LOWER SCHOOL CURRICULUM OUTLINE AND FRAMEWORK FOR LITERACY, NUMERACY AND SCIENCE

Our Aim: Meeting the needs of the developing child

- **Class 1 (ages 6 and 7)**

The Class 1 child is eager to learn and express themselves through reading and writing. Numbers and letters are presented in exciting and imaginative ways that feed their enthusiasm. Teaching is pictorial and imaginative, the aim being to stimulate the intellect though activity, rhythm and imagination. Time is spent laying down good habits of classroom life and work, cultivating reverence for nature, respect of others and learning to connect with and care for the children's environment. The children need fantasy and imaginative pictures and so learning is enriched through fairy-tales.

- **Class 2 (ages 7 and 8)**

In Class 2 the children are growing aware of themselves and each other so they hear fables, where the characters encounter problems with others when their boastfulness, cunning or pride cloud right judgment. These themes can be explored through drawing, writing, modeling and role-play. They are balanced by hearing legends of the Saints who use their skills and gifts to aid others. Cursive writing begins and composition is introduced, which aids spelling. Reading skills continue to develop and are encouraged. Maths work builds with mental practice and longer exercises, moving on to larger numbers, number bonds and working with the four processes. Geometrical form drawing is begun.

- **Class 3 (ages 8 and 9)**

Class 3 sees the child's awareness move further out into the world so we look at farming, building and trades to learn an appreciation for how the things we need for a comfortable life are produced for us by the hard work and effort of others. This can be accompanied by practical projects involving growing vegetables, weaving baskets, grinding flour and baking bread. There are many trips in connection with these topics. Stories now are from the Old Testament, including Genesis and other creation stories. The children begin to write full sentences from stories and activities, explore nouns, verbs, adjectives and punctuation. In maths, practice of all 12 tables continuous; long multiplications and long divisions are introduced, money handling and change, and various forms of measurements – linear, liquids, solids and temporal.

Class 4 (ages 9 and 10)

In Class 4 the children are ready for more of an academic challenge so they encounter Norse mythology, fractions and the relationship of mankind to the animal kingdom. The aim is to meet the children's growing interest in the world and to provide more opportunities for independence in their work. Mythology is now introduced, especially the Norse Myths (also known as the Edda) and in form drawing Celtic knot work in particular is explored. In English, grammar work covers the tenses and parts of speech; in maths fractions are introduced, using all four processes and measurements and area work is continued.

There are Main Lesson blocks on local Geography and local History, beginning with the school grounds and leading on to sightseeing trips and the two-day walking trip to Ely. Other Main Lesson blocks on "Man and Animal" explore the form and functions of the human being, leading to an understanding of the animal world, followed by a more detailed study of some animals. The children will start making reports and work on a project.

- **Class 5 (ages 10 and 11)**

By the time the child reaches Class 5, they have achieved a kind of elegant balance in the proportions of their body and the ripeness of their intellect. Mythology now approaches early history, looking at the early civilizations of India, Persia, Babylonia and Egypt, moving on to classical ancient Greece and the year culminates in a trip to the national Olympic Games staged by all Steiner schools. Geography becomes regional, with a study of the British Isles and nature study takes the form of botany. English work develops with direct speech, converting from active to passive voice, punctuation, more tenses and vocabulary work. In maths, the decimal system is introduced, as well as percentages. All previous mathematical subjects will continue to be practiced.

Class 6 (ages 11 and 12)

During Class 6 the curriculum seeks to stimulate the child's growing curiosity about the world they live in. While studying the natural sciences (geography, geology, botany and physics) the teacher directs attention to the laws of natural phenomena. In physics, for example, gravity, magnetism, heat, light and sound are looked at. In geography the configurations of the earth's layers and landmasses are investigated, focusing on Europe, her peoples and cultures. The Mineralogy Main Lesson concentrates on discovering the substance and materials of the earth. Other areas to be explored are the oil refinery (with its environmental implications), the coal mine and the extraction of metals from the earth (with particular reference to iron ore and the blast furnace.) Through the study of history the children encounter the natural law of cause and effect. Their growing capacity to think causally is deepened by sequencing of the subject matter so that the past can be seen as a meaningful process leading up to present times. In this journey it becomes evident that the human race has played a profoundly influential role in shaping history. The study emerges out of the myths and legends of Ancient Greece and begins in earnest with Alexander the Great, moves on to the rise and fall of the Roman Empire and culminates in the Middle Ages and Islam. Trips might include Roman sites eg Hadrian's Wall.

Class 7 (ages 12 and 13)

The main theme for Class 7 is an exploration of the transition in history from the Middle Ages to the Renaissance, and the Age of Discovery with the great voyages of the 15th to the 17th centuries. In keeping with the Steiner principle of teaching reflecting the child's development, these topics mirror the child's own transition into adolescence. They are on the cusp of the great discoveries, new vistas and perilous trials that encompass adolescence. At this stage, the child's potential for depth of feeling is increased and the music and art of the Renaissance meet that in the curriculum. Class 7 is a year of feeling, and feeling in balance. To complement this, in their art classes pupils produce beautiful views of Venice and other pieces reflecting the mood and style of the Renaissance, and are capable of producing very mature work. Other Main Lesson themes for Class 7 include astronomy and studies of the night sky, linking with the voyages of discovery. Geography encompasses the study of a continent, looking at the cultural, material and economic conditions of human societies. Graphs and algebra are introduced in maths, whilst continuing to build on geometry.

Class 8 (ages 13 and 14)
The teacher's role is to guide the pupils gradually into independent thinking and facilitate their increasing knowledge and power of deduction. The pupils begin to analyse subjects and ideas critically and become less dependent on the teacher's authority. In this final year, each pupil has to work independently on a substantial project of their own choosing, and the Class 8 play is considered a major event in the school calendar. English lessons continue with literature study, creative writing and narrative and descriptive prose. Maths continues with more complex arithmetic using roots and powers, compound interest and surface areas, and the five basic Platonic solids are calculated and constructed, whilst algebra continues with the theory of equations, introducing more variables. Physics covers magnetism, electricity, and electromagnetism; organic chemistry studies substances which build up the human body whilst biology examines, the human eye and the muscles and bone. An astronomy block builds on the work done in Class 7. History lessons this year cover the major trends in the development of Western culture from the 17th Century to the present, examining in particular revolutionary periods, both political and economic. Biographies of inventors, industrialists and social reformers are an on-going feature in these lessons.

- **Combined Classes**

Cambridge Steiner School works towards a combined class model. Combined year-group classes are the norm in many smaller schools across the UK and around the world - at both Steiner and other state and independent schools. The classes consist of children covering an age range of more or less two years. There are many ways to teach combined classes and the Waldorf curriculum lends itself particularly well to this approach.

The curriculum has been likened to an ascending spiral - subjects are revisited several times, with each new exposure affording greater depth and new insights. As the children grow and move up the school, they naturally encounter the development of each subject. A combined curriculum gives a valuable opportunity for this to happen over an extended period of time, some children deepening their experience of a subject they are returning to, while others are experiencing where the curriculum will take them in the future.

Above all, the role of the teacher becomes key to delivering material that fosters the unique educational needs of each child. Often the teacher will present the same content to the class as a whole, but will deliver it with differentiation in an age appropriate and ability appropriate way.

There are many advantages to this form of learning, both social and academic. The children gain experience from helping, and being helped by, others across a broad range of subjects; and it reinforces the recapitulation, or re-living of material - a key element of the Steiner Waldorf approach.

Cambridge Steiner School

Lesson Allocation – Indicative content

INDICATIVE CONTENT MAIN LESSON BLOCKS PER YEAR GROUP (daily 2 hour lesson) based on a spread of 10 blocks, 3-4 weeks in length, plus an end of year review			
Class 1		**Class 6**	
Form Drawing	1	Literacy / Drama	1
Literacy	3	Numeracy	2
Numeracy	3	History - Romans	2
Humanities & Science	2	Geology	1
Class Play	1	Geography - Europe	1
		Science: Nature Study (further study of animal and plant kingdoms); Physics	3
Class 2			
Form Drawing	1	**Class 7**	
Literacy	3	Literacy / Drama	1
Numeracy	3	Maths (algebra)	2
Humanities & Science: Nature Study / Home Surroundings	2	History	2
Class Play	1	Geography	1
		Nature Study (human physiology - health and nutrition)	1
Class 3		Physics	1
Literacy / Old Testament / Drama	3	Chemistry	1
Numeracy	4	Astronomy	1
Farming	1		
Building	1	**Class 8**	
Local Trades	1	Literacy / Drama	2
		Maths (platonic solids and algebra)	1
Class 4		History	2
Literacy / Norse Mythology / Drama	3	Geography	1
Numeracy	3	Nature Study (human anatomy)	1
Local Geography and History	2	Physics	1
Science: Nature Study (human and animal)	2	Chemistry	1
		Meteorology	1
Class 5			
Literacy / Greek Mythology / Drama	3		
Numeracy	3		
UK Geography	2		
Science: Nature Study (botany)	2		

Subject Lessons in the Lower School – INDICATIVE CONTENT								
SUBJECT LESSONS 20 per week (40/45 minutes)	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8
Creative/Artistic Education								
Art / Painting / Form Drawing	2	2	2	2	2	2	2	2
Modelling	1	1	1	0	0	0	0	0
Handwork	2	2	2	2	2	2	2	2
Overall percentage	*25%*	*25%*	*25%*	*20%*	*20%*	*20%*	*20%*	*20%*
Practical Skills/Physical Education								
Games	0	0	1	2	2	2	2	2
Outdoor Education (inc gardening on rotation)	4	4	4	4	4	4	4	4
Eurythmy	0*	0*	1	1	1	0*	0*	0*
Overall percentage	*20%*	*20%*	*30%*	*35%*	*35%*	*30%*	*30%*	*30%*
Languages and Music								
French	2	2	2	2	2	2	2	2
German	2	2	2	2	2	2	2	2
Music	1	1	1	1	1	1	1	1
Overall percentage	*25%*	*25%*	*25%*	*25%*	*25%*	*25%*	*25%*	*25%*
Social Development/Habit Building								
Golden Time	3	1	0	0	0	0	0	0
Rest Afternoon	2	2	0	0	0	0	0	0
Taking Care	1	1	1	1	1	1	1	1
Overall percentage	*30%*	*20%*	*5%*	*5%*	*5%*	*5%*	*5%*	*5%*
Intellectual broadening								
Literacy / Numeracy/ Practice / ML extension / Journaling	0	1	3	3	3	4	4	4
Overall percentage	*0%*	*10%*	*15%*	*15%*	*15%*	*20%*	*20%*	*20%*

*Eurythmy taking place within ML / alternated with another subject

Meeting the different aptitudes and needs of the pupils

- Our curriculum is designed to meet the needs of a broad spectrum of learners: balanced weight is given to academic, artistic and practical subjects.
- Within each lesson there should be a range of activities: discussion, hands on activities, storytelling, focused individual work, group work and artistic elements.
- In order to help nurture a healthy social life in the class and a sense of inclusion, we feel it is important that all children in the class learn the same content especially in Main lesson as this is the core learning theme. The teacher will endeavour to present this material in a variety of ways so that all learning profiles are catered for. The structure of the Main lesson block is very helpful in this regard; it allows the teacher to revisit the same topic using a diversity of approaches over the course of the three to four week block.
- At certain times, children are encouraged to choose how to convey what they have learned. E.g. in free rendering recall there is a range of media available and the children decide how they will express their understanding of the material. This allows them to determine the approach that is most natural to them and that plays to their strengths.
- The teacher will set tasks based on their creative presentation of a theme. Where appropriate, they will set a variety of tasks so that all abilities and learning styles are met.
- Maths is taught using a variety of kinesthetic and visual aids: pebble maths, numicon and Cuisenaire rods. We also use open ended investigations and problem solving activities that can be accessed by all learners but that can be taken further by the most able. Nrich.maths.org is an excellent source of practical problems. We especially use these activities to stretch the high achievers without having to introduce new content. There is an emphasis on mental arithmetic. Children are encouraged to explore different strategies for solving a problem and to employ those that they feel most comfortable with.
- Nurturing peer support creates an inclusive and positive learning environment.

BREADTH AND DEPTH OF LEARNING

Humanities: A rich immersion in the humanities begins in Class 1, as each day children listen with rapt attention as the teacher tells a fairy tale or nature story. Progressing through the classes, the children absorb the legends of saints, multicultural folklore, Native American tales, Norse mythology and sagas; stories of Ancient India, Persia, Mesopotamia, Egypt and Greece; the History of Western civilization from Rome through the Middle Ages, the rise of Islam, the Age of Exploration, the Renaissance and Reformation, the French Revolution, Industrial Revolution, The Cold War up till the present day. In the early years, by "living into" these cultures through legends and literature, children gain flexibility and an appreciation for the diversity of mankind.

The study of geography as a separate subject begins in Class 4 and starts with a study of the immediate environment, broadening out in the following years to regional, national and global studies.

● Class 4 – The study of the geography and history of the local area. Focusing on the unique geography of the Fens, myths and legends of the country, their formation, traditional way of life, their drainage and cultivation. Visits to local Fenlands. The Local History and Geography of Cambridge. Visit to the city of Cambridge and the Colleges. The Strawberry Fair in Cambridge was one of the largest Medieval Fairs in the world. Study the unique culture and landscape of the chalk belt. Visit Chalk pits. Practical map making activities of the local environment. The main purpose is to link human activity to the natural environment.

● Class 5 – Geography of the British Isles. Again the emphasis is on connecting the physical geography with human activity for example, mining developed in mountainous and coastal regions where rocks were exposed and minerals closer to the surface, large towns often developed by estuaries that were ideal ports etc. The variations in topography, climate and agriculture are explored. History: The culture and religion of early civilisations of India, Persia, Babylonia and Egypt, moving on to classical ancient Greek history. A focus is on what influences of these societies can still be seen today? For example the cultivation of particular crops, the etymology of words, philosophical and political ideas, mathematics, art and architecture. The birth of democracy in Athens will be a particular focus. A study of the ancient literature of those peoples: The Mahabharata, the Ramayana, Gilgamesh, Myths of Isis and Osiris. The Iliad and the Odyssey.

● Class 6 – European physical and human geography. Each child completes an extended project on a European country of their choice and gives a presentation. Contrasting environments will be studied for example the Alps and Holland to see what impact this has on the culture and economy of a people. History: Roman from Kingdom to Republic to Empire. Roman Law that forms the basis of many countries legal systems. Practical projects based on Roman engineering for example making brick arches. Roman Britain; field trip to Roman site, the rise of Christianity, Saxon and Danish invasions of Britain, Alfred the Great, William the Conqueror. The Rise of Islam: the life of Muhammad, Islamic contributions to art, mathematics and philosophy. Visit to the local Mosque.

● Class 7 – World geography, including focus on one continent and looking at the cultural, material and economic conditions of specific societies. Study of World wind and current patterns and its influence on the Age of Exploration. History: the Middle Ages and the transition from feudalism to the Renaissance and biographies of key figures such as Leonardo Di Vinci. The Age of Discovery with the great voyages of the 15th to the 17th centuries. A history of the Slave Trade and its abolition, biographies such as Equiano (a freed slave) and William Wilberforce. The Reformation, brought about by the Hegemony and corruption of the Catholic Church the life of Martin Luther.

● Class 8 – World Geography, including meteorology; history – western culture from the 17th Century to the present, examining in particular revolutionary periods, including the English Reformation and Civil War and the revolutions in America, France and Russia, Napoleon and the Napoleonic Wars. Biographies of inventors, industrialists and social reformers for example; James Watt, Kier Hardy, James Cadbury, Emeline Pankhurst and Emily Hobhouse. The British Empire: Imperialism and Colonialism. The World Wars and the holocaust. The founding of the United Nations. The Cold War. The Digital age.

Modern Foreign Languages: From Class 1 onwards, children learn a wide range of French and German vocabulary and short phrases through songs, verses, poems, recitation, games and cultural activities. In these earlier years the emphasis is on listening and speaking: the children internalise the new sounds of a language and are more able to pronounce them accurately whilst their innate language instinct is still more present. The written language is introduced towards the end of Class 3 or beginning of Class 4 where pupils also begin to gain an understanding of the grammar, spelling, phonics and structure of the language. In the older classes there are occasionally opportunities for individual exchanges and pupils from overseas Steiner schools sometimes visit us.

Technology and ICT: Pupils are introduced to a wide range of simple technologies through their practical creative work starting with cooking and sewing. As they get older this develops to include gardening, building, woodwork, pottery, flint knapping and metalwork. In these activities they use an increasing range of hand tools, and learn how mechanical tools function. E-safety is introduced in an age appropriate manner from the Sunbeam year in Kindergarten. This continues and develops in the Lower School as pupils develop an understanding of a range of mechanical technologies in the broad context of other disciplines. From around Class 6 onwards the children are taught to use computers within the class as a research tool. Touch typing is also introduced.

Religious Education: The moral and spiritual well-being of the children is nurtured by developing a strong sense of belonging for all children whatever their faith background. This is achieved through a calendar of seasonal festivals from around the world that the school celebrates together. A sense of reverence and an attitude of tolerance and respect towards each other is encouraged and modelled by the teachers and reinforced by verses said at the beginning and end of the day. Festivals from different religious traditions are celebrated, particularly when a child within the class is part of a religious community. World religions and the diverse cultures that embody them are studied during the Main lesson blocks including stories, songs and dances: Stories of holy people and Saints from diverse traditions in class 2, Judaism in class 3, Buddhism, Zoroastrianism and Hinduism in class 5, Islam and Christianity in Class 6. Pupils develop a well-informed understanding of world religions, and a strong sense of the value of community and of the wonder of the natural world. Through the Outdoor curriculum we attempt to foster a deep connection and love of the natural world. The Rites of Passage curriculum which is part of our Outdoor Curriculum aims at guiding the child to a deeper sense of self-awareness and purpose and into exploring the bigger questions in life for themselves. It also encourages them to develop open and trusting relationships with their peers and to talk about personal and profound matters with them.

Eurythmy is an art of movement that engages the whole human being. It aims to harmonise the child physical well-being with their feelings or emotions. Regular eurythmy practice lessons help children to become more coordinated, graceful and alert and to be more at ease with themselves. In the eurythmy lesson the children move to poetry, prose text and live instrumental music and this experience deepens their aesthetic appreciation of literature and music and complements other aspects of the curriculum. Eurythmy also requires the children to work in groups which develops spatial awareness and a capacity to sense the movements of the group as a whole, while also concentrating on their own movement.

Physical Education: There is both integrated and discrete physical education. Integrated physical education includes the movement exercises that come at the beginning of Main Lesson to help the pupils to settle their focus for learning. The use of rhythm and movement may come into many lessons, such as maths where pupils, for example may throw and catch beanbags as they recite times tables, or a foreign language, where pupils might follow a sequence of movements when learning parts of the body. Weekly games lessons include a wide range of team games. In the younger classes games are often introduced with a story so that the physical activity has an imaginative focus. Around Class 5 the ancient Greek Olympic events are introduced: running, jumping, discus and javelin. Ball games are introduced with rules tailored to the age group. From Class 6 to class 8, formal sports are taught. This takes place at a local sports hall and introduces the pupils to a broad range of activities including football and badminton, basketball, handball and volleyball.

The Natural Environment: The curriculum respects the restorative benefits of the natural world. We have our own Outdoor curriculum and Outdoor Classroom Teacher. The Outdoor programme includes outdoor crafts: pottery, green woodwork, basketry, (flint knapping and metal work lead by external providers). Children experience harvesting and purifying the clay as well as building kilns. It also includes outdoor games, practical outdoor activities linked to the Main lesson, bush crafts and nature walks, foraging, tracking, navigation, weather forecasting and expedition planning. Each class has an Outdoor day in which they spend from 11:15-15:00 outdoors. The Outdoor curriculum runs parallel to the Main Lessons following the same themes where possible and enriching and deepening the children's experience of them. Craft and project based lessons run in the school grounds, we also visit local Wild life Reserves regularly. A range of field trips connected to the curriculum also form part of the Outdoor Curriculum.

Gardening: enables children to develop a deeper appreciation for and awareness of the human being's relationship to the natural world. By caring for the garden, experiencing the growth of plants, and harvesting what they give us, the children develop a deeper consciousness and appreciation for the earth. It is an opportunity to temporarily escape the fast-paced world of human society and to slow down and relax, taking the time to notice the details of nature and to use all five senses to experience the world more deeply. The children take great pride in participating in the production of the food they can eat. From seeds to seedlings and from planting to harvest, the children weed, water, and tend to vegetables, herbs, flowers, and fruits. They enjoy harvesting and learning to prepare what they have grown – and then eating it!

Science: A curiosity in the natural world is nurtured right from the Kindergarten years and much is learned through the children's free interactions with the natural world and extended time spent within it.

- Classes 1 and 2- Nature studies are introduced in class 1 and 2. Through stories and observation children learn the phases of the moon, the rhythms of day and night and winter and summer, as well becoming familiar with some common local flora and fauna.
- Class 3 – Main Lessons on time explore the subject through hands on experiences of different ways of measuring times: making sundials, understanding the roots of time in the relationship between the sun and the earth, making water clocks, and candle clocks.
- Class 4 - There is a Main lesson on The Human Being and The Animal, when the class is

presented with a project that focuses on the creatures that move in and around the earth. The children will learn about the special adaptations that animals have developed to help them master survival in their environment/habitat. This is contrasted with humans who are not masters of one thing like most animals, but are open to learn many things and to transform their environment through language, uprightness, skilful hands and intelligence. Then the animal theme is continued looking at animals that are native to our islands. Each child will complete a project on an animal of their choosing and give a presentation to the class.

- Class 5 - The focus in the science Main Lesson shifts one step closer to the earth itself with the study of the plant kingdom. An emphasis is on observing plants in their natural environment, the processes growth of flowering and fruiting. The focus is on a phenomenological approach as outlined in Goethe's seminal work "the metamorphosis of plants that see plants as a living process through time. The evolution of plants from algaes, to mosses, ferns and flowering plants is also brought in a pictorial and age appropriate fashion.
- Class 6 – The scientific focus moves on to the earth itself, with a Main Lesson in Mineralogy. In these Main Lessons the scientific approach stresses the activity of the senses rather than the activity of dissecting and analysing the parts, because children at this stage learn most through what they can see, hear, smell, taste or touch. The aim is to bring the children's senses to life and school their ability to make observations about natural phenomena. In class 6 Physics lessons nurture the children's ability to observe and question these phenomena. They will observe and take part in demonstrations to show the properties of light, heat, sound, magnetism and static electricity. The

children are then encouraged to think for themselves about the observations that they have made and what conclusions might be drawn. They are then guided to build open concepts based on these experiences and conclusions. Erroneous conclusions might be corrected or adjusted through further observations. Through a highly experiential approach science lessons are full of fun, joy, wonder and questioning. Sexual education is also introduced in class 6 through a life cycles Main Lesson.

- Class 7 - The five concepts above are revisited, now the relationship between electricity and magnetism is studied as is current electricity. Basic mechanics is also introduced: pulleys, the classes of levers and incline planes and the idea of mechanical advantage. There is a new emphasis on measurement and a quantative approach that reflects the child's increasing objectivity. Biographies of the scientists who made these discoveries help to bring the subject to life and to provide a context. The first Chemistry lesson is on Inorganic Chemistry in class 7. It includes an exploration of the following: combustion, acids, bases, the lime cycle (through making lime in a lime kiln), oxygen, hydrogen, carbon dioxide, Metals. They will also learn about Nutrition, the senses and the workings of the major organs of the human body and connect this with an understanding of how to keep their body healthy.
- Class 8 - the main lessons for Science include Human anatomy, a particular emphasis is based on the study of the human skeleton and the human beings remarkable adaptations for bipedalism. Organic Chemistry focuses on a study of fats, proteins and carbohydrates and fermentation; their origins, functions in the body and uses in industry and the food industry. This may be the enhanced by the practical experience of making soap, paper, yogurt, cheese and more. In Class 8 Physics a study of atmospheric pressure and Latent heat paves the way for an understanding of the steam engine in the industrial revolution. In class 8 the pupils own practical scientific skills are honed.

Music is taught in an integrated way and as a separate subject. Singing and recorder playing is used in Main Lesson in a wide variety of contexts and all children sing daily. In the weekly music lesson all pupils learn musical notation and pupils have the opportunity to learn other musical instruments.

Art is taught in an integrated way and as a separate subject. Artistic work is an integral part of the Main Lesson and is used in a wide variety of contexts. Pupils have opportunities to learn a wide range of art techniques in weekly art lessons. Care is taken to introduce good foundational skills. Top quality materials are used so that the children develop an intuitive sense of beauty, harmony and aesthetics. In classes 1-5 the children work with colour, developing their sense of colour through watercolour painting, crayon and pencil drawing. In drawing outlines are avoided, instead the children learn to work in planes of colour. Some drawings and paintings are guided, at other times the children work from their imagination often drawing the images from story content. In classes 1 and 2 paintings explore colour in its pure form without any figurative content. From class 3 paintings gradually become more figurative. Through this extended work with pure colour the children develop an intuitive understanding of colour that they can bring to their own creations later on. In class 6 light and dark is studied in parallel with the physics block. Black and white drawing explores how form arise out of the interplay between light and dark, first through formal exercises and then through life study of simple geometric forms. In class 7, the children study the laws of perspective within the context of the renaissance, once mastered these laws can be applied to create elaborate and complex compositions. In class 8 life drawing now includes organic forms and objects. Layered painting is introduced. Modelling is also an important part of the art curriculum as it helps develop a sense of form. In classes 1-3 the children model coloured beeswax figures and animals from stories. From class 3 clay work is introduced. From class 6 lino printing is also explored.

Handwork is an integral part of the curriculum for all children from Class 1 to Class 8. It provides a balancing element to the intellectual activities experienced elsewhere in the curriculum and is designed to aid the harmonious development of the child. The scheme of work is taken from Rudolf Steiner's indications, which outline examples of activities that match the developmental stage of the child, ensure progression and are tailored to suit the needs of the teaching group. Examples of Handwork skills that are taught in the weekly lesson include sewing, knitting, crochet, weaving, tailoring, dyeing and felting, with importance placed on the use of high quality, beautiful and natural materials in order to enhance the artistic and creative development of the child.

Taking Care provides a space for the children to work practically with their environment and contribute to the community. Work is often project based i.e. maintaining an area of the school garden or creating a school newspaper, as well as taking care of their own classroom.

Cambridge Steiner School

Curriculum Framework – Key Concepts and Skills

LITERACY - Learning Opportunities

Kindergarten	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8
WRITING								
Children's have the fine motor skills necessary to begin to learn to write (e.g. able to sew and use both block and stick crayons)	Understand that writing is speaking on paper Use crayon sticks or coloured pencils with correct pencil hold Develop good posture for writing, good position of book/paper on desk for writing Understand the three directions of space in books: up/down, left/right, front/back Write their own name Recognise sounds, shapes and names of all vowels and consonants in capital and lower case letters Write high frequency words is, a, the, I, for, of, are, was, all, to, and, but Use their phonic knowledge to write simple regular words Make phonetically plausible attempts at more complex words and sentences (emergent writing) Begin to sequence sentences to form simple narratives Begin to demarcate sentences with capital letters and full stops Recreate stories in self-created illustrated 'book'	Write in cursive script Write digraphs sh, th, ch, wh, ph, gh ee, oo, ei, ea, ai ow, ew, aw y as vowel and consonant (extended code) Write and spell correctly days of week, months, numbers and other familiar topics Write high frequency words as was, were, are, said, their/ there, have Hear when a sentence starts and stops Use capital letters and full stops when writing simple sentences Begin to use question marks with some accuracy Illustrate with simple text some direct experiences or scenes from stories Begin to date their work Recognise the basic structure of literature – beginning, middle, end	Identify and use verbs, nouns, adjectives and adverbs Write in well-formed cursive script Understand and use more technical vocabulary connected to curriculum focus, eg farming, trades, ecology Write short descriptions/accounts of recent events or stories Write about an event in the correct sequence Write down short dictated passages Become familiar with book format: author, title, chapters, headings and uses these in class work Write a simple outline of a chosen book Understand that commas indicate pauses Use commas to separate items in lists Answer simple comprehension questions in full sentences To re-read and self-correct own writing	Write with an ink pen Know how to use a dictionary Recognise and work with typical features of texts and books: alphabetical order, chapters, index, glossary Spell irregular plurals Use more irregular families of spellings accurately Use commas, exclamation and question marks and knows that speech is separated by quotation marks Write an accurate account of events or stories heard in class Recognise and begin to use types of sentences: statement, command, question, exclamation Begin to write direct speech in retelling stories Show understanding of texts through comprehension exercises Plan, research, and write text to accompany individual projects Is able to read out own handwritten work to the class	Use a dictionary and thesaurus independently to find unfamiliar words for spelling and meaning Use common suffixes and prefixes Use a thesaurus to explore synonyms and antonyms Understand the purpose and use appropriate punctuation: semi-colon, colon, hyphen, brackets Use speech marks for direct speech Use the apostrophe correctly Characterise and use all major parts of speech: nouns, verbs, adjectives, adverbs, prepositions (time and space), articles, conjunctions, interjections Use simple and continuous verb forms in all tenses, including present Take down a dictation on a known subject with reasonable accuracy Be confident to write a summary of a book, highlighting description	Use present perfect tense in simple and continuous forms (simple form speech marks 'I have walked' and continuous form 'I have been walking') Use direct and reported speech correctly Understand the correct use of comma, semi-colon and colon Understand the main parts of a sentence: subject, predicate, direct and indirect objects Understand different meaning of modal verbs: can, may, should, ought, would Write a formal letter (business, complaint, enquiry) Write in the style of a personal diary or blog (account of a school trip) Make notes summarising a spoken presentation, following a recall session Write an accurate account of a practical task (science demonstration) Write in the style of another person (historical character)	Understand noun, adverbial and prepositional phrases Understand subordinate and relative clauses Use an etymological dictionary Use verb moods including. Indicative imperative, interrogative, subjunctive and conditional Compose a poem with a specified structure using rhythm, rhyme and metre Write a descriptive story from imagination Write a fictional story which is believable Create and write about a character in depth Begin using essay structure in writing a response to a specified topic Recognise essay structure a tool to organise thoughts Take down notes from teachers and classmates presentations Make summaries of per presentations Write up clear, organised, step-by-step science experiments	Observe and accurately record scientific phenomena Understand and use knowledge of literary and rhetorical devices to enhance the impact of written word Use the essay structure in a variety of different writing tasks Write character studies revealing temperament a disposition as well as physical traits Support statement in written work with evidence Write in a variety of styles and from different perspectives Summarise, take notes and begin to analyse character motivation and authorial voice in written responses Plan, record and self-evaluate achievement in preparing an extended, self-chosen project

	Prepare for introduction of cursive handwriting in class 2			Understand that writing styles vary according to subject matter	of main characters and events Write in different styles or moods and understand how writing can influence the reader Learn to think about the audience you are writing for Edit their own text Recognise and understand the use of paragraphs Use appropriate organisation or heading Write from own or a different point of view Write from own research on a given main lesson topic Identify and use metaphors and similes Order the steps of an instruction correctly	Develop understanding of implicit and inferred meaning in text	Understand and use various styles of writing and their applications Understand registers and apply when writing Use bullet points, spider diagrams and notes	
READING								
Encoding: Children can clap or move in time to music. They can clap out the syllables of their name and other words (Ann-a-bel). Structuring: Children demonstrate a desire to communicate through the medium of text. They are conscious in mark making, decide what shapes or words to draw or write, and represent these on paper. Decoding: (spelling recognition, blending,	Recognise the sounds of all the vowels and consonants Read all vowels and consonants sounds in capital and lower case letters Read the high frequency words is, a, the, I, for, of, are, was, all, to, and, but Read and understand their own writing and classroom displays	Read digraphs sh, th, ch, wh, ph, gh ee, oo, ei, ea, ai ow, ew, aw y as vowel and consonant Read steadily, showing familiarity with sound blends Recognise days of week, months, numbers in written form Read high frequency words such as was, were, are, said, their/ there, have To pause at full stops. Read questions using correct intonation	Recognise common homophones Read with increasing fluency Use appropriate expression when reading Read silently and aloud Give an oral report on a book to peers Begin to read unfamiliar texts by using contextual, semantic, grammatical and phonetic knowledge and clues Use strategies of re-reading and self-correcting when reading aloud Recognise and spell common phonic patterns	Make a reasonable attempt at unknown words in a text using a variety of clues Read simple chapter books confidently and independently Begin to use dictionaries to explore word meanings Understand words of degree Write a simple first-person account of a historical or mythological incident Begin to be aware that books can provide imaginative experiences of	Read chapter books confidently and independently Read aloud with expression and awareness of punctuation including direct speech Use a dictionary and thesaurus to find the meaning of unfamiliar words Read confidently from their main lesson book Read books with a range of styles and content Give a verbal summary of a book's contents	Understand and describe how a writer appeals to different types of reader or audience Use a thesaurus Use books as reference resource for independent study Extract the information that is required from a text Read books in a range of styles and give a verbal summary of the main content Use direct and inferred understanding of the text when reading Use a range of sources when reading.	Understand the writer's use of poetic structures: rhythm, rhyme and metre Become familiar with use and meaning of figurative devices, alliteration, onomatopoeia, assonance, simile, metaphor, personification, perspective Understand and describe how a writer focuses on character and mood Explain why a particular book is liked or chosen in a book	Become familiar with use and meaning of figurative devices: proverb, idiom, aphorism, paradox, analogy and antithesis Distinguish between formal language, idiom, slang and jargon Recognise and discuss poetic style Characterise lyric, narrative, epic poetry Read and understand some key elements of a classic literary fiction or drama: theme, plot, protagonist, recurring imagery Choose and read a wide rage of books

phoneme manipulation) Children can hear and say rhymes, and identify words which begin with the same letter (e.g alliteration using tongue twisters). Comprehension and Connection: Children have a love of story. They are familiar with a range of story structures (repetitive, simple story arc) and anticipate a refrain or what might happen next. Research Skills: Children are aware that information can be retrieved from non-fiction books .		Recognise difference between naming and doing words Recognise and spell common phonic patterns. Recognise and spell increasing bank of sight words	Recognise and spell increasing bank of sight words Understand silent letters, digraphs, long vowels in spelling patterns Begin to develop empathy through connecting to characters and events in chosen texts	different cultural and historical events Understand different genres as well as fact and fiction	Read different types of text for enjoyment, research, instructions Understand that authors use language, plot and character to engage readers	Recognise the difference between trustworthy and untrustworthy sources	review, oral and written Understand and use some literary terminology and the vocabulary of poetic techniques	independently for challenge, interest and enjoyment Make critical comparisons between chosen texts Understand bias, inference, emotive and objective writing
SPEAKING AND LISTENING								
Listening: Children increasingly maintain and sustain attention. They listen carefully to and retain details of stories and conversations. They can divide their attention appropriately in a wide range of situations. Understanding: Children understand increasingly complex stories, and have a more sophisticated understanding of nuance. They are beginning to understand the intent	Identify separate spoken sounds in words Seek support by asking questions Recite in chorus (morning verse, rhymes, poems, class plays) Retell the sequence of events in teacher-presented stories Enact with peers simple scenes from stories Listen to teachers and other children, maintaining focus in groups and as part of the whole class Share news with the class	Recite aloud short verses alone (e.g. Birthday verse) and recite some lines of a poem alone Perform short plays in chorus Speak simple speech exercises and tongue twisters in chorus Recite the alphabet accurately forwards and backwards Listen to and follow verbal instructions given by teachers in all subjects Recall main points of a story told by the teacher	Give a clear explanation of what they are doing to an inquirer Recall more complex events and stories, using language appropriate to the genre Listen and respond to specific instructions Is able to accurately repeat back an instruction	Hold some individual lines or part in a short drama Understand and respond to various levels of formality in interactions inside and outside the classroom Present a book report to peers, reading from own writing and making some eye contact with audience Present a book report to peers, with description of main character and events: 'I liked it because…' Listen respectfully to another point of view in collaborative work	Take an individual role in a class drama Recreate and perform literary texts imaginatively Is able to perform on stage before the school community Plan, rehearse and deliver presentations on a range of information Give a more in- depth presentation in front of the class using notes Give constructive feedback based on listening to their peers Articulate in-depth questions and enter into lively discussions	Recite own birthday verse each week throughout the year Join in a debate on a chosen theme as part of a group Listen to the contribution of other speakers as part of a debate Give a short presentation of a topic using notes only as a prompt Perform an individual role in a class play Contribute with confidence to class discussion during recall session	Recite own birthday verse each week throughout the year Recite school verses collectively Recite selected poetry collectively Use own research and writing as basis of a class debate on a chosen subject Understand and use persuasion and a clear argument in class discussion Explain and begin to analyse some motives and causes of historical events Participate in small groups in collaborative	Recite own birthday verse each week throughout the year Participate in a class play inhabiting a role over several performances Work in collaboration with all classmates in improvised drama Project voice confidently and expressively in a full length drama production over several performances Present an extended project to a wide audience using research material and/or explain a

of the speaker, interpreting what is behind a person's words. They carry out detailed sequential instructions. Speaking: Children order their ideas in a logical sequence. They use a range of vocabulary in imaginative ways to add information, express ideas , recreate roles or explain events. They show some awareness of the listener, recount experiences and imagine possibilities.	Interact with others and respect turn-taking in conversations Listen and respond to simple instructions Experience grammatical elements embedded in rich oral language environment of classroom	Retell narratives in the correct sequence, drawing on the language patterns of stories (once upon a time, who, where, what, why, how) Recognise the basic structure of literature – beginning, middle, end Experience form in literature through reciting rhythmic and rhyming verses		Create own verses derived from lesson content	on a wide range of topics Speak audibly and fluently, using Standard English	Listen to a teacher or peer presentation and prepare questions that show independent thinking Give constructive feedback after listening to or observing peers	work and clearly report findings to class Work constructively in pairs to a timescale and present an outcome Participate sensitively in resolving social friction Perform independently in class plays Deliver a presentation to peers and teachers: make eye contact with audience and answer questions showing further knowledge Prepare short speeches on given topics	process involved in creating a physical object Answer searching questions about the chosen project from the audience Respond to questions and challenges following a presentation from own research Articulate complex ideas and thoughts in an organised and clear manner Improvise, rehearse and perform play scripts and poetry with confidence Recite and meaningfully enliven classical and humorous dramatic pieces

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Curriculum Framework – Key Concepts and Skills

NUMERACY - Learning Opportunities

Class 1	Class 2	Class 3	Class 4	Kindergarten	Class 5	Class 6	Class 7	Class 8
Can estimate numbers up to 24 and beyond.	Can fluently count to 100 and back counting on from any given number and is at ease with counting up to 1000.	Can fluently count numbers up to 1000 and is at ease with numbers up to a million.	Is confident with counting numbers into millions. Can count in fractions; Knows what the Greatest common factors, the Least common multiples and the common denominators are.	NUMBER	Is confident with counting numbers into a million; is confident with fractions and decimal fractions up to several digits behind the point. Can round decimals.	Select and use appropriate strategies for familiar and unfamiliar problems, including multi-step problems.	Derive and develop a range of strategies for approaching algebraic problems, and evaluate outcomes.	Make and test conjectures about patterns and relationships; look for proofs or counterexamples.
Can lay out numbers with objects up to 20 by using the 5 structure and recognise numbers as whole entities just by looking at them.	Can estimate numbers up to 100 and beyond.	Can estimate numbers up 1000 and beyond; can also estimate time, money, distance, weight and volume.	Can estimate numbers into millions, practical sums with money and measurements and fractions.	Children have an emerging 'number sense', understanding that a number denotes a specific quantity.	Can estimate measurements, fractions, decimal fractions.	Move freely between different numerical representations, e.g. equivalent fractions, fractions and decimals.	Move freely between verbal, numeric, and algebraic representations.	Move freely between numeric, algebraic, graphical and diagrammatic representations.
Can read and write Roman Numerals up to XII and Arabic Numerals up to 100.	Can lay out numbers up to 1000 by using the place value set and recognise them as entity.	Recognises coins and notes and can combine them to make different amounts. Can measure and weigh many different objects.	Can cut different objects (food, paper, cloth) into fractions and find equivalent fractions. A fraction envelope can be used for adding, subtracting, multiplying and dividing fractions.	Use comparative language of more, fewer, less. Recognise and use words of half, quarter and whole. .		Fluency with algorithmic thinking.	Develop algebraic, logical thinking.	Fluency with algebraic, logical thinking to generalise the structure of arithmetic.
Understands place value (T, U)	Can read and write numbers up to 1000.	Can read and write numbers up into thousands; can read and record non-standard and imperial measurements.	Can read and write numbers up into the millions; can read and write fractions.	Children can recite numbers 1-20 and beyond, often up to 100. They count accurately with correspondence to 20.	Can read and write fractions, mixed numbers, numbers with decimal fractions.	Use vocabulary appropriately.	Use vocabulary appropriately.	Use vocabulary appropriately.
Can count rhythmically in 2's, 3's, 4's, 5's and 10's.	Understands place value (Th, H, T, U)	Understands place value up into millions.	Understands place value fully and recognises where fractions fit in.		Understands the importance of place value for decimal fractions and how to line them up for vertical addition and subtraction.	Understand the application of mathematics in the world, including economically.	Understand the underlying mathematical structure of a variety of natural phenomena.	

	Can recite the times tables in sequence from 1-12 in chorus. Knows the division tables.	Knows the times and division tables in and out of sequence.	Knows the times and division tables in and out of sequence; some new tables between 13 – 25 are added;		Knows the times and division tables up to 12 in and out of sequence. Knows some more tables between 13 and 25 by heart;	Understand and use place value for integers and decimals of any size.		Understand number bases including binary.
Addition: Can regroup and combine numbers to make a larger quantity. Knows the symbol for addition and can do number stories and written equations with numbers up to 24 and beyond with and without manipulatives.	Addition: Can add up numbers to 100 and beyond horizontally, with carrying. Can do simple equations.	Addition: Can do vertical and horizontal addition up into the thousands with carrying.	Addition: Can do vertical addition up to 6-digit numbers and beyond. Can add up fractions by finding the lowest common denominator.		Addition: Can add up fractions with the same and different denominators and mixed numbers. Can add up numbers with decimal fractions vertically and horizontally.	Order positive and negative numbers, including decimals and fractions, on a number line, mentally. Work with the 4 operations and negative numbers.	Use positive and negative numbers in formulae, including equalities, inequalities, greater than and less than (= ≠ < > ≤ ≥).	Understand and use positive and negative numbers on graphs in all four quadrants.
Subtraction: Knows that subtraction means giving away. Can work out the difference by counting up Knows the symbol for subtraction and can do number stories and written equation up to 24 and beyond with and without manipulatives. .	Subtraction: Can subtract numbers horizontally up to 100 and beyond. Can work out the difference between a larger and smaller number and judge when best to use it. Knows all the different terminology for subtraction.	Subtraction: Can do vertical subtraction with borrowing. Horizontal subtraction to be continued.	Subtraction: Can do vertical subtraction with numbers 3-4-digit numbers and beyond. Can subtract fractions by finding the lowest common denominator.	They solve practical problems, identifying one more and one less, doubling and halving and sharing groups equally (e.g. pieces of an apple) and can solve practical problems that involve combining groups of e.g. 2,4 or 10. Recognise some numbers of significance	Subtraction: Can subtract fractions with the same and different denominators and mixed fractions. Can subtract numbers with decimal fractions.	Recognise relationships between the four operations such as reversibility, commutativity.	Use relationships between operations in working with formulae and equations.	
Multiplication: Knows that times means groups of. Can put objects into equal groups and count them. Knows the symbol for multiplication and can write simple multiplications down.	Multiplication: Can do written multiplications by using the times tables up to 12 x 12 and combine them with addition and subtraction.	Multiplication: Can do vertical multiplication with a single-digit-multiplier.	Multiplication: Can do vertical multiplication with two- and three-digit multipliers. Can multiply fractions and reduce them. Understands that x means of: one half of one half is one quarter;		Multiplication: Can multiply fractions and mixed numbers. Can multiply decimal fractions by 10, 100, 1000. Can multiply numbers with decimal fractions by a whole number.	Understand and use the standard order of operations (BIDMAS).	Use the standard order of operations in formulae and equations.	

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Division: Can share out numbers into equal amounts by using manipulatives or pictures. Knows the symbol for division and can write down simple division sums.	Division: Can do written divisions by using the division tables. Can combine them with multiplication and addition.	Division: Can do vertical divisions with a single digit divisor.	Division: Can do long division (three and four steps problems) with a two-digit divisor. Can divide fractions. Understands that divide means fitting into: how many times does ½ fit into 2?		Division: Can divide fractions and mixed numbers by flipping them over. Knows the divisibility rules for reducing fractions. Can divide decimals with a whole number in the divisor. Can do long division.	Powers/indices: squared	Powers and roots: squared, cubed, and beyond. Recognise powers of 2, 3, 4, 5.	Distinguish between exact roots and decimal approximations. Understand standard form.
Knows the number bonds up to 20.	Knows the addition and subtraction facts up to 24 by heart.	Knows the multiplication and division facts as well as the addition and subtraction facts.	Knows all the arithmetic facts by heart. New times tables and divisions with remainders are added.		Knows all the arithmetic facts heart. Knows some equivalent fractions by heart.	Work interchangeably with terminating decimals and corresponding fractions. Convert between percentages, fractions, decimals.		
Can distinguish between odd and even, ordinal and cardinal numbers.	Can recognise number patterns in the multiplication tables.		Knows what proper, improper and mixed fractions are. Knows what prime numbers are.		Knows square and triangular numbers, perfect, abundant and deficient numbers, prime factors.	Understand and work with prime numbers.	Understand and work with prime factors.	
Knows the days of the week.	Knows the months of the year.	Can tell the time; distance, weight, volume and money are introduced using non-standard and standard units of comparative measurement.	Knows the different measurements (metric) and starts with conversion problems.		Can convert measurements (linear, in the metric system (km, m, cm, mm etc).	Know and work with standard units of measure.	Understand and work with compound units of measure such as km/h.	
Can draw straight lines and curves in many different forms and sizes.	Can draw symmetrical forms on a horizontal and vertical axis; draws the geometrical patterns of the times tables on the 12 or 10 circle.	Can draw mirrored forms on a diagonal axis.	Can draw knot forms.	SPACE AND MEASURE	Can do free hand drawings of geometrical shapes: circle, square, rectangle, triangle, angles, the division of the circle.	Work confidently with rounding and approximation.		Using a calculator.
Can do word problems and number stories up to 24.	Can do word problems and number stories up to 100.	Can do word problems with money and simple measurements.	Can do word problems with money, measurements and fractions.	Children have a conceptual understanding of the passing and scale of time, including past,	Can do word problems with fractions and decimal fractions and conversion problems.	Understand the concept of infinity.	Understand there are different sizes of infinity.	

				present and future tenses.				
Quantitative values of numbers. Can reliably count objects with 1 to 1 correspondence.				They understand that shapes with certain properties in common have names. Children understand the need for consistency of measure (e.g. using the same sized cup to measure flour and water)	Knows what angles are; knows different types of angles; Can work out the area and the perimeter of rectangles and squares. Get's a first introduction to the Pythagorean Theorem.	Understand and work with formulae and variables; substitute numerical values for variables and constants Generate terms of a sequence from a term to term or position to term rule.	Use and interpret algebraic notation Understand and use vocabulary around expressions, terms, equations, inequalities, etc. Write expressions and formulae from word problems. Simplify and manipulate algebraic expressions etc. Rearrange to change subject Solve linear equations algebraically Recognise arithmetic sequences and find the nth term. Recognise geometric sequences.	Graph and solve equations – one and two variables, simultaneous Interpret given graphs to find solutions to algebraic problems

						Convert related standard units using simple formulae.	Work out relationships between units as formulae. Use compound units such as speed to solve problems.	
						Use scale. Work with percentages including percentage change, interest. Angles – understand angles on a point, line, opposite, corresponding, alternate angles on parallel lines. Construct 90 and 60 degree angles. Understand degrees as part of a rotation around a point.	Understand direct and inverse proportion. Understand percentage and fractions as operators; express one quantity as percentage or fraction of another. Understand ratio notation including reduction and expansion. Express division into parts as ratio. Divide a quantity into parts in a given ratio. Bisect an angle, a line, construct a perpendicular. Derive construction of other angles. Estimate angles. Draw and measure angles with protractor.	Solve problems using direct and inverse proportion, including graphically. Understand exponential scale. Understand multiplicative relation can be expressed as a ratio or fraction. Relate ratio to fractions and linear functions. Understand properties of platonic solids and their angles. Understand internal and external angles; derive the formulae for working them out.

						Understand formulae for areas of triangles, quadrilaterals, circle. Use to work out areas of irregular/composite figures. Understand perimeter and circumference.	Understand how to work out volume of cuboids and other prisms, spheres. Understand surface area.	Volume and surface area of a cone. Understand and use vocabulary: vertex, edge, face.
						Apply transformations including translations, rotations, reflections, and scaling to figures with a coordinate grid. Understand congruence and similarity. Know the internal angles of a triangle add to 180 degrees; the internal angles of a quadrilateral add up to 360 degrees Find missing angles in a triangle or quadrilateral. Understand Pythagoras' theorem and derive simple proofs Circles – understand and use vocabulary: radius, diameter, perimeter, arc, chord, sector, segment, tangent.	Construct congruent triangles and related shapes by scaling, with and without a coordinate grid. Use Pythagoras' Theorem to solve problems involving right angled triangles, and related problems. Understand circle theorems.	Be familiar with elements of trigonometry.

						Use geometric instruments and techniques to construct increasingly complex patterns based on 6, 8, 12, 16, and 24 divisions of circles.	Construct and understand the properties of various spirals, including fibonacci spiral and associated sequence Interpret mathematical relationships both algebraically and geometrically	Construct nets for a variety of polyhedra.

SCIENCE - Learning Opportunities

Kindergarten	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8
Physical Sciences						Physics		
Laying foundations for Astronomy Seasonal songs and poems talking about the position of the sun at various times of year.	Observing the transformation of materials by cooking on an open fire. Becoming aware of the position of the sun at various times of the year through seasonal songs and poems. Seasonal festivals marking the movement of the sun such as St. Johns, Martinmas, and Candlemas.	As class one but with increased awareness.	As class one and two and the children's awareness continues to grow.	As classes 1-3 but again with increasing awareness.	Astronomy: Study of early astronomers as an introduction to Freehand Geometry main lesson. Laying foundations for Physics: Olympic training – wind resistance - discus v javelin. Opposing forces – wrestling.	Understands some sources of sound, and that sound quality is determined by material and method of sound production. Understands that sound is associated with vibrations	Understands the 3 factors determining the frequency of a vibrating string – length, mass and tension – and the relationship to pitch. Understands the relationship between the amplitude of vibration and the volume of sound	Knows that sounds can be reflected, directed, focused and absorbed Knows the speed of sound through air, and that the speed of sound depends on the medium it is travelling through

Seasonal festivals marking the movement of the sun such as St. Johns, Martinmas, Candlemas. Laying foundations for Physics Daily play with natural materials investigating balance, gravity etc.	Investigating balance and gravity via outdoor play with natural materials. Experiences and understands the properties of various materials through working with them – e.g. modelling, den building, craftwork indoor and outdoor.					Pitch – understands that pitch is related to size Volume – understands that volume is related to the intesity of production Propogation – understands that sound can travel through various media	Understands the harmonics of a vibrating string, and the relationship to audible overtones. Understands that this forms the basis of consonance and dissonance in musical harmony. Understands that the length of a column of air primarily determines the pitch of blown sounds.	Knows that sound needs a medium to travel through Knows that sound travels in longitudinal waves Knows how understanding of sound can be applied to design of buildings and instruments
						Understands that there are many sources of light Understands the propagation of light – light travels in all directions, with decreasing intensity Understands the difference between transparent, translucent and opaque materials.	Understands that the relative consonance of musical intervals can be expressed by the simplicity of the ratio of their frequencies. Understands the principle of resonance. Understands how the above principles are used in musical instruments from various cultures.	Knows how convex andconcave lenses affect the propagation of light Knows the causes and effects of the refraction and diffraction of light Understands and describes changes of state of liquids, solids, gases, including evaporation

						Understands a relationship of light, darkness and colour Understands a difference between colour pigment and colour light, and their primary and secondary colours. Understands illumination and shadow, complementary colours, and contrast	Understands the human perception of sound, the function of the ear, including the danger of high volume sound] (see also human biology) Understands that light can be reflected, and the reflective quality of various materials Understands that the angle of incidence equals the angle of reflection.	Understands how pressure affects temperature and the state of matter. Understands that the absorption and of heat depends on the material and mass Understands the heating, magnetic and chemical effects of electric currents
						Understands some different sources of heat and cooling, including combustion and friction Understands that heating and cooling substances causes expansion and contraction. Understands how heat can travel by conduction, convection and radiation.	Understands that light can be focused to create images Understands that light can be focused by a small aperture or a lens. Experiences the different effects of concave and convex lenses	Understands electric circuits, switches and fuses Knows how a telegraph works Understands the electrical conduction and insulation effects of various materials, and earthing

						Understand magnetite, natural magnetic rock, its use in early navigation and its relationship to the earth's magnetic field	Understands that light can be reflected and focused by curved mirrors	Understands the magnetic effect of a current and its applications, e.g. electro-motor, dynamo
						Understands the nature of the 2 magnetic poles, attraction and repulsion, and their relationship to the earth's magnetic field	Can explain the typical properties of solids, liquids and gases using ideas about particles	Understands how liquids exert pressure in proportion to their depth (hydrostatic force)
		.				Understands how magnetism can be induced, temporarily and permanently.	Understands how temperature affects the states of matter of various substances.	Understands how a manometer can measure water pressure
						Understands how magnets can be de-magnetised	Can use a thermometer to measure heat, and understands how the Celsius scale is based on the properties of water.	Understands Pascal's Law
						Understands which materials can be magnetised and attracted by magnetism.	Understands that every substance has a specific boiling and freezing point, and that altering the composition of a substance can affect these.	Understands that liquids cannot be compressed
						Understands the magnetic force field	Understands that the density of a substance is affected by its temperature, and the exceptional behaviour of water	Know some applications of hydraulic power

						Understands that static electricity can be produced by rubbing certain substances together	Understands the anomaly point of water and its significance in the natural world	Understands Archimedes' Principle
						Understands that static electricity can be detected by the senses or by an electroscope	Understands how electric currents can be generated by chemical reactions	Understands how density (of the object and the liquid) affects buoyancy
						Observes and can describe the phenomena of electro-static attraction and repulsion	Understands the principle of the Voltaic Cell and the Battery.	Understands why a boat floats
						Understands that electrostaic charges can be positive or negative, and that like charges repel each other and opposite charges attract each other	Understands the difference between static and current electricity.	Understands that liquids have different densities
						Can compare and contrast the effects of static electricity and magnetism	Understands that magnetism can be created by electricity	Understands that liquids have surface tension
							Understands how electromagnetism can be used to create motion (electric motor)	Understands that air has volume and mass

							Can construct a simple electric motor Can describe a variety of practical uses of electricity Can describe some of the dangers of an electric current, and of lightning	Understands that air offers resistance to moving objects Understands that air exerts pressure. Knows how a siphon and a syringe work
							Understands the principle of mechanical advantage Understands the law of the lever, and the principles of the 3 classes of lever. Understands the principles of: the pulley, the wheel and axle, the inclined plane, the wedge, the screw.	Understands Bernoulli's Principle Understands vacuum as an absence of substance Understands how Magdeburg Hemispheres work

							Understands the effects of friction and lubrication.	Understands vacuum in relation to steam power and the industrial revolution Understands the factors which affect gas pressure: number of particles, volume of container, temperature
Earth Sciences						Chemistry		
Laying foundations for Meteorology Understanding how the weather changes at different time of the year through song, poems and daily outdoor time. Seasonal songs and poems spoken daily giving the children an age appropriate knowledge of the changing seasons	Observes, experiences and describes weather associated with the seasons and how day length varies. This is underpinned by the celebration of various seasonal festivals throughout the year.	As class one but with increased awareness	Observes and understands the relationship between the seasons and agricultural cycles Observes, experiences and describes weather, its relationship to the seasons and its impact on agriculture	As classes 1-3 but with increasing awareness	Meteorology: Water cycle – Geography of the British Isles Geology:		Understands the difference between chemical and physical change Understands that combustion is a form of chemical change Is able to observe and describe a range of forms of combustion, connecting these observations with the substance being burned	Understands the role of carbon dioxide in human and plant respiration Understands solution & mixtures Implications of water being a good solvent: nature, human, industry

Daily outdoor play to include caring for the school environment. Giving thanks for the food we eat – having reverence for the earth Laying foundations for Chemistry:					The formation of coal – the Geography of the British Isles Soil layers – The Geography of the British Isles		Understands the role of oxygen in combustion. Knows the composition of air Has observed combustion with pure oxygen gas	Understands some properties of glucose,: chemical properties, implications for animal and plant life. Solubility, energy Understands the process of testing food for sugar
Baking bread and making soup every week. Drying apples. Making a fire for cooking on weekly outdoor day.							Knows how oxygen was discovered. Understands the concept of elements and compounds Understands that an element (e.g. oxygen) can be isolated from a compound, and is generated by plants	Understands the production in plants of glucose and oxygen through photosynthesis, including the chemical equation Understands the role of glucose in human nutrition and respiration Understands the production of sugar from cane and beet

Learning about the properties of water, sand and mud.							Understands the concept of acid & base/alkali & salts, and can describe the difference between an acid and a base. Understands that combustion can separate a substance into acid smoke and basic ash. Understands some implications for the environment, including greenhouse gases and acid rain	Understands the symbiosis between animal and plant kingdoms in relation to photosynthesis and nutrition and respiration. Understands the effects of sugar on teeth, diet and blood sugar; understands diabetes Understands the properties of starch
							Knows that organic chemistry is the chemistry of carbon based substances Understands the concept of an indicator. Understands that cabbage water and litmus are indicators for acidity.	Understands the properties of starch: its transformation into sugar, in relation to plants (germintion), animals and food production Can draw the molecular structure of some sugars Understands the structure, origin and uses of cellulose

							Know that acidity is measured using the pH scale. Understands the lime cycle in relation to: •Geography/geology, wildlife •Industry (Some uses & effects of lime) •Chemistry Knows the history and has a rudimentary understanding of the Periodic Table, including some chemical symbols	Understands the role of cellulose in paper manufacture Understands the origins and properties of fats and oils Can test foods for fat content
							Understands the concept of a balanced chemical equation Understands the Law of Conservation of Mass Understands the dissolving & crystalising process of a salt	Understands the nature of burning oil, and the causes and dangers of a 'chip pan fire'. Understands the chemical properties and manufacture of soap Understands the origins and properties of proteins

							Understands the filtering of a salt in solution	Can test foods for protein content
							Knows the different qualities of various metals	Understands a simple atomic model
							(Silver, copper) plating	Understands the differences between atoms, elements and compounds
							Understands redox reaction	Knows the chemical symbols and formulae for some elements and compounds
							Understands redox reaction in relation to smelting (lead, copper)	Knows the basic structure of the Periodic Table
							Understands some industrial and historical significance of purification and smelting a range of metals	Sets some scientific understanding within its historical context, through the study of the biographies of significant scientific figures
Life Sciences						Biology		

Laying foundation for Zoology	Nature studies- Identify and name a variety of common animals	As in class one but with increased awareness and with the addition of:	Understands how humans work with and manipulate nature to produce food and other resources through farming.	Zoology	Understands the relationships between plants and their environment including soil, climate, and insects.		Understands and describes the sensory organs and systems of the human being	Understands the form and functions of the skeleton as a whole, including support, protection, movement and making blood cells
The study of life cycle of animals through song and poem such as the caterpillar/butterfly or Tadpole/frog poem.	Weekly outdoor lessons growing various plants and vegetables. Observing the changing seasons.	Learn about various animals and their relationship to humans in The Song of Hiawatha.	Is beginning to understand the impact of farming on local ecology and the importance of respecting and caring for the environment	Compares the evolution of humans and animals examining adaptations to their environments.	Botany:		-Understands and describes structure and functioning of the eye	Understands the form and function of the spinal column and its relation to uprightness
Laying foundations for Botany	Identifies and names a variety of plants and trees	The story of 'Mondamin' and the discovery of the cultivation of corn from The Song of Hiawatha	Observes and understands the relationship between the seasons and agricultural cycles	Closely examines an aspect of human physiology (e.g. head; hand and arm: foot, femur and spine) and compares this to an animal understanding the impact of form and function.	Understands and describes the development and life cycle of plants, including seed, bulb, germination, flower, and fruit.		-Understands issues related to the care of the eyes and eyesight	Understands the form and function of the foot, its arch and its relation to uprightness and movement
Exploring the world with weekly nature walks	Laying foundations for Biology	Learn about the various trees and their uses as described in The Song of Hiawatha	Biology	Understand the limitations of the human body, mitigated by technological and cultural invention and achievements.	Name some plant parts and compare and contrast root and stem, seed and fruit, leaf and flower.		-Understands and describes structure and functioning of the ear as the organ of hearing and balance	Understands aspects of proportion within the human body, in relation to the Golden Mean
Daily outdoor play with natural materials to include some gardening.	Various songs and poems about the different parts of the body – body geography.	Observes similarities and differences; growth, change and decay in the natural world.	Study of farming and observation of reproduction of farm animals.	The Human being and animals main lesson. Looking at specialisation and generalisation.	Knows the name of many local plants and trees.		-Understands issues related to the care of the ears and hearing	Understands polarities and contrasts in the skeletal structure of the head, chest and limbs
Seasonal table to look close up at seasonal produce – conkers, beech nuts, flowers etc.		Begins to understand the importance and inter-relationship of all things within the natural environment	Hatching of chicks.	Individual projects on a chosen animal – developing key observation skills.	Describes the plant life of a range of biomes including desert, forest, tundra and how these are distributed across the world.		-Understands and describes the senses of taste and smell, with reference to the tongue and nose	Has studied the forms of specific contrasting bones: e.g. the vertebrae and femur

Growing various plants including wheat. Awareness of safe/unsafe plants		Understands what plants and animal need to grow, develop and stay healthy Begins to understand the importance and inter-relationship of all things within the natural environment		Presenting project to classmates. Laying foundations for Botony	Understands trees as communities of plants and animals and their relationship to the weather, the soil and the wider landscape Compares and contrasts the specialisation of animals within one group, e.g. Birds of prey, song birds, water birds, flightless birds carnivorous mammals bears, big cats, wolves and foxes. Herbivorous mammals: mountain goat, deer, giraffe, hippo, rhino		Understands and describes the sense of touch in relation to the nervous system	Understands the relationship of bones and muscles in major joints, the lever principles involved, and the measurement of force exerted by different muscles Understands the function of muscles, including the roles of antagonistic muscles
Identification of plants Observing growth, decay, metamorphosis. Laying foundations for Biology		Understand what plants and animals need to grow, develop and stay healthy		Begins to understand the importance and inter-relationship of all things within the natural environment Understand what plants and animals need to grow, develop and stay healthy			Has a basic knowledge of the human gas exchange system -Understands and describes structure and functioning of the lungs for breathing -Understands issues related to the care of the lungs, and associated diseases	Has studied the form and function of a sense organ: e.g. the eye or ear

Various songs and poems about the different parts of the Human body – body geography and animal biology. Developing Scientific Skills							-Understands and describes structure and functioning of the heart and the circulatory system Understands issues related to the care of the heart, and associated diseases Has a basic knowledge of the human digestive system	
Observation- the children observe the natural world at close quarters – bugs, tadpoles, flowers etc. Linking concepts to real life – The children make connections with real life and are then able to link these experiences to concepts at an appropriate time.							-Understands and describes the structure and function of the organs of the digestive system, including the roles of enzymes and bacteria -Understands the breakdown and passage of the nutrients into the blood, and its transport to cells Understands the excretion of waste products as faeces and urine, and through the skin	

Grouping and Classifying Opportunities for grouping and classifying are provided as part of real work. Understanding the significance of accuracy in measurement							Has a basic knowledge of the effects of ingesting various substances -Understands and describes the main features of a healthy diet, including: -Carbohydrates, lipids, proteins, vitamins, minerals, fibre and water	
Children learn to understand the importance of using the same measure e.g. cups when measuring. They also use balance scales and will begin to understand about mass. The use of tools and technology The children use tools and soft technology							-Understands the calculations of energy requirements in a healthy diet -Understands some consequences of an unbalanced diet, including obesity, starvation and deficiency diseases -Has a basic understanding of eating disorders	

Sawing, drilling, sewing all require careful and accurate work.							-Understands and describes the effects of some medical drugs -Understands and describes the effects and benefits of some medical drugs Understands and describes the effects and dangers of some recreational drugs	
							Has a basic knowledge of the structure and function of the skin Understands issues related to the care and healing of skin Has a basic knowledge of the brain and nervous system	

							Has a basic knowledge of the human reproductive system Understands issues related to: -Puberty -Relationships -Parenthood -Sexual health -Contraception Has a basic knowledge of other health factors, including: -Exercise -Sleep -Personal hygiene	