two dimensions.

Recognise rotational and line symmetry (including order of rotational symmetry) in two dimensions.

- Identify line symmetry of two-dimensional shapes.
- Find the order of rotational symmetry of two-dimensional shapes.
- Recognize and use symmetrical properties of triangles, quadrilaterals and circles.

Use the following symmetry properties of circles:

- Equal chords are equidistant from the centre.
- The perpendicular bisector of a chord passes through the centre
- Tangents from an external point are equal in length.
- Apply symmetry properties of circles to solve problems.
- Understand that a locus describes the path of a set of points that obey a rule.
- Construct a locus for different sets of points in two dimensions.

Use the following transformations of the plane: reflection (M), rotation (R), translation (T), enlargement (E), and their combinations.

- Reflect, rotate and translate and enlarge plane shapes.

Identify and give precise descriptions of transformations connecting given figures.

- Recognize and describe transformations.

Describe transformations using co-ordinates and matrices (singular matrices are excluded).

- Use vectors to describe translations.
- Add and subtract vectors and multiply them by scalars.
- Calculate the magnitude of a vector.
- Represent vectors in conventional ways.
- Use the sum and difference of vectors to express them in terms of coplanar vectors.
- Use position vectors.

- Recognize and use shear and stretch transformation as well as combined transformations.

Display information in the form of a matrix of any order.

- Precisely describe transformations using co-ordinates and matrices.
- Display information in the form of a matrix.
- Perform matrix calculations including the determinant and inverse of non-singular matrices.
- Calculate the sum and product (where appropriate) of two matrices.
- Calculate the product of a matrix and a scalar quantity.

v) Data

Understand what is meant by positive, negative and zero correlation with reference to a scatter diagram.

- Draw a scatter diagram for bivariate data.
- Identify whether or not there is a positive or negative correlation between the two variables.
- Decide whether or not a correlation is strong or weak.

Draw a straight line of best fit by eye.

- Draw a line of best fit.
- Use a line of best fit to make predictions.
- Decide how reliable your predictions are.

Construct and use cumulative frequency diagrams.

- Recognize the common errors that are often made with scatter diagrams.

- Construct and use histograms with equal intervals.
- Construct and use histograms with unequal intervals.

Identify the modal class from a grouped frequency distribution.

- Draw cumulative frequency diagrams.
- Identify the modal class from a grouped frequency distribution.

Calculate the probability of simple combined events, using possibility diagrams and tree diagrams where appropriate.

- Use tree diagrams to show all possible outcomes of combined events.
- Calculate the probability of simple combined events using tree diagrams.

Biology (Course Description)

The main aim of Biology teaching in Grades 9 and 10 is to prepare students for IGCSE tests in Biology. Biology is the science of living organisms (including animals, plants, fungi and microorganisms) and their interactions with each other and the environment. The study of biology involves collecting and interpreting information about the natural world to identify patterns and relate possible cause and effect. Biological information is used to help humans improve their own lives and strive to create a sustainable world for future generations. Students should be helped to understand how, through the ideas of biology, the complex and diverse phenomena of the natural world can be described in terms of a small number of key ideas which are of universal application.

Students should acquire sufficient knowledge and understanding to basic biological themes, they should become confident citizens in a technological world and develop an informed interest in scientific matters. Students should recognize that science is evidence based and understand the usefulness, and the limitations, of scientific method. Students should also develop skills that are relevant to the study and practice of biology and that are useful in everyday life. Students will be encouraged to solve biological problems on their own and to communicate effectively about it through the language of science. Students should also to develop attitudes relevant to biology such as concern for accuracy and precision, objectivity, integrity, enquiry, initiative and inventiveness. Students will be encouraged to appreciate that science is subject to social, economic, technological, ethical and cultural influences and limitations and that the applications of science may be both beneficial and detrimental to the individual, the community and the environment.

Biology (Course Objectives)

i) Reproduction

- Define sexual and asexual reproduction and discuss their advantages and disadvantages
- Identify the main parts of flower and describe their functions.
- Describe the differences between insect/pollinated and wind/pollinated flowers.
- Investigate and describe the structure of a non-endospermic seed in terms of the embryo (radicle, plumule and cotyledons) and testa, protected by the fruit
- Outline the formation of a seed (limited to embryo, cotyledons, testa and role of mitosis) and fruit (produced from the ovary wall)
- Describe different ways of seeds and fruits dispersal.
- Identify the main organs of male and female reproductive organ systems and describe their functions.
- Describe the menstrual cycle in terms of changes in the uterus and ovaries
- Describe fertilization, early development of the zygote, development of the fetus
- Describe the ante-natal care of pregnant women including special dietary needs and maintaining good health
- Outline the processes involved in labor and birth
- Describe the roles of testosterone and oestrogen in the development and regulation of secondary sexual characteristics at puberty
- Describe the symptoms, signs, effects and treatment of some sexually transmitted diseases.
- Describe the basic methods of birth control.

- Define the terms growth and development and describe the factors that affect it.

ii) Inheritance

- Define inheritance
- Define the terms chromosome, gene, allele, haploid and diploid nucleus.
- Describe the inheritance of sex in humans
- Define mitosis and meiosis, give differences between them and state their role in growth and reproduction.
- Define the basic terms related to monohybrid inheritance (genotype, phenotype, homozygous, heterozygous, dominant and recessive allele)
- Calculate and predict the results of monohybrid crosses

iii) Ecology

- Describe energy flow in the ecosystem
- Define the terms food web, food chain, producer, consumer, herbivore, carnivore, omnivore, decomposer, trophic level.
- Describe how energy is lost between trophic levels
- Describe and interpret the pyramids of numbers and pyramids of biomass.
- Describe the carbon, nitrogen and water cycle.
- Define population
- State the factors affecting the rate of population growth
- Describe the increase in human population size and its social implications
- Interpret graphs and diagrams of human population growth

iv) Human Influence on the Environment

- Outline the effects of humans on ecosystems, with emphasis on examples of international importance
- List the undesirable effects of deforestation
- Describe the undesirable effects of overuse of fertilizers
- Describe the undesirable effects of pollution, including enhanced greenhouse effect and acid rain.
- Describe the need for conservation of species and their habitats and natural resources

Chemistry (Course Description)

The main aim of Chemistry teaching in Grades 9 and 10 is to prepare students for IGCSE tests in Chemistry. Chemistry is the science of the composition, structure, properties and reactions of matter, understood in terms of atoms, atomic particles and the way they are arranged and link together. It is concerned with the synthesis, formulation, analysis and characteristic properties of substances and materials of all kinds. Students should be helped to appreciate the achievements of chemistry in showing how the complex and diverse phenomena of both the natural and man-made worlds can be described in terms of a small number of key ideas which are of universal application.

Students should acquire sufficient knowledge and understanding to basic chemical themes, they should become confident citizens in a technological world and develop an informed interest in scientific matters. Students should recognize that science including chemistry is evidence based and understand the usefulness, and the limitations, of scientific method. Students should also develop skills that are relevant to the study and practice of chemistry and that are useful in everyday life. Students will be encouraged to solve chemical problems on their own and to communicate effectively about it through the language of science. Students should also to develop attitudes relevant to chemistry such as concern for accuracy and precision, objectivity, integrity, enquiry, initiative and inventiveness. Students will be encouraged to appreciate that science is subject to social, economic, technological, ethical and cultural influences and limitations and that the applications of science may be both beneficial and detrimental to the individual, the community and the environment.

Chemistry (Course Objectives)

i) The Periodic Table

- Describe the Periodic Table as a method of classifying elements and its use to predict properties of elements
- Describe the change from metallic to non-metallic character across a period
- Describe the properties of elements in Groups I, VII and VIII
- Describe the transition elements, halogens, alkali metals, noble gases and state their uses.

ii) Metals

- List the general physical properties of metals and describe their general chemical properties
- Explain in terms of their properties why alloys are used instead of pure metals and identify representations of alloys from diagrams of structure
- Describe reactivity series of selected metals and deduce an order of reactivity from a given set of experimental results
- Describe the ease in obtaining metals from their ores by relating the elements to the reactivity series
- Describe and state the essential reactions in the extraction of iron from hematite
- Describe the conversion of iron into steel using basic oxides and oxygen
- Know that aluminum is extracted from the ore bauxite by electrolysis
- Discuss the advantages and disadvantages of recycling metals, limited to iron/steel and aluminum
- Name the uses of aluminum, copper and mild steel

iii) Air and Water

- Describe chemical tests for water using cobalt chloride and copper sulfate
- Describe the treatment of the water supply in terms of filtration and chlorination
- Name some of the uses of water in industry and in the home
- State the composition of clean, dry air and name the common pollutants in the air
- State the source of carbon monoxide, sulfur dioxide, nitrogen oxides and lead compounds and state their adverse effect on buildings and on health
- State the conditions required for the rusting of iron and describe and explain methods of rust prevention.
- Describe the need for nitrogen-, phosphorus- and potassium-containing fertilisers
- Describe the displacement of ammonia from its salts
- State that carbon dioxide and methane are greenhouse gases and explain how they may contribute to climate change and state the sources of these gases

iv) Sulfur

- Name some sources of sulfur
- Name the use of sulfur in the manufacture of sulfuric acid
- Describe the properties and uses of dilute and concentrated sulfuric acid
- State the uses of sulfur dioxide

v) Carbonates

- Describe the manufacture of lime (calcium oxide) from calcium carbonate (limestone)

- Name some uses of lime and slaked lime
- Name the uses of calcium carbonate in the manufacture of iron and cement

vi) **Organic Chemistry**

- Name and draw the structures of methane, ethane, ethene, ethanol and ethanoic acid
- State the type of compound present, given a chemical name ending in -ane, -ene, -ol, or -oic acid or a molecular structure
- Name the fuels: coal, natural gas and petroleum
- Name methane as the main constituent of natural gas
- Describe petroleum as a mixture of hydrocarbons and its separation into useful fractions by fractional distillation
- Describe the properties of molecules within a fraction and name the uses of the fractions
- Describe the concept of homologous series as a ‘family’ of similar compounds with similar chemical properties due to the presence of the same functional group
- Describe the properties of alkanes and the bonding in alkanes
- Describe the manufacture of alkenes
- Distinguish between saturated and unsaturated hydrocarbons from molecular structures and by reaction with aqueous bromine
- Describe the formation of poly(ethene) as an example of addition polymerization of monomer units
- Describe the manufacture of ethanol by fermentation and by the catalytic addition of steam to ethene
- Describe the properties of ethanol and name the uses of ethanol as a solvent and as a fuel
- Describe the properties of aqueous ethanoic acid

- Define polymers as large molecules built up from small units (monomers)
- Name some typical uses of plastics and of man-made fibres such as nylon and Terylene and describe the pollution problems caused by nonbiodegradable plastics
- Name proteins and carbohydrates as constituents of food

Physics (Course Description)

The main aim of Physics teaching in Grades 9 and 10 is to prepare students for IGCSE tests in Physics. Physics is the science of the fundamental concepts of field, force, radiation and particle structures, which are inter-linked to form unified models of the behavior of the material universe. From such models, a wide range of ideas, from the broadest issue of the development of the universe over time to the numerous and detailed ways in which new technologies may be invented, have emerged. These have enriched both our basic understanding of, and our many adaptations to, our material environment. Students should be helped to understand how, through the ideas of physics, the complex and diverse phenomena of the natural world can be described in terms of a small number of key ideas which are of universal application.

Students should acquire sufficient knowledge and understanding to basic themes in physics, they should become confident citizens in a technological world and develop an informed interest in scientific matters. Students should recognize that science including physics is evidence based and understand the usefulness, and the limitations, of scientific method. Students should also develop skills that are relevant to the study and practice of physics and that are useful in everyday life. Students will be encouraged to solve physical problems on their own and to communicate effectively about it through the language of science. Students should also to develop attitudes relevant to physics such as concern for accuracy and precision, objectivity, integrity, enquiry, initiative and inventiveness. Students will be encouraged to appreciate that science is subject to social, economic, technological, ethical and cultural influences and limitations and that the applications of science may be both beneficial and detrimental to the individual, the community and the environment.

Physics (Course Objectives)

1. Magnetism

- Describe the forces between magnets, and between magnets and magnetic materials
- Give an account of induced magnetism
- Distinguish between magnetic and non-magnetic materials
- Describe methods of magnetization
- Draw the pattern of magnetic field lines around a bar magnet
- Describe an experiment to identify the pattern of magnetic field lines, including the direction
- Distinguish between the magnetic properties of soft iron and steel
- Distinguish between the design and use of permanent magnets and electromagnets

2. Electricity

i) Electric charge

- State that there are positive and negative charges
- State that unlike charges attract and that like charges repel
- Describe simple experiments to show the production and detection of electrostatic charges
- State that charging a body involves the addition or removal of electrons
- Distinguish between electrical conductors and insulators and give typical examples

ii) Current

- State that current is related to the flow of charge
- Use and describe the use of an ammeter
- State that current in metals is due to a flow of electrons

iii) Voltage

- State that the electromotive force of an electrical source of energy is measured in volts
- State that the potential difference across a circuit component is measured in volts
- Use and describe the use of a voltmeter, both analogue and digital

iv) Resistance

- Recall and use the formula for resistance
- Describe an experiment to determine resistance using a voltmeter and an ammeter
- Relate the resistance of a wire to its length and to its diameter

v) Circuits

- Understand that electric circuits transfer energy from the battery or power source to the circuit components then into the surroundings
- Draw and interpret circuit diagrams
- Understand that the current at every point in a series circuit is the same
- Give the combined resistance of two or more resistors in series

- State that, for a parallel circuit, the current from the source is larger than the current in each branch
- State that the combined resistance of two resistors in parallel is less than that of either resistor by itself
- State the advantages of connecting lamps in parallel in a lighting circuit
- Describe the action of a variable potential divider (potentiometer)
- Describe the action of thermistors and light-dependent resistors and show understanding of their use as input transducers
- Describe the action of a relay and show understanding of its use in switching circuits

vi) Dangers of Electricity

- State the hazards of damaged insulation, overheating of cables and damp conditions
- Explain the use of fuses and circuit breakers and choose appropriate fuse ratings and circuit-breaker settings

vii) Transformers

- Distinguish between direct current and alternating current
- Describe the construction of a basic transformer
- Describe the use of the transformer in high-voltage transmission of electricity
- Give the advantages of high-voltage transmission

viii) The Magnetic Effect of a Current

- Describe the pattern of the magnetic field due to currents in straight wires and in solenoids
- Describe applications of the magnetic effect of current
- Describe an experiment to show that a force acts on a current-carrying conductor in a magnetic field
- Describe an experiment to show the corresponding force on beams of charged particles
- State that a current-carrying coil in a magnetic field experiences a turning effect and that the effect is increased by increasing the number of turns on the coil, increasing the current and increasing the strength of the magnetic field

3. Atomic Physics

i) Radioactivity

- Show awareness of the existence of background radiation
- Describe the detection of α -particles, β -particles and γ -rays (β + are not included and β -particles will be taken to refer to β -)
- State that radioactive emissions occur randomly over space and time
- State the nature, relative ionizing effects and relative penetrating abilities of radioactive emissions
- State the meaning of radioactive decay, using equations to represent changes in the composition of the nucleus when particles are emitted
- Use the term half-life in simple calculations, which might involve information in tables or decay curves
- Describe how radioactive materials are handled, used and stored in a safe way

ii) The Nuclear Atom

- Describe the structure of an atom in terms of a nucleus and electrons
- Describe the composition of the nucleus in terms of protons and neutrons
- Use the term proton number, Z
- Use the term nucleon number, A
- Use the term nuclide and use the nuclide notation
- Use the term isotope and give and explain examples of practical applications of isotopes

Geography (Course Description)

In Grade 10, students begin Key Stage 4 and continue to work toward their IGCSE qualification in Geography. The curriculum aims to develop: an understanding of location on a local, regional and global scale; an awareness of the characteristics, distribution and processes affecting contrasting physical and human environments; an understanding of the ways in which people interact with each other and with their environment; an awareness of the contrasting opportunities and constraints presented by different environments; an appreciation of and concern for the environment; and an appreciation of the earth including its people, places, landscapes, natural processes and phenomena.

During Grade 10, the focus of study concerns the following topic areas: Marine Processes and Landforms; Weather and Climate; Climate and Vegetation; Agriculture; Industry; and Energy and Water.

Geography (Course Objectives)

i) Marine Processes and Landforms

- Waves
- Marine Erosion
- Landforms formed by marine processes
- Landforms of coastal deposition
- Dunes
- Coral Reefs

ii) Weather and Climate

- Measuring the Weather
- Cloud Formations
- Tropical Storms
- Droughts

iii) Climate and Vegetation

- Equatorial Climate
- Tropical Desert Climate
- Ecosystems
- Tropical Rainforest
- Case Study: Loss of tropical rainforest in Borneo
- Case Study: Panama's tropical rainforest
- Tropical Desert Ecosystem
- Case Study: The Sahara Desert

- Case Studies: Management and conservation in the Namib Desert and Mojave Desert

iv) Agriculture

- Commercial and subsistence farming
- Large-scale commercial farming systems
- Sustainable development and resource conservation
- Small-scale subsistence farming
- Food shortages

v) Industry

- Industrial Sectors
- The Informal Sector
- The motor vehicle manufacturing industry
- High-technology industry
- Tourism

vi) Energy and Water

- World water consumption
- Non-renewable fossil fuels
- Renewable energy supplies
- Power stations
- Water supply

Global Perspectives (Course Description)

Young people face unprecedented challenges in an interconnected and information-heavy world, not least in how they will gain a sense of their own active place in the world and cope with changes that will impact on their life chances and life choices.

Students of Global Perspectives will have opportunities to acquire and apply a range of skills to support them, including: researching, analysing and evaluating information • developing and justifying a line of reasoning; reflecting on processes and outcomes; communicating information and reasoning; and collaborating to achieve a common outcome. Candidates explore stimulating topics that have global significance. They learn to collaborate with others from another culture, community or country. They assess information critically and explore lines of reasoning. They learn to direct their own learning and develop an independence of thought.

Global Perspectives (Course Objectives)

i) Skills Development

- Searching for Information
- Reading and Recording
- Setting up Research
- Identifying information and trends
- Understanding key issues
- Identifying causes and consequences
- Identifying and evaluating possible courses of action
- Identifying different perspectives
- Questioning knowledge claims
- Questioning the reliability of information
- Evaluating causes and consequence
- Questioning underlying beliefs
- Developing a line of reasoning
- Reflecting on issues and perspectives
- Reflection on teamwork, outcomes and own performance
- Reflect on personal learning
- Planning a project
- Teamwork and individual effort
- Select evidence and present research

ii) Individual Report

- Belief Systems
- Project Preparation

- Individual Research
- Peer Edit and Review

iii) Group Project

- Conflict and Peace
- Project Preparation
- Group Research
- Peer Edit and Review
- Group Presentation

iv) Written Examination Practice

- Demographic Change
- Practice Examination: Demographic Change

History (Course Description)

In Grade 10, students develop within Key Stage 4 and continue to work toward their IGCSE qualification in History. The curriculum aims to: stimulate an interest in and enthusiasm for learning about the past; promote the acquisition of knowledge and understanding of individuals, people and societies in the past; ensure that learners' knowledge is rooted in an understanding of the nature and use of historical evidence; promote an understanding of key historical concepts: cause and consequence, change and continuity, and similarity and difference; provide a sound basis for further study and the pursuit of personal interest; encourage international understanding; and encourage the development of historical skills, including investigation, analysis, evaluation and communication skills.

The content of Grade 10 focuses on the following Key Questions:

- How effectively did the USA contain the spread of Communism?
- How secure was the USSR's control over Eastern Europe, 1948–c.1989?
- Why did events in the Gulf matter, c.1970–2000?
- Depth Study: Germany, 1918 - 1945

History (Course Objectives)

i) How Effectively did the USA Contain the Spread of Communism?

- America and events in Korea, 1950–53
- America and events in Cuba, 1959–62
- American involvement in Vietnam.
- Events of the Cold War
- Case studies of:
 - American reactions to the Cuban revolution, including the missile crisis and its aftermath
 - American involvement in the Vietnam War, e.g. reasons for involvement, tactics/strategy, reasons for withdrawal
 - American reactions to North Korea's invasion of South Korea, involvement of the UN, course of the war to 1953

ii) How Secure was the USSR's Control over Eastern Europe, 1948 – c. 1989?

- Why was there opposition to Soviet control in Hungary in 1956 and Czechoslovakia in 1968, and how did the USSR react to this opposition?
- How similar were events in Hungary in 1956 and in Czechoslovakia in 1968?
- Why was the Berlin Wall built in 1961?
- What was the significance of 'Solidarity' in Poland for the decline of Soviet influence in Eastern Europe?
- How far was Gorbachev personally responsible for the collapse of Soviet control over Eastern Europe?
- Soviet Power in Eastern Europe

- Resistance to Soviet power in Hungary (1956) and Czechoslovakia (1968)
- The Berlin Wall
- ‘Solidarity’ in Poland
- Gorbachev and the collapse of Soviet control over Eastern Europe

iii) Why Did the Events in the Gulf Matter, c. 1970 – 2000?

- Why was Saddam Hussein able to come to power in Iraq?
- What was the nature of Saddam Hussein’s rule in Iraq?
- Why was there a revolution in Iran in 1979?
- What were the causes and consequences of the Iran–Iraq War, 1980–88?
- Why did the First Gulf War take place?
- The rise to power of Saddam Hussein in Iraq
- The rule of Saddam Hussein up to 2000, and the consequences of his rule for different groups in Iraq
- The nature of the Shah’s rule in Iran and the Iranian Revolution of 1979
- The causes and consequences of the Iran–Iraq War, 1980–88; Western involvement in the war The causes, course and consequences of the Gulf War, 1990–91

iv) Germany, 1918 – 1945

- Was the Weimar Republic doomed from the start?
- Why was Hitler able to dominate Germany by 1934?
- The Nazi regime
- How effectively did the Nazis control Germany, 1933–45?

➤ What was it like to live in Nazi Germany?

Information Technology (Course Description)

In Grade 10, students develop within Key Stage 4 and continue to work toward their IGCSE qualification in Information Technology. The curriculum aims to develop: knowledge of ICT including new and emerging technologies; autonomous and discerning use of ICT; skills to enhance work produced in a range of contexts skills to analyse, design, implement, test and evaluate ICT systems; skills to consider the impact of current and new technologies on methods of working in the outside world and on social, economic, ethical and moral issues; ICT-based solutions to solve problems; and the ability to recognise potential risks when using ICT, and use safe, secure and responsible practice.

All pupils must have the opportunity to study aspects of information technology and computer science at sufficient depth to allow them to progress to higher levels of study or to a professional career. All pupils should be taught to: develop their capability, creativity and knowledge in computer science, digital media and information technology; develop and apply their analytic, problem-solving, design, and computational thinking skills; understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to identify and report a range of concerns.

Information Technology (Course Objectives)

i) Hardware Devices

- Cloud computing
- Components
- Input and output devices
- Storage devices

ii) Computer Networks

- Network topology
- Internet and intranet
- Network devices
- Authentication techniques
- Video and teleconferencing

iii) Word Processing Techniques

- Microsoft Word processing sessions

iv) Computer Systems and Components

- Hardware vs Software
- RAM and ROM
- Examples of devices
- Input and output
- Processing
- Storage

v) Document Production

- Evidence shots
- Practical paper database
- Database design
- MS Access

vi) Databases

- Multiple criteria queries
- BSOD fan database

vii) Spreadsheets

- Using SUM
- Simple formulae and formatting

viii) HTML Production

- Practical applications of CSS
- HTML files
- Theory: content versus layout

Business Studies (Course Description)

During the Grade 10 academic year the aims of the Business Studies curriculum are to enable candidates to continue toward achieving their IGCSE qualification. Preparation for the examinations will include developing from learning undertaken in Grade 9 and continuing with the curriculum. Additionally, students will: make effective use of relevant terminology, concepts and methods, and recognise the strengths and limitations of the ideas used in business; apply their knowledge and critical understanding to current issues and problems in a wide range of business contexts; distinguish between facts and opinions, and evaluate qualitative and quantitative data in order to help build arguments and make informed judgements; appreciate the perspectives of a range of stakeholders in relation to the business environment, individuals, society, government and enterprise; develop knowledge and understanding of the major groups and organisations within and outside business, and consider ways in which they are able to influence objectives, decisions and activities; develop knowledge and understanding of how the main types of businesses are organised, financed and operated, and how their relations with other organisations, consumers, employees, owners and society are regulated; develop skills of numeracy, literacy, enquiry, selection and use of relevant sources of information, presentation and interpretation; and to develop an awareness of the nature and significance of innovation and change within the context of business activities.

Business Studies (Course Objectives)

i) Understanding Business Activity

- Business activity
- Classification of businesses
- Enterprise, business growth and size
- Types of business organisation
- Business objectives and stakeholder objectives

ii) People in Business

- Motivating workers
- Organisation and management
- Recruitment, selection and training of worker
- Internal and external communication

iii) Marketing

- Marketing, competition and the customer
- Market research
- Marketing mix
- Marketing strategy

iv) Operations management

- Production of goods and services
- Costs, scale of production and break-even analysis
- Achieving quality production

- Location decisions

v) Financial information and decisions

- Business finance: needs and sources
- Cash-flow forecasting and working capital
- Income statements
- Balance sheets
- Analysis of accounts

vi) External influences on business activity

- Government economic objectives and policies
- Environmental and ethical issues
- Business and the international economy

Modern Language (Course Description)

In Grade 10, students develop further with Key Stage 4 and continue to work toward their IGCSE qualification in a specific Modern Language. The curriculum aims to: develop the ability to communicate effectively using the target language; offer insights into the culture and society of countries where the language is spoken; develop awareness of the nature of language and language learning; encourage positive attitudes towards speakers of other languages and a sympathetic approach to other cultures and civilisations • provide enjoyment and intellectual stimulation; develop transferable skills (e.g. analysis, memorising, drawing of inferences) to complement other areas of the curriculum; and to form a sound base of the skills, language and attitudes required for progression to work or further study, either in the target language or another subject area.

The subject content is organised around five broad topic areas which provide contexts for the acquisition of vocabulary and the study of grammar and structures. Through the study of these Topic areas, candidates gain insight into target language countries and communities. The Topic areas are:

- Everyday activities
- Personal and social life
- The world around us
- The world of work
- The international world

Modern Language (Course Objectives)

i) Everyday Activities

- Home life and school
- Food, health and fitness
- Home life
- School routine
- Eating and drinking
- Health and fitness

ii) Personal and Social Life

- Self, family and personal relationships
- Holidays and special occasions
- Self, family, pets, personal relationships
- House and home
- Leisure, entertainments, invitations
- Eating out
- Festivals and special occasions
- Holidays; getting around
- Accommodation

iii) The World Around Us

- Home town and local area
- Natural and made environment
- People, places and customs

- Home town and geographical surroundings
- Shopping Public services
- Natural environment
- Weather Finding the way
- Meeting people Places and customs
- Travel and transport

iv) The World of Work

- Continuing education
- Careers and employment
- Language and communication in the work place
- Further education and training
- Future career plans
- Employment
- Communication Language at work

v) The International World

- Tourism at home and abroad
- Life in other countries and communities
- World events and issues
- Holiday travel and transport
- Geographical surroundings
- Weather
- Places and customs

- Food and drink
- Meeting people
- Issues according to available resources and individual interest

Physical Education (Course Description)

A high-quality physical education curriculum inspires all pupils to succeed and excel in competitive sport and other physically-demanding activities. It should provide opportunities for pupils to become physically confident in a way which supports their health and fitness. Opportunities to compete in sport and other activities build character and help to embed values such as fairness and respect.

During Grade 9, pupils will be encouraged to: develop competence to excel in a broad range of physical activities; are physically active for sustained periods of time; engage in competitive sports and activities; and to lead healthy, active lives.

Physical Education (Course Objectives)

Pupils should tackle complex and demanding physical activities. They should get involved in a range of activities that develops personal fitness and promotes an active, healthy lifestyle.

Pupils should be taught to:

- Use and develop a variety of tactics and strategies to overcome opponents in team and individual games [for example, badminton, basketball, cricket, football, hockey, netball, rounders, rugby and tennis]
- Develop their technique and improve their performance in other competitive sports, [for example, athletics and gymnastics], or other physical activities [for example, dance]
- Take part in further outdoor and adventurous activities in a range of environments which present intellectual and physical challenges and which encourage pupils to work in a team, building on trust and developing skills to solve problems, either individually or as a group
- Evaluate their performances compared to previous ones and demonstrate improvement across a range of physical activities to achieve their personal best
- Continue to take part regularly in competitive sports and activities outside school through community links or sports clubs.

Economics (Course Description)

In Grade 10, students develop within Key Stage 4 and continue to work toward their IGCSE qualification in Economics. The curriculum aims to assist candidates to gain lifelong skills, including: an understanding of economic theory, terminology and principles • the ability to apply the tools of economic analysis; the ability to distinguish between facts and value judgements in economic issues; an understanding of, and an ability to use, basic economic numeracy and literacy; the ability to take a greater part in decision-making processes in everyday life; an understanding of the economies of developed and developing nations; and an excellent foundation for advanced study in economics.

Economics (Course Description)

i) The Basic Economic Problem: Choice and the Allocation of Resources

- The basic economic question
- Factors of production
- The satisfaction of human wants
- Opportunity costs
- Production Possibility Curves

ii) The Allocation of Resources: how markets work; market failure

- Economic systems
- Market economic systems
- Mixed economic systems
- Private and Public Expenditures
- Product Demand
- Causes of increases and decreases in demand
- Product Supply
- Causes of increases and decreases in supply
- Market price
- Price elasticity of demand
- Price elasticity of supply
- The impact of taxes and subsidies on market outcomes
- How the decision of firms can affect others
- Social costs and benefits
- Market failure and government intervention

- Conservation or commercialization?

iii) The Individual as Producer, Consumer and Borrower

- Why do we need money?
- What makes a good money?
- The history of money / What is money?
- The money market
- The stock market
- Why do people work?
- What is the labour market?
- The market wage for a job
- Why do the earnings of employees differ?
- Why do governments intervene in labour markets?
- What is a trade union?
- Collective bargaining
- Consumption
- Saving
- Borrowing money

iv) The Private Firm as Producer and Employer

- Starting a business
- Sole Trader, Joint-stock companies
- Multinational corporations
- Cooperatives
- Production

- The aims of production
- Calculating costs and revenues
- Profit, loss or break-even
- The size of firms
- How firms grow in size
- The relationship between costs and productive scale

v) Competition

- Why do firms compete?
- Pricing strategies
- What is a market structure?
- Monopolies

vi) Role of Government in an Economy

- The government as an employer, consumer and producer
- Macroeconomic objectives
- Demand-side policies
- Supply-side policies
- Policy conflicts
- Financing public expenditure
- Tax systems
- Direct taxes
- Indirect taxes
- Balancing the budget

vii) Economic Indicators

- What is inflation?
- What is deflation?
- Employment trends
- The causes and consequences of unemployment
- Measuring output / GDP
- Economic growth
- Growth cycles

viii) Developed and Developing Economies: Trends in Production, Population and Living Standards

- Economic development in different economies
- Development indicators
- Measures to reduce international poverty
- The global population
- Causes of population change
- The structure of populations

ix) International Aspects

- Globalization and trade
- International trade patterns
- Free trade or protectionism?
- Exports and imports
- The balance of payments
- Exchange rates
- Correct trade imbalance

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Science:

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History:

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