

# Recognize International Academy

## KS3 Curriculum

### Years 7-9

(Grades 6-8; Age 11-14)

The RIA KS3 core curriculum is based on the content and standards of the National Curriculum for England 2014. It sets broad and challenging targets for academic achievement. All of the included content is designed to lead students towards developing the skills and knowledge that will allow for success in their future studies and examinations in KS4 and beyond. RIA has changed aspects of the curriculum so as to better reflect the international nature of our school and setting. As with our KS1 and KS2 curriculum, RIA sets no limits as to what level of achievement a student can reach at a given age. Our individualised approach to learning encourages and supports students to aim as high as they can.

## English and Literature

### Purpose of study

English has a pre-eminent place in education and in society. A high-quality education in English will teach pupils to speak and write fluently so that they can communicate their ideas and emotions to others and through their reading and listening, others can communicate with them. Through reading in particular, pupils have a chance to develop culturally, emotionally, intellectually, socially and spiritually. Literature, especially, plays a key role in such development. Reading also enables pupils both to acquire knowledge and to build on what they already know. All the skills of language are essential to participating fully as a member of society.

### Subject Content

#### Reading

Students are taught to:

**develop an appreciation and love of reading, and read increasingly challenging material independently through:**

- reading a wide range of fiction and non-fiction, including in particular whole books, short stories, poems and plays with a wide coverage of genres, historical periods, forms and authors. The range will include high-quality works from:
  - Literature in the medium of English, both pre-1914 and contemporary, including prose, poetry and drama
  - Shakespeare
  - seminal world literature
- choosing and reading books independently for challenge, interest and enjoyment.
- re-reading books encountered earlier to increase familiarity with them and provide a basis for making comparisons.

**understand increasingly challenging texts through:**

- learning new vocabulary, relating it explicitly to known vocabulary and understanding it with the help of context and dictionaries
- making inferences and referring to evidence in the text knowing the purpose, audience for and context of the writing and drawing on this knowledge to support comprehension checking their understanding to make sure that what they have read makes sense.

**read critically through:**

- knowing how language, including figurative language, vocabulary choice, grammar, text structure and organisational features, presents meaning
- recognising a range of poetic conventions and understanding how these have been used
- studying setting, plot, and characterisation, and the effects of these
- understanding how the work of dramatists is communicated effectively through performance and how alternative staging allows for different interpretations of a play
- making critical comparisons across texts studying a range of authors, including at least two authors in depth each year

## Writing

Students are taught to

**write accurately, fluently, effectively and at length for pleasure and information through**

- writing for a wide range of purposes and audiences, including:
- well-structured formal expository and narrative essays
- stories, scripts, poetry and other imaginative writing
- notes and polished scripts for talks and presentations
- a range of other narrative and non-narrative texts, including arguments, and personal and formal letters
- summarising and organising material, and supporting ideas and arguments with any necessary factual detail
- applying their growing knowledge of vocabulary, grammar and text structure to their writing and selecting the appropriate form
- drawing on knowledge of literary and rhetorical devices from their reading and listening to enhance the impact of their writing
- plan, draft, edit and proof-read through:
- considering how their writing reflects the audiences and purposes for which it was intended
- amending the vocabulary, grammar and structure of their writing to improve its coherence and overall effectiveness
- paying attention to accurate grammar, punctuation and spelling; applying the spelling patterns and rules set out in English Appendix 1 to the key stage 1 and 2 programmes of study for English.

## Grammar and vocabulary

Students are taught to:

**consolidate and build on their knowledge of grammar and vocabulary through:**

- extending and applying the grammatical knowledge set out in English Appendix 2 to the key stage 1 and 2 programmes of study to analyse more challenging texts
- studying the effectiveness and impact of the grammatical features of the texts they read, drawing on new vocabulary and grammatical constructions from their reading and listening, and using these consciously in their writing and speech to achieve particular effects
- knowing and understanding the differences between spoken and written language, including differences associated with formal and informal registers, and between Standard English and other varieties of English
- using Standard English confidently in their own writing and speech discussing reading, writing and spoken language with precise and confident use of linguistic and literary terminology.

## Spoken English

Students are taught to:

**speak confidently and effectively, including through:**

- using Standard English confidently in a range of formal and informal contexts, including classroom discussion
- giving short speeches and presentations, expressing their own ideas and keeping to the point

- participating in formal debates and structured discussions, summarising and/or building on what has been said
- improvising, rehearsing and performing play scripts and poetry in order to generate language and discuss language use and meaning, using role, intonation, tone, volume, mood, silence, stillness and action to add impact.

# Mathematics

## Purpose of study

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

## Subject Content

### Number

Pupils are taught to:

- understand and use place value for decimals, measures and integers of any size
- order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥
- use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation properly
- use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative
- use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals
- recognise and use relationships between operations including inverse operations
- use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations
- interpret and compare numbers in standard form  $A \times 10^n$   $1 \leq A < 10$ , where  $n$  is a positive or negative integer or zero
- work interchangeably with terminating decimals and their corresponding fractions (such as 7 as 3.5 and 23 or 0.375 and 8 )
- define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100%
- interpret fractions and percentages as operators
- use standard units of mass, length, time, money and other measures, including with decimal quantities
- round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures]
- use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation  $a < x \leq b$
- use a calculator and other technologies to calculate results accurately and then interpret them appropriately
- appreciate the infinite nature of the sets of integers, real and rational numbers.

## Algebra

Pupils are taught to:

- use and interpret algebraic notation, including:
  - $ab$  in place of  $a \times b$
  - $3y$  in place of  $y + y + y$  and  $3 \times y$
  - use  $a^2$  in place of  $a \times a$ ,  $a^3$  in place of  $a \times a \times a$ ;  $a^2b$  in place of  $a \times a \times ba$ ,  $b$  in place of  $a \div b$
  - coefficients written as fractions rather than as decimals
  - brackets
- substitute numerical values into formulae and expressions, including scientific formulae
- understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors
- simplify and manipulate algebraic expressions to maintain equivalence by:
  - collecting like terms
  - multiplying a single term over a bracket
  - taking out common factors
  - expanding products of two or more binomials
- understand and use standard mathematical formulae; rearrange formulae to change the subject
- model situations or procedures by translating them into algebraic expressions or formulae and by using graphs
- use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement)
- work with coordinates in all four quadrants
- recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in  $x$  and  $y$  and the Cartesian plane interpret mathematical relationships both algebraically and graphically
- reduce a given linear equation in two variables to the standard form  $y = mx + c$ ; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically
- use linear and quadratic graphs to estimate values of  $y$  for given values of  $x$  and vice versa and to find approximate solutions of simultaneous linear equations
- find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear, exponential and reciprocal graphs
- generate terms of a sequence from either a term-to-term or a position-to-term rule
- recognise arithmetic sequences and find the  $n$ th term
- recognise geometric sequences and appreciate other sequences that arise.
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## Ratio, proportion and rates of change

Pupils are taught to:

- change freely between related standard units [for example time, length, area, volume/capacity, mass] use scale factors, scale diagrams and maps
- express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1
- use ratio notation, including reduction to simplest form

- divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio
- understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction
- relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions
- solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics
- solve problems involving direct and inverse proportion, including graphical and algebraic representations
- use compound units such as speed, unit pricing and density to solve problems. *Geometry and measures*
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## **Geometry and measures**

Pupils are taught to:

- derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders)
- calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes draw and measure line segments and angles in geometric figures, including interpreting scale drawings derive and use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line
- describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric
- use the standard conventions for labelling the sides and angles of triangle ABC, and know and use the criteria for congruence of triangle
- derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies
- identify properties of, and describe the results of, translations, rotations and reflections applied to given figures
- identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grids
- apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles
- understand and use the relationship between parallel lines and alternate and corresponding angles
- derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons
- apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras' Theorem, and use known results to obtain simple proofs
- use Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles
- use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D

- interpret mathematical relationships both algebraically and geometrically.

## **Probability**

Pupils are taught to:

- generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities.
- record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale
- understand that the probabilities of all possible outcomes sum to 1
- enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams

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## **Statistics**

Pupils are taught to:

- describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers)
- construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data
- describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs; interpret their solution in the context of the given problem.

# **Science**

## **Purpose of study**

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

## **Working scientifically**

Through the content across all three disciplines, pupils are taught:

### **Scientific attitudes**

- pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility
- understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review
- evaluate risks.

### **Experimental skills and investigations**

- ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience
- make predictions using scientific knowledge and understanding
- select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate
- use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety
- make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements apply sampling techniques.

### **Analysis and evaluation**

- apply mathematical concepts and calculate results
- present observations and data using appropriate methods, including tables and graphs
- interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions
- present reasoned explanations, including explaining data in relation to predictions and hypotheses
- evaluate data, showing awareness of potential sources of random and systematic error

- identify further questions arising from their results.

### **Measurement**

- understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature
- use and derive simple equations and carry out appropriate calculations
- undertake basic data analysis including simple statistical techniques.
- the structural adaptations of some unicellular organisms
- the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.

## **Subject content – Biology**

Pupils are taught about:

### **Structure and function of living organisms**

#### **Cells and organisation**

- cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope
- the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts
- the similarities and differences between plant and animal cells
- the role of diffusion in the movement of materials in and between cells

#### **The skeletal and muscular systems**

- the structure and functions of the human skeleton, to include support, protection, movement and making blood cells
- biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles
- the function of muscles and examples of antagonistic muscles.

#### **Nutrition and digestion**

- content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed
- calculations of energy requirements in a healthy daily diet
- the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases
- the tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts)
- the importance of bacteria in the human digestive system
- plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots.

#### **Gas exchange systems**

- the structure and functions of the gas exchange system in humans, including adaptations to function
- the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume
- the impact of exercise, asthma and smoking on the human gas exchange system
- the role of leaf stomata in gas exchange in plants.

#### **Reproduction**

- reproduction in humans (as an example of a mammal), including the structure and function of

the male and female reproductive systems, menstrual cycle (without details

- of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta
- reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.

### **Health**

- the effects of recreational drugs (including substance misuse) on behaviour, health and life processes

## **Material cycles and energy**

### **Photosynthesis**

- the reactants in, and products of, photosynthesis, and a word summary for photosynthesis
- the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere
- the adaptations of leaves for photosynthesis.

### **Cellular respiration**

- aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life
- a word summary for aerobic respiration
- the process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration
- the differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism.
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## **Interactions and interdependencies**

### **Relationships in an ecosystem**

- the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops
- the importance of plant reproduction through insect pollination in human food security
- how organisms affect, and are affected by, their environment, including the accumulation of toxic materials.

### **Genetics and evolution**

- Inheritance, chromosomes, DNA and genes
- heredity as the process by which genetic information is transmitted from one generation to the next
- a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model
- differences between species
- the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation
- the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection
- changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction
- the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.

## **Subject content - Chemistry**

Pupils are taught about:

### **The particulate nature of matter**

- the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure
- changes of state in terms of the particle model.

### **Atoms, elements and compounds**

- a simple (Dalton) atomic model
- differences between atoms, elements and compounds
- chemical symbols and formulae for elements and compounds
- conservation of mass changes of state and chemical reactions.

### **Pure and impure substances**

- the concept of a pure substance
- mixtures, including dissolving
- diffusion in terms of the particle model
- simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography
- the identification of pure substances.

### **Chemical reactions**

- chemical reactions as the rearrangement of atoms
- representing chemical reactions using formulae and using equations
- combustion, thermal decomposition, oxidation and displacement reactions
- defining acids and alkalis in terms of neutralisation reactions
- the pH scale for measuring acidity/alkalinity; and indicator
- reactions of acids with metals to produce a salt plus hydrogen
- reactions of acids with alkalis to produce a salt plus water
- what catalysts do.

### **Energetics**

- energy changes on changes of state (qualitative)
- exothermic and endothermic chemical reactions (qualitative).

### **The Periodic Table**

- the varying physical and chemical properties of different elements
- the principles underpinning the Mendeleev Periodic Table
- the Periodic Table: periods and groups; metals and non-metals
- how patterns in reactions can be predicted with reference to the Periodic Table
- the properties of metals and non-metals
- the chemical properties of metal and non-metal oxides with respect to acidity.
- the order of metals and carbon in the reactivity series
- the use of carbon in obtaining metals from metal oxides
- properties of ceramics, polymers and composites (qualitative).

### **Earth and atmosphere**

- the composition of the Earth
- the structure of the Earth
- the rock cycle and the formation of igneous, sedimentary and metamorphic rocks
- Earth as a source of limited resources and the efficacy of recycling

- the carbon cycle
- the composition of the atmosphere
- the production of carbon dioxide by human activity and the impact on climate.
- fuels and energy resources.

## **Subject content – Physics**

Pupils are taught about:

### **Energy**

- Calculation of fuel uses and costs in the domestic context
- comparing energy values of different foods (from labels) (kJ)
- comparing power ratings of appliances in watts (W, kW)
- comparing amounts of energy transferred (J, kJ, kW hour)
- domestic fuel bills, fuel use and costs

### **Energy changes and transfers**

- simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged
- heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference: use of insulators
- other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels.

### **Changes in systems**

- energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change
- comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions
- using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes.

### **Motion and forces**

- Describing motion
- speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time)
- the representation of a journey on a distance-time graph
- relative motion: trains and cars passing one another.

### **Forces**

- forces as pushes or pulls, arising from the interaction between two objects using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces
- moment as the turning effect of a force
- forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water
- forces measured in newtons, measurements of stretch or compression as force is changed
- force-extension linear relation; Hooke's Law as a special case
- work done and energy changes on deformation
- non-contact forces: gravity forces acting at a distance on Earth and in space, forces between

magnets and forces due to static electricity.

### **Pressure in fluids**

- atmospheric pressure, decreases with increase of height as weight of air above decreases with height
- pressure in liquids, increasing with depth; upthrust effects, floating and sinking
- pressure measured by ratio of force over area - acting normal to any surface.

### **Balanced forces**

- opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface.

### **Forces and motion**

- forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only)
- change depending on direction of force and its size.

## **Waves**

### **Observed wave**

- waves on water as undulations which travel through water with transverse motion;
- these waves can be reflected, and add or cancel - superposition.

### **Sound waves**

- frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound
- sound needs a medium to travel, the speed of sound in air, in water, in solids
- sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal
- auditory range of humans and animals.

### **Energy and waves**

- pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound;
- waves transferring information for conversion to electrical signals by microphone.

### **Light waves**

- the similarities and differences between light waves and waves in matter
- light waves travelling through a vacuum; speed of light
- the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface
- use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye
- light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras
- colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.

## **Electricity and electromagnetism**

### **Current electricity**

- electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge
- potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current
- differences in resistance between conducting and insulating components (quantitative)

### **Static electricity**

- separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects
- the idea of electric field, forces acting across the space between objects not in contact.

### **Magnetism**

- magnetic poles, attraction and repulsion
- magnetic fields by plotting with compass, representation by field lines
- Earth's magnetism, compass and navigation
- the magnetic effect of a current, electromagnets, D.C. motors (principles only).

## **Matter**

### **Physical changes**

- conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving
- similarities and differences, including density differences, between solids, liquids and gases
- Brownian motion in gases
- diffusion in liquids and gases driven by differences in concentration
- the difference between chemical and physical changes.

### **Particle model**

- the differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density, the anomaly of ice-water transition
- atoms and molecules as particles.

### **Energy in matter**

- changes with temperature in motion and spacing of particle
- internal energy stored in materials.

### **Space physics**

- gravity force, weight = mass  $\times$  gravitational field strength ( $g$ ), on Earth  $g=10$  N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only)
- our Sun as a star, other stars in our galaxy, other galaxies
- the seasons and the Earth's tilt, day length at different times of year, in different hemispheres
- the light year as a unit of astronomical distance.

# Art and Design

## Purpose of study

Art, craft and design embody some of the highest forms of human creativity. A high-quality art and design education should engage, inspire and challenge students, equipping them with the knowledge and skills to experiment, invent and create their own works of art, craft and design. As students progress, they should be able to think critically and develop a more rigorous understanding of art and design. They should also know how art and design both reflect and shape our history, and contribute to the culture, creativity and wealth of nations.

## **Aims**

The RIA curriculum for art and design aims that students:

- produce creative work, exploring their ideas and recording their experiences
- become proficient in drawing, painting, sculpture and other art, craft and design techniques
- evaluate and analyse creative works using the language of art, craft and design
- know about great artists, craft makers and designers, and understand the historical and cultural development of their art forms.

Students should be taught to develop their creativity and ideas, and increase proficiency in their execution. They should develop a critical understanding of artists, architects and designers, expressing reasoned judgements that can inform their own work.

Students should be taught:

- to use a range of techniques to record their observations in sketchbooks, journals and other media as a basis for exploring their ideas
- to use a range of techniques and media, including painting
- to increase their proficiency in the handling of different materials
- to analyse and evaluate their own work, and that of others, in order to strengthen the visual impact or applications of their work
- about the history of art, craft, design and architecture, including periods, styles and major movements from ancient times up to the present day.

# **Geography**

## **Purpose of study**

Geography should inspire in pupils a curiosity and fascination about the world and its people that will remain with them for the rest of their lives. Teaching should equip pupils with knowledge about diverse places, people, resources and natural and human environments, together with a deep understanding of the Earth's key physical and human processes. As pupils progress, their growing knowledge about the world should help them to deepen their understanding of the interaction between physical and human processes, and of the formation and use of landscapes and environments. Geographical knowledge, understanding and skills provide the frameworks and approaches that explain how the Earth's features at different scales are shaped, interconnected and change overtime.

## **Aims**

The RIA curriculum for geography aims that pupils:

- develop contextual knowledge of the location of globally significant places - both terrestrial and marine - including their defining physical and human characteristics and how these provide a geographical context for understanding the actions of processes
- understand the processes that give rise to key physical and human geographical features of the world, how these are interdependent and how they bring about spatial variation and change over time
- are competent in the geographical skills needed to: collect, analyse and communicate with a range of data gathered through experiences of fieldwork that deepen their understanding of geographical processes
- interpret a range of sources of geographical information, including maps, diagrams, globes, aerial photographs and Geographical Information Systems (GIS)
- communicate geographical information in a variety of ways, including through maps, numerical and quantitative skills and writing at length.

Pupils are taught:

## **Locational knowledge**

- extend their locational knowledge and deepen their spatial awareness of the world's countries using maps of the world to focus on Africa, Russia, Asia (including China and India), and the Middle East, focusing on their environmental regions, including polar and hot deserts, key physical and human characteristics, countries and major cities

## **Place Knowledge**

- understand geographical similarities, differences and links between places through the study of human and physical geography of a region within Africa, and of a region within Asia

## **Human and physical geography**

- understand, through the use of detailed place-based exemplars at a variety of scales, the key processes in:
- physical geography relating to: geological timescales and plate tectonics; rocks, weathering and soils; weather and climate, including the change in climate from the Ice Age to the present; and glaciation, hydrology and coasts
- human geography relating to: population and urbanisation; international development; economic activity in the primary, secondary, tertiary and quaternary sectors; and the use of natural resources

- understand how human and physical processes interact to influence, and change landscapes, environments and the climate; and how human activity relies on effective functioning of natural systems
- Geographical skills and fieldwork
- build on their knowledge of globes, maps and atlases and apply and develop this knowledge routinely in the classroom and in the field
- interpret Ordnance Survey maps in the classroom and the field, including using grid references and scale, topographical and other thematic mapping, and aerial and satellite photographs
- use Geographical Information Systems (GIS) to view, analyse and interpret places and data
- use fieldwork in contrasting locations to collect, analyse and draw conclusions from geographical data, using multiple sources of increasingly complex information.

# History

## Purpose of study

A high-quality history education will help pupils gain a coherent knowledge and understanding of the wider world. It should inspire pupils' curiosity to know more about the past. Teaching should equip pupils to ask perceptive questions, think critically, weigh evidence, sift arguments, and develop perspective and judgement. History helps pupils to understand the complexity of people's lives, the process of change, the diversity of societies and relationships between different groups, as well as their own identity and the challenges of their time.

**Below is an overview of the content of our time-line for History**

### **Year 1 and 2**

- ) changes within living memory - where appropriate, these should be used to reveal aspects of change in national life
- ) events beyond living memory that are significant nationally or globally [for example, the Great Fire of London, the first aeroplane flight or events commemorated through festivals or anniversaries]
- ) the lives of significant individuals in the past who have contributed to national and international achievements, some should be used to compare aspects of life in different periods [for example, Elizabeth I and Queen Victoria, Christopher Columbus and Neil Armstrong, William Caxton and Tim Berners-Lee, Pieter Bruegel the Elder and LS Lowry, Rosa Parks and Emily Davison, Mary Seacole and/or Florence Nightingale and Edith Cavell]
- ) significant historical events, people and places in their own locality

### **Year 3**

#### **Pre-History to Ancient History**

- ) develop a chronologically secure knowledge
- ) establish clear narratives within and across the periods they study
- ) note connections, contrasts and trends over time and develop the appropriate use of historical terms

Emergence of Humans/Tools

Spoken languages

The Rise of Agriculture

Civilizations in Mesopotamia

Ancient Egypt

### **Year 4**

#### **Ancient History**

- ) develop a chronologically secure knowledge
- ) establishing clear narratives within and across the periods they study
- ) note connections, contrasts and trends over time and develop the appropriate use of historical terms

Ancient India and China

Indigenous cultures

Southern Ocean Trade

classical Greece and Rome

### **Year 5**

## **Middle Ages**

- ) regularly address and sometimes devise historically valid questions about change, cause, similarity and difference, and significance
- ) construct informed responses that involve thoughtful selection and organisation of relevant historical information
- ) understand how our knowledge of the past is constructed from a range of sources

Dark Ages in Europe

Rise of Islam

Mongol Conquests

Science, Invention, Education during 'Dark Ages'

## **Year 6**

### **Middle Ages- Modern Era**

- ) regularly address and sometimes devise historically valid questions about change, cause, similarity and difference, and significance
- ) construct informed responses that involve thoughtful selection and organisation of relevant historical information
- ) understand how our knowledge of the past is constructed from a range of sources

Renaissance

Revolutions (French/ European/ Russian)

Age of Enlightenment

Conquest of the Americas

## **Year 7**

### **Modern Era**

- ) extend and deepen their chronologically secure knowledge and understanding of local and world history, so that it provides a well-informed context for wider learning
- ) identify significant events, make connections, draw contrasts, and analyse trends within periods and over long arcs of time
- ) use historical terms and concepts in increasingly sophisticated ways

Industrialization

Imperialism

World Wars

Civil/ Human Rights

## **Year 8**

### **Modern Era**

- ) identify significant events, make connections, draw contrasts, and analyse trends within periods and over long arcs of time
- ) pursue historically valid enquiries including some they have framed themselves, and create relevant, structured and evidentially supported accounts in response
- ) understand how different types of historical sources are used rigorously to make historical claims and discern how and why contrasting arguments and interpretations of the past have been constructed

Cold War/ Modern Conflict

Space/ Information Age/ Globalization

Current Events in Regions and Civilizations

## **Year 9—Flexible based on overall learner needs**

### **Government/ Civics**

Why Government? Rule of Law/ Sovereign States/Founding documents (Constitutions)

Forms of Modern Government/ Civic Duties within them

World Governing Bodies, practice and representation

# **Physical Education**

## **Purpose of study**

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.

## **Aims**

The RIA curriculum for physical education aims that pupils:

- 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
- lead healthy, active lives.

## **Subject content**

Pupils should build on and embed the physical development and skills learned in key stages 1 and 2, become more competent, confident and expert in their techniques, and apply them across different sports and physical activities. They should understand what makes a performance effective and how to apply these principles to their own and others' work. They should develop the confidence and interest to get involved in exercise, sports and activities out of school and in later life, and understand and apply the long-term health benefits of physical activity.

Pupils are taught to:

- use a range of tactics and strategies to overcome opponents in direct competition through 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]
- perform dances using advanced dance techniques within a range of dance styles and forms
- take part in outdoor and adventurous activities which present intellectual and physical challenges and be encouraged to work in a team, building on trust and developing skills to solve problems, either individually or as a group
- analyse their performances compared to previous ones and demonstrate improvement to achieve their personal best
- take part in competitive sports and activities outside school through community links or sports clubs.

# **Music**

## **Purpose of study**

Music is a universal language that embodies one of the highest forms of creativity. A high-quality music education should engage and inspire pupils to develop a love of music and their talent as musicians, and so increase their self-confidence, creativity and sense of achievement. As pupils progress, they should develop a critical engagement with music, allowing them to compose, and to listen with discrimination to the best in the musical canon.

## **Aims**

The RIA curriculum for music aims that pupils:

- perform, listen to, review and evaluate music across a range of historical periods, genres, styles and traditions, including the works of the great composers and musicians
- learn to sing and to use their voices, to create and compose music on their own and with others, have the opportunity to learn a musical instrument, use technology appropriately and have the opportunity to progress to the next level of musical excellence
- understand and explore how music is created, produced and communicated, including through the inter-related dimensions: pitch, duration, dynamics, tempo, timbre, texture, structure and appropriate musical notations.

## **Subject content**

Pupils should build on their previous knowledge and skills through performing, composing and listening. They should develop their vocal and/or instrumental fluency, accuracy and expressiveness; and understand musical structures, styles, genres and traditions, identifying the expressive use of musical dimensions. They should listen with increasing discrimination and awareness to inform their practice as musicians. They should use technologies appropriately and appreciate and understand a wide range of musical contexts and styles.

Pupils are taught to:

- play and perform confidently in a range of solo and ensemble contexts using their voice, playing instruments musically, fluently and with accuracy and expression
- improvise and compose; and extend and develop musical ideas by drawing on a range of musical structures, styles, genres and traditions
- use staff and other relevant notations appropriately and accurately in a range of musical styles, genres and traditions
- identify and use the inter-related dimensions of music expressively and with increasing sophistication, including use of tonalities, different types of scales and other musical devices
- listen with increasing discrimination to a wide range of music from great composers and musicians
- develop a deepening understanding of the music that they perform and to which they listen, and its history.

# **Computing**

## **Purpose of study**

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate - able to use, and express themselves and develop their ideas through, information and communication technology - at a level suitable for the future workplace and as active participants in a digital world.

## **Aims**

- The RIA curriculum for computing aims that pupils:
- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident and creative users of information and communication technology.

## **Subject content**

Pupils are taught to:

- design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems
- understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem
- use two or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions
- understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]
- understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems
- understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits
- undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users
- create, re-use, revise and re-purpose digital artifacts for a given audience, with attention to trustworthiness, design and usability
- understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct and know how to report concerns

## Design and Technology

**Purpose of study:** Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world.

**Aims:** The RIA curriculum for design and technology aims that pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

### Subject content

#### **Design**

- identify and solve their own design problems and understand how to reformulate problems given to them
- develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations
- use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses
- develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools

#### **Make**

- select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture
- select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties

#### **Evaluate**

- analyse the work of past and present professionals and others to develop and broaden their understanding
- investigate new and emerging technologies
- test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups
- understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists

#### **Technical knowledge**

- understand and use the properties of materials to achieve functioning solutions
- understand how mechanical systems enable changes in movement and force
- understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs]

- apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components [for example, microcontrollers].

### **Cooking and nutrition**

- understand and apply the principles of nutrition and health
- cook a repertoire of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet
- become competent in a range of cooking techniques [for example, selecting and preparing ingredients; using utensils and electrical equipment; applying heat in different ways; using awareness of taste, texture and smell to decide how to season dishes and combine ingredients; adapting and using their own recipes]
- understand the source, seasonality and characteristics of a broad range of ingredients.

## **Languages**

### **Chinese (Mandarin)**

#### **Purpose of Study**

The purpose of Chinese (Mandarin) study is to help students become as well-equipped in this language as they can be. For some students, who already have Chinese as one of their home languages, this will mean developing their reading and writing and learning as many new characters as possible. For the more advanced, this will also mean developing their ability to add nuance and lyricism in their communications. For others, who are approaching Chinese as a foreign language, developing practical oral communication will be the priority, and students will be given the opportunity to work towards HSK Levels as appropriate.

## Well-Being

### **Purpose of study**

Our Well-Being education helps to provide pupils with knowledge, understanding and awareness of a wide range of issues connected with growing up, with study, with the world of work, with health and relationships, and with the way that societies function. By providing our students with such information, we hope for them to have an increased chance of leading fulfilling, safe, healthy and generous lives. We hope that they will develop a keen awareness of others and themselves, and will be better equipped to make positive choices. Below, are just a few of the topics that are covered within our Well-Being curriculum.

- ) Knowing the benefits of physical activity, nutrition and the importance of sleep
- ) Developing a positive sense of self and understanding how the media portrays young people and body images
- ) Connecting self-esteem and its impact on interpersonal relationships
- ) Identifying one's own strengths, interests, skills and qualities as a learner
- ) Understanding the physical and emotional changes of adolescence
- ) Recognizing, clarifying and challenging one's own core values and how these values impact others
- ) Defining qualities and behaviors expected in positive relationships
- ) Understanding the benefits of persistence, ambition and enterprise
- ) Understanding habits, dependence, addiction and substance abuse
- ) Knowing methods and reasons for contraception
- ) Knowing the characteristics of mental and emotional health and strategies to manage it
- ) Have a basic knowledge of first aid and life saving skills
- ) Learning about puberty and what to expect with body changes
- ) Know the qualities of positive/ stable relationships like trust, mutual respect, honesty
- ) Evaluate the extent self confidence/ esteem is affected by the judgment of others
- ) Know the characteristics/ symptoms of mental and emotional health (Stress, anxiety, depression)
- ) Strategies to manage strong emotions
- ) Characteristics of positive, strong, supportive and equal relationships vs unhealthy or abusive relationships
- ) Further develop study and employability skills like time management, self organization, project planning and networking
- ) Defining and understanding personal and physical consent
- ) Identify, assess and manage risk taking behaviour

