



Steiner Education Australia

AUSTRALIAN STEINER CURRICULUM FRAMEWORK

COMPARISON

Between the

AUSTRALIAN CURRICULUM FRAMEWORK

and the

THE AUSTRALIAN STEINER CURRICULUM
FRAMEWORK

at the end of each Stage

English	2011
Mathematics	2011
Science	2011
History	2011
Geography	2014

Comparison of the National Curriculum and the Steiner Curriculum at the end of Each Stage

Comparison at the end of Stage 1- Classes K to 3

English Stage 1

In English there is a high degree of equivalence in end of stage Content Organisers in the area of skills in listening, viewing, writing, reading, spelling, grammar, oral language and the creation of recalled narrative texts and factual texts. The focus and approach of the final year of the ASCF in Stage 1 English is comparable with the National Curriculum Year 3 introduction but centres more particularly around

- immersion in high quality literature from traditional sources: folk tales, legends and mythologies from different times and cultures as well as poetry and drama
- daily oral language work of verse speaking, singing, poetry and drama
- daily practice of listening to told stories, recall of previous narratives and pictorial, dramatic and written representation of recalled stories in all learning areas eg not only English or literary studies but also science and history, maths and geography of the local area
- study of a foreign language and a different cultural context for language

Assessment would therefore focus primarily on observation of

- basic skills in listening, viewing, writing, reading, recall of texts, spelling, grammar, written expression, vocabulary and oral language skills
- levels of enjoyment and engagement in literature, artistic representation of narratives
- skills in dramatic presentation, recitation.

What would not be a focus until the following stage would be

- Conceptual analysis of evaluative language, identification of effect on audiences of techniques, discussion of effect of language devices and comparison of different ways meaning is created in alternate texts of a similar topic, persuasive language.
- Digital technologies

Mathematics Stage 1

There is a high degree of equivalence in the Content Organisers **by the end of this stage**. The interpretation of these through elaborations is often aligned however this is with the distinction that much additional work is done in the following areas

- concrete exploration of mathematics through cooking, handcrafts, creating a real shop with garden produce etc
- rhythmic work eg clapping and walking number sequences, patterns and multiplication tables on a daily basis
- moving numeral and geometrical forms on the floor, in sand on a daily basis in early Stage 1
- daily narrative pictures of number quantities, processes and written conventions or representations of algorithms

A general difference **in assessment** might be the use of **informal and observational assessment of mental arithmetic, concrete and pictorial work as well as strategies and algorithms** rather than heavy reliance on formal testing at this stage.

What would not be a focus until the following stage would be

- **theoretical representation** of unit fractions (though practical experiences, activities and verbal identification are covered)

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- conducting of chance experiments to identify variations in results
- use of digital technologies eg calculator

Science Stage 1

The approach to Science in Stage 1 is experiential through authentic life tasks and narrative based knowledge and wisdom. Equivalent Content Organisers can usually be found in this stage yet the elaborations are sometimes quite different. The knowledge is practical, embodied and in living pictures of nature and people's lives and activities eg

- Creating a farm and/or garden with vegetables, fruits and grains
- Building an individual scale house of their own design and real practical structure such as a cubbyhouse, pizza oven, wall or gazebo with their class.
- Stories of eg the farmer, the bricklayer, the miller, the carpenter and builder
- Stories of the animals and plants of the environment of their school grounds, home garden and local landscape.

A main difference therefore would be **in assessment** since teachers would look for

- practical contribution to eg gardening, building, cooking and handcraft activities
- recall of storylines with practical knowledge of care of farm animals, sowing and harvesting, house design and building, time measurement and home crafts
- a sense of trust and gratitude for their home on the earth
- a sense of confidence in being able to build a home, create a kitchen garden, cook and make handcrafts with different materials
- a spirit of exploration of different ways of completing the above tasks and practical adjustment to create more useful approaches
- an ability to follow spoken, drawn or written directions for tasks
- a sense of cooperation as well as independence in tasks
- informal sharing and communication of discoveries

What would not be a focus until the a following stage would be

- the **abstract conceptualisation of information** e.g. Concepts about Earth's rotation (Stage 2) science experiments **not related to authentic home and school activities** (Stage 2)
- use of **digital technologies** (Skills scaffolded in Stage 2 met in Stage 3)

History Stage 1

Foundation to Year 3 History in the National Curriculum moves from the child to the family, to local community and then more diverse communities. This movement is followed in the Steiner curriculum in the broad topic of Local Surroundings which encompasses Science and Geography also. The Steiner curriculum begins formal History in Year 5. Prior to this it is

- Experienced in family, school and community celebrations
- Relived in handcrafts and woodwork from times when communities made their own life needs within the family or locally
- Met in the rich literary sources told to the children and dramatically enacted eg Aboriginal and Torres Strait Islander sources, Asian sources, world folk tales and legends, Russian, Celtic or Hebrew sources.
- Recalled in the stories of the different society structures, traditional trades and lifestyles of these stories.
- Experienced in the study of the local area and the development of farming, tools, practices and communities in relation to the geography of the landscape
- Studied with regard to different types of homes developed throughout time and across diverse community.

There is convergence at the end of Stage 1 with ACARA content descriptors although the learning experiences are different.

Geography Stage 1

In Kindergarten, children are provided with opportunities to experience wonder, gratitude and reverence for all life and to interact joyfully with the natural and humanly created world through self-directed play, outdoor exploration, nature festivals and authentic home and garden activities as well as stories, action rhymes and games. The self-directed play and imitated work of the children allows them to imagine, create, represent and build diverse landscapes, gardens and structures and engage in exploratory projects in the environment.

The International Steiner Curriculum indications for Classes 1-2 are for Integrated *Home Surroundings* Topics that cover Science, Geography and History in the current Australian Curriculum.

When the Australian Steiner Curriculum Framework was written in 2010-2011 the Science/(Geography) units set out this content. The writers have therefore added to these Topics to make the Geography content explicit where needed and to direct teachers to the necessary Geographical focus within the Local Surroundings themes.

In Class 3 the Australian Steiner Curriculum Framework focuses on the practical interaction with the widening local area through Farming (3.5) and Building (3.6) Topics. These Topics integrate the natural, managed and built environments and involve the students in group and individual geographical questions and research.

By the end of Class 3 the Content and Achievement Standards of the Australian Curriculum have all been met in the Australian Steiner Curriculum Framework except for the following:

- In Mapping Skills - grid reference met in Class 4
- Aspects of National Level Geography -Class 5-6
- World Level Geography- Class 6
- Year 3- Feelings and perceptions about places, and how they influence views about the protection of these places- Class 6
- The Use of Digital Technologies- Classes 7/8

Comparison at the end of Stage 2 - Classes 4 to 6

English Stage 2

Immersion in quality oral and written literature of the full history of mythologies (including Asian and Aboriginal and Torres Strait Islander), Australian literature, historical and contemporary biographies, verse from Nordic to the Vedas and Greek Hexameter and full dramatic productions each year continue to be a focus. Daily writing of narrative recall in diverse forms eg diary, speech, excerpt or summary builds strength in listening, organisation of material and written expression. Daily oral work in the morning circle continues. Grammar explores both inner experience and outer expression and extends eg to the full range of the tenses, use of active/passive voice and the conditional/concessional tense. Experience of meaning, quality of style and structure of a wide range of excellence in the literature of the world is seen to precede and lay the best groundwork for the students own reflective thought, written expression as well as recognition of bias, persuasive texts and appropriateness of different language styles. Thus while the analysis of language and literature occurs it is subsequent to the experience of the literature and is artistically and authentically integrated.

Assessment is based on both formative and summative assessment, with the focus on the formative. Examples are: the Main Lesson Book record of learning, observation of story recall and oral work, work completed in practice lessons, informal tests and project work and research. Annotated work samples form the basis for standards assessment.

What would not be a focus until Stage 3 would be

- creation of digital texts

Mathematics Stage 2

By the beginning of Stage 2 the curriculum, based on fluency with the four operations with whole numbers, can move toward fractions then decimals and lastly percentages, bringing equivalence in these areas. Mathematical reasoning is investigated more consciously and formulae are understood and chosen for problem based scenarios in line with the National Curriculum. Accurate geometrical constructions with instruments develop out of the earlier freehand forms well beyond the scope and complexity of geometry for Stage 2 of the National Curriculum. Understanding of Business Mathematics also integrates ethics and good practice eg loans on purchase of assets but not for recurrent expenditure.

Assessment is both formative and summative, with a focus on formative. In class assessments / tests occur, including:

- daily mental arithmetic of all processes including fractions, decimals and percentages
- continued oral fluency of times tables, moved number sequences and rhythmic number games
- written application of the four processes and known strategies to fractions, decimals and percentages
- use of simple formula for area and perimeter
- understanding of principles of business mathematics including interest, discount, profit, loss, and taxation.
- observation of accuracy, beauty and colour harmony of circle divisions and stellar polygons

Annotated work samples also form the a basis for teacher judgements on standards of work achieved.

What would not be a focus until the following Stage would be

- describing probabilities of chance events and conducting chance experiments and comparing observed frequencies.
- Use of digital technologies of the computer eg to generate translations and reflections or rotations
- Use of the Cartesian plane to express relationships.

Science Stage 2

Science in Stage 2 moves from learning about the natural world (natural science) in an imaginative way to a more objective use of sense perception in its relationship to nature. For example the knowledge of the animal world and its early categorisation happens not by simply cataloguing characteristics but rather by the imaginative, description of animal characteristics in relation to the human physical organism (Science 4). The evolution of the plant kingdom – from the fungi, algae, mosses, ferns, cone plants to flowering plants is studied also in relation to the stages of infancy to childhood to adolescence to adulthood, (Science 5). This way of working builds a deeper engagement of the senses with the world via the imagination. The next step is taken with the study of the mineral world and stars (Science 6). The progression from human/animal to plant to mineral/stars is also a journey of emotional connection to the outside world. The first physics lessons are also introduced in year 6 which particularly exercise the early formal stages of intellectual discernment as an ability to make objective meaningful connections of one perception to another.

Assessment would be developed within the following parameters

- Ability to make objective representations of sense perceptions and to make meaningful connections between different experiences.
- Ability to describe experiences objectively and to separate experience from explanation.
- Ability to graphically represent experiences and connections to other experiences.
- Ability to learn age appropriate specialist language for new areas of scientific experience.
- Assessment of what has been learned in new areas of experience e.g. rock types and identification methods for a range of minerals; ability to be able to represent graphically star movements above the horizon from different places on the Earth, such as the equator, the poles and from their own location.
- Ability to put together a book, recording a series of experiments around a theme and the subsequent recording and discussion that takes place.

Annotated work samples also form the a basis for teacher judgements on standards of work achieved.

What would not be a focus until the following stage would be

- Making intellectual judgements to explain phenomena based on abstract models.
- Digital technology would not be a focus other than in the sense that the laying out and reporting of experiments are scaffolding its later use.

History Stage 2

The ASCF focuses on Australian History from the life Aboriginal and Torres Strait Islander people to the journeys of exploration and European settlement and up to the time of Federation. In world History a significant review of the earliest times up to the Roman Empire occurs.

Within this stage the focus includes

- shifts from mythological histories to narrative and biographical accounts of life in earlier times
- moves from narrative recall to increasing investigation of sources eg diaries and maps/charts
- beginning to develop different perspectives of events eg as Captain Cook or a convict boy on the First Fleet
- developing from descriptions of daily life and biographies to emergent studies of civilisations and their contributions eg beginnings of democracy, contribution of technology eg bridge building of the Roman Empire and the heritage today of eg Greek Olympics.

Assessment is based on

- Main Lesson Books as a record of learning, projects, research, participation in historical plays, narrative recall.
- Annotated work samples as the basis for teacher judgements on standards of work achieved.

What would not be a focus until the following stage would be

- Australian history of the 20th century and beyond
- recognition of broader cause and effect relationships over time
- prescribed use of digital technologies for research and presentation of information and findings

Geography Stage 2

In Stage 2 the local focus broadens over the three years to the beginnings of a more formal World Geography. Steiner Education sees Geography as having an important integrative function which explores and reveals the links between landscape, vegetation, climate, human geography, history, economics and the built environment. These links emerge throughout the various Topics in a natural way.

The exploration of the Local Environment through indigenous Dreaming Stories and historical stories, hiking, camping and mapping in Class 4 is supplemented by a Topic on the use of environmental resources for writing and a Topic on the comparison of the human being and the animal kingdom and their relationship to the environment.

In Class 5 the Topic on the Local Region and State brings much geography in the study of early colonisation, how the landscape impacts on human activities and the way in which human, economic and social geography merges with history. The History Topics are also a study in the relationship between the geography of a country and its daily life, agriculture, philosophy and cultural characteristics.

Class 6 first broadens Australian Geography and then extends outwards to our neighbouring continents and awareness of World Geography. This is supported by studies in Geology and formation of landforms as well as Astronomy and the connection of daily and seasonal cycles and weather to earth's rotation and celestial phenomena.

By the end of Class 6 all Content Descriptions have been met with the exception of

- Use of digital technologies – Year 8

Comparison at the end of Stage 3 - Classes 7 and 8

English Stage 3

Strengths of the Steiner Approach

An appreciation of the historical development of language and of the art of communication is helpful in guiding students towards responsible and imaginative language usage. When students pay attention to the inner landscape of language they learn how to enliven the way they use written and spoken words to communicate with others. The creative power of the living word has the potential to revitalize the 'wasteland' in culture (T.S. Eliot, 1963). The Steiner approach suggests that there is a close connection between nurturing the living qualities of language (Steiner, GA 299) and using sustainable practices in regard to caring for the world of nature.

PERSONAL AND SOCIAL COMPETENCE

Students become more aware of their emotional well-being; they express their feelings with growing confidence and become more skilled in their use of a variety of artistic modalities. They identify different moods and understand how different styles of writing convey specific feelings. They practice writing their own poetry and use a wider range of poetic devices. Students balance their inner quest for self-knowledge with their discovery of new global perspectives; they direct their attention towards the exploration of the outer world and away from the newly experienced unrest in their inner life. Students participate in class activities and value team learning and group interaction

Students develop an independent life of feeling at this age which is often accompanied by emotional turbulence. It is helpful for them to recognize that the changing tides of emotions form part of the developmental pathway. Students draw strength from several elements of the English curriculum. Supported by the biographical element and strong emotional content in the selection of texts they are able to consolidate their learning into a meaningful world picture. In Class 8 they appreciate the opportunity to research their own interests, present a sustained/in-depth project in oral and written form and put on a major drama production which they bring to a new level of professionalism. In learning drama students build on the skills developed in the other units; they enhance their memory retention, and are able to further shape their emotions under the protective mask of a role in a play. They work co-operatively in teams and in this way nurture positive social interactions.

By sharing their interpretations and understanding of the themes and issues raised with their class colleagues, the in-depth study of a novel in class also facilitates collaborative teamwork which helps to build the social fabric of the class. Students are encouraged to enjoy reading and to select and read a wide range of fiction and non-fiction texts. Reading nurtures the imaginative capacity which in turn helps problem solving of all kinds and keeps thinking flexible and resilient (Robinson, 2007; Eisner, 2009). Students learn vicariously to empathise with characters in the texts and in time they are able to translate this ability into real life scenarios (Greene, 1995).

ETHICAL BEHAVIOUR

Students learn to make individual judgments. Guided by the study of the Arthurian legends in Class 7, they come to appreciate and understand the values associated with the Code of Chivalry: nobility, charity, abstinence, truthfulness, mercy, purity, love of humankind and loyalty. The attention paid to language as a living organism and to the importance of students finding their authentic 'voice' as a socio-moral capacity has implications for the sustainability of the natural environment. A leading objective of the 'Wish, Wonder and Surprise' unit aims to engender an attitude of reverence and wonder towards Nature.

In Class 8 students struggle to identify and articulate their individual moral stance to world issues as they critically reappraise the ideals they have been given by their previous education (family and school). They build moral capacity by trying to balance the conflicting demands of their sharpening minds, newly awakened feeling capacity and their changing biology. Their youthful idealism is best supported when lesson content provides them with inspiring role models. English lessons encourage the growth of cultural literacy and awareness. Discernment, imaginative empathy, and interest in the inner lives of others are

also cultivated. Over the course of the units students develop a richer understanding of the significance of the moral choices they face as human beings.

Factors of the Approach which influence Assessment

The holistic orientation means that the educational goals include cognitive, socio-emotional and moral elements which are integrated into the subject areas, and designed to meet the developmental needs of the students. When making decisions on what knowledge, understanding and skills should be assessed, and how, it is necessary, from a Steiner perspective, to ensure that the strategies support goal achievement. In particular the Steiner approach is concerned to ensure that assessment methods are aligned with the Melbourne Goals.

Steiner pedagogy observes that complex levels of analytical thinking require a distancing from the world and an onlooker stance. If tasks involving high levels of abstraction are introduced too soon this can have the effect of promoting in students a distancing of themselves from the world and the adoption of a cynical attitude towards life. For this reason Steiner teachers design thinking-level tasks with the intention that they help students to connect with the world around them and to become empowered in terms of thinking things out for themselves, knowing how things work, and becoming technically proficient in a range of areas. Content topics that support students to build their connections to the world include for example the Year Seven themes of discovery and independence. This orientation applies to the developmental sequencing of skills as well where complex levels of analysis and abstraction are introduced more slowly. In Year 7 and 8 when intellectual questioning awakens it is understood to be important to try to preserve the characteristically noble and idealistic qualities of this birth so as to avoid the development of scepticism.

Significant differences in regard to the Steiner English curriculum in Stage 3 include:

- The sequence of skills relating to complex levels of analysis is introduced more gradually in the Steiner approach.
CONVERGENCE: By year 10 students reach levels of proficiency in analytical skills
- The Steiner approach to the ACARA descriptors varies due to the emphasis placed on *process* rather than *product* which may have implications in relation to assessment and reporting and the way in which the skills are measured. The subjective and artistic nature of the skills call for a qualitative and descriptive reporting style.

Rationale of the approach to Step One: Experiential learning

During this stage the teacher scaffolds learning experiences based on tacit forms of knowing; it is important to note however that in the high school students take responsibility for and direct their learning more than in the primary school during this stage. 'Warm up' activities: word/rhythm games (clapping/drumming), singing, choral speaking, role play may be included. The objective is to enliven and warm the students' interest in the content topic by firing their 'will' nature. This may include *physical* activities but the underlying intention is to awaken the students to *inner activity*: to spark their intellectual curiosity by first enlivening their responses on the level of their bodies (senses, sentience, sensibility) and feelings.

In relation to the phenomenological methodology the introduction to the unit's topic may begin with a focus on outer, *structural* or *physical* frameworks, for example timelines, historical overviews, description of period clothes, homes, activities. The close observation may move into the *life and living* qualities of the content and learning experience: students may notice what is life-giving and what is not; they may look closely at gestures and movements in illustrations of the period or in stories. As the three stages of content elaboration are repeated several times over the course of a unit, the framework of the study is systematically reinforced and deepened. Teachers may vary their pathway through the content selecting to first follow one strand through on the three levels before starting a further threefold process, or they may systematically introduce new content so that there is an overlap of the stages in every lesson, or they may move the content as a whole through the three stages. The main guideline is for the teacher to use a combination of artistic judgement and a form of teacher action research: to closely observe what activities are most enlivening during this phase (what works and why and for which students) so that their creative response to action in the moment is linked to a systematic process of reflective sharing and questioning. It is possible that a complete lesson plan may need to be put aside because of particular students' needs or the creative potential of a situation that arises.

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Step Two incorporates a core element of the Steiner approach and provides a basis for 'heart' intelligence which is understood to embrace emotional, moral, and soul-spiritual aspects. One of the learning objectives of the artistic and multimodal activities is to support the *individuation* process of students – to assist them to express their individual voice, opinions, feelings and developing values; in this way the skills provide the foundation for the development of sociol-emotional and spiritual-moral growth. While the ability to represent ideas and opinions creatively and visually is understood to foster the development of *higher order thinking skills*, during this stage students are expected to stay on the experiential level and not begin analytical interpretation too soon in terms of the process of learning in a single lesson unit.

Step Three: The Steiner approach strongly supports the view that students should be encouraged to think for themselves. Lesson objectives strive towards rigour in relation to thinking skills. However, as noted above, complex levels of analysis are introduced more slowly.

The Australian and Steiner Curricula are in alignment at the end of Stage 3 in English in all areas. OVERVIEW OF THE RELATIONSHIP BETWEEN THE AUSTRALIAN ENGLISH CURRICULUM STRANDS AND THOSE USED IN THE STEINER ENGLISH CURRICULUM

ASCF English Step One: Learning Experience – <i>observing, taking in, describing</i>	ACARA ENGLISH STRANDS AND SUB-STRANDS		
	LANGUAGE	LITERATURE	LITERACY
STRAND ONE: Aesthetics theme – evolutionary development of the English language	Language for variation and change	Literature and context	Texts in context
STRAND TWO: Interacting with others	Language for interaction	Responding to literature	Interacting with others
STRAND THREE: Reading, comprehending and responding to a wide range of texts	Text structure and organisation	Examining literature	Interpreting, analysing, evaluating
ASCF English Step Two: Multimodal and artistic activities - <i>characterising; responding on a feeling level</i>			
STRAND FOUR: Artistic and creative responses to literary texts; characterisation		Responding to literature Creating literature	Creating texts
ASCF English Step Three: Conceptual knowledge and skills – <i>interpreting, analysing, evaluating</i>			
STRAND FIVE: Applying language and literacy skills in the editing and evaluating of written and spoken assignments	Expressing and developing ideas Text structure and organisation	Creating literature Examining literature	Creating texts Interacting with others Interpreting, analysing and evaluating
STRAND SIX: Interpreting, analysing and evaluating elements of style and context in written and spoken assignments	Language for interaction	Responding to literature	Interacting with others
STRAND SEVEN: Publishing and presenting written and spoken assignments Review Aesthetics theme	Language variation and change	Literature and context	Texts in context Interpreting, analysing and evaluating Interacting with others

Mathematics Stage 3

Strengths of the Steiner Approach

During this stage students develop critical thinking as the faculties of intellectual thought continue to awaken within them. They increasingly encounter and employ causative logic in their experience of Mathematics. Students enjoy active and interactive problem solving opportunities; they work together in pairs, teams and as a whole class to consider and develop solution strategies to a variety of problems. They enjoy exercising and trialling their emergent reason and sense of discernment. All the topics are imbued with a creative element that encourages the students to look at Mathematics from a variety of perspectives. Creative thinking skills are encouraged as a means of developing original or alternative approaches to problem statement and solution. Geometry is appreciated both as an accurate visual and artistic representation of form, and as a means of discovering the properties of shapes.

CRITICAL AND CREATIVE THINKING

In Class 7 for example, the introduction of Algebra represents a major conceptual leap forwards for the students. While working with the concrete, logical rules and processes bring the children into their thinking realm their newly-found logical reasoning skills are applied to the representation and integration of the concrete with the abstract. The rules and processes of Algebra are developed out of working with simple formulae and the use of pronumerals, brackets and negative numbers in equations as a technique for solving practical problems. During this topic, the aims are to engender in the students an appreciation of how general rules of arithmetic become clear through algebra, and to enable the children to grasp the principle of balance in an equation.

SOCIO-EMOTIONAL UNDERSTANDING

In Class 8 the students are offered the unique opportunity of exploring the place of the human being within the rhythms of the universe by investigating the relationship of breathing and heartbeat to the Platonic cosmic year, heavenly circles, the seasons, the nature and measurement of time and the circle/spiral of fifths in music. The circle is discussed both as a symbol and as a geometric shape – its diameter, circumference, pi, area etc. are all considered. The curves and forms generated by moving circles, such as the helix and cycloid are also studied.

The ‘Change and Rhythms’ unit seeks to evoke in the students both a Mathematical understanding and a rich inner experience of their relation to the world of cyclical change and rhythm. At a time where they are in danger of losing a reverent picture of the dynamic cosmos in which they live, the exploration serves to renew their sense of wonder at being part of something far larger and more meaningful than they at first realise. In addition, a significant objective of the unit encourages students to appreciate the fact that Mathematics has its own intrinsic value and beauty, and offers them the opportunity to enjoy experiencing the elegance and diverse applications of the subject.

INTERCULTURAL UNDERSTANDING

Students appreciate that the evolution of Mathematics has taken place within the context of the development of human culture over the course of several different epochs of history. They are presented with the biographies and contributions of Mathematicians from cultures as diverse as the classical Greek and Mediterranean civilizations, Persian and Middle East cultures, Egyptian, Arabic and Islamic cultures, as well as European, Asian, African and Aboriginal and Torres Strait Islander cultures. Students learn to appreciate and respect the cultural differences between people and build a capacity for imaginative empathy, which is understood to provide a firm foundation for moral conscience, ecological awareness and global citizenship.

INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) COMPETENCE

In year 8, the students are exposed to digital technologies in their study of Mathematics. They learn to use ICT appropriately and effectively in the representation and solution of problems. Digital technologies can engage students and allow for deeper understanding of mathematical concepts, but the primary focus remains on the development of robust thinking and problem solving skills, which can then be applied to the students’ work with ICT.

ICT can be used in all topics in year 8, but is particularly useful in the constructions of tables and graphs, the representation and transformation of compound forms and the Platonic Solids, dealing with repetitive calculations such as interest on loans and investments, or the representation of the fluctuations in share prices and exchange rates etc.

LINKS TO OTHER LEARNING AREAS

In general the close interrelationship of subject areas in ASCF strengthens the crossover of the foundational skills students develop in Mathematics. The Mathematics topics are aligned to other subject areas such as the link with Science, History, Art and English in topic 8.1; Art, Science, History, and Eurythmy in topic 8.2; Science and English in topic 8.3; Art and Science in topic 8.4; History and English in topic 8.5.

Factors of the Approach which influence Assessment

The holistic orientation means that the educational goals include cognitive, socio-emotional and moral elements which are integrated into the subject areas, and designed to meet the developmental needs of the students. When making decisions on what knowledge, understanding and skills should be assessed, and how, it is necessary, from a Steiner perspective, to ensure that the strategies support goal achievement. In particular the Steiner approach is concerned to ensure that assessment methods are aligned with the Melbourne Goals.

Significant differences in regard to the Steiner Mathematics curriculum in Stage 3 include:

- The sequence of skills relating to complex levels of analysis is introduced more gradually in the Steiner approach.
CONVERGENCE: The end of the stage.
- The theme of chance and probability is related to the natural and human worlds rather than being treated as a mathematical concept that does not connect with reality.

Curriculum skills and content that either vary or are postponed to a further stage:

The Australian and Steiner Curricula are in alignment at the end of Stage 3 in Mathematics in all areas except:

- Data representation and interpretation one descriptor convergent in Class 9 (Mathematics 9.1).

CLASS 8	
Australian curriculum	Steiner curriculum
Data representation and interpretation	
Explore the variation of means and proportions in representative data	Mathematics 9.1

Science Stage 3

Strengths of the Steiner Approach

As an introductory grounding to empirical scientific method, students are provided with the opportunity to: train, sensitise and sharpen their sense observations; understand the difference between observations and explanations; use their imaginations to build a picture of the underlying causative principles.

CRITICAL AND CREATIVE THINKING

In Year 7 the development of critical and creative thinking is built through lessons, rich in experience, where students are required to separate observations from explanations. Experiences are typically left unexplained on the day of the experience and students are expected to make pure descriptions using written and visual means. On the subsequent day, through questions, riddles and classroom discussion, the experiences are explored in depth with the engagement of critical discernment and experience based thinking. Using this method, causative laws, moral issues, environmental issues and philosophical issues are explored in an age appropriate way. The different areas of Year 7 Science 7.1 -7.5 engage thinking in qualitative different ways, each exercising another aspect of thinking.

In Year 8 the development of critical and creative thinking is furthered from the year 7 lessons. They too are rich in experience, where students are required to separate observations from explanations, however, it is no longer as possible for students to overview the experiences, e.g. it is not possible for students to see the force that moves in all directions (pressure) in a fluid, or the transmission of a wave of pressure and rarefaction (a sound wave) in the atmosphere. To understand such phenomena the student has to use their imagination to build a picture of the underlying causative principles – a form off primary model building. The understanding of the phenomena requires a greater degree of abstraction than the thought processes in year 7. For example the elements of galvanic electricity explored in year 7 become now the elements of electromagnetism – where the themes of electricity and magnetism unite in a way that has underpinned much of modern technology. The different areas of Year 8 Science 8.1 -8.5 engage thinking in qualitatively different ways, each exercising another aspect of intelligence.

LITERACY AND NUMERACY

During this stage students' science learning extends their literacy skills as they experience phenomena and equipment which is new to them and which they are required to describe. A new vocabulary, which is sometimes topic exclusive, is learnt and practiced both orally in the classroom and in written form. The reporting of phenomena develops a further literacy - confidence in being able to record accurate observations upon which further deliberation is based. Students create their own main lesson¹ 'text' book which include different text types and visual representations (diagrams tables, schematic drawings) which demonstrate ways of summarising what has been learned from a particular topic.

There is ample scope for numeracy to be enriched and furthered. Examples from Class 7 include working with ratios in the measurement of the frequency ratios of musical intervals, the numerical relationship between frequency and pitch, the expansion indexes of materials being heated, the calibration and use of temperature scales, the work advantage ratios of lifting weights using pulleys in different combinations and the gearing of bicycles. In Class 8 students calculate the speed of sound in air water; sinusoidal waveforms in terms of amplitude and frequency; hydraulic and atmospheric pressure.

PERSONAL AND SOCIAL COMPETENCE

The learning of inspiring biographies of great scientists who are powerful role models of hard work, creativity and endurance (e.g. Michelangelo's biography in relationship to the chemistry of lime in the fresco painting of the Sistine Chapel), is character building, helps to enliven the content and provides human interest.

Factors of the Approach which influence Assessment

The holistic orientation means that the educational goals include cognitive, socio-emotional and moral elements which are integrated into the subject areas, and designed to meet the developmental needs of the students. When making decisions on what knowledge, understanding and skills should be assessed, and how, it is necessary, from a Steiner perspective, to ensure that the strategies support goal achievement. In particular the Steiner approach is concerned to ensure that assessment methods are aligned with the Melbourne Goals.

¹ 3-week blocks of lessons

The table below identifies the alignment between the Australian and Steiner curricula but also highlights areas where there are variations in emphasis and interpretation.

Significant differences in regard to the Steiner Science curriculum in Stage 3 include:

- The emphasis that is placed on identifying the incremental steps whereby students move from concrete operations to formal operations;
- A more gradual introduction to causal logic and abstract thinking.

Ensuring that students are able, as much as possible, to gain an overview of the lesson content and tasks, and that they:

- first gain confidence in reporting and explaining their observations
- move from a concrete base towards increasing complex conceptual tasks;
- learn how to create an imaginative picture in their minds of the principle at work in the phenomenon under study;
- build a picture in their minds of imagined processes that demonstrate the principle at work;
- are able to establish a firm foundation for the later construction of abstract conceptual models;
- understand how physical law is embodied in the human organism;
- move from experience into abstraction following a more historical path of discovery is preferred.

WHERE CONVERGENCES COME LATER

The Australian and Steiner Curricula are in alignment at the end of Stage 3 in Science in most areas, particularly in the categories of Science as Human Endeavour and Science Inquiry Skills. The main difference, apparent in the category of Science Understanding, is one of philosophical orientation, which has ramifications in terms of variations in content and methods. The Steiner Approach identifies a further stage of transition² between that of ‘concrete operations’ and ‘formal operations’. Although it is recognised that abstract thinking begins in this stage, conceptual tasks are still grounded in experiential learning and real life observations as much as possible.

End of Stage 3: Classes 7 and 8

CLASS 7 SCIENCE UNDERSTANDING: Physical sciences	
Australian curriculum	Steiner curriculum
2. Earth’s gravity pulls objects towards the centre of the Earth.	. Science 10.1 – Physics, Mechanics
Explanation: Here the emphasis is on discernment by the students of a phenomenon they can overview that has to do with cause and effect of bodies in contact; connection of vibration and pitch; the lever law, pulleys, gears on a bike. The abstract concept of gravity is left to Science 10.1 Physics: Mechanics. The topic is covered in such subjects within the Steiner curriculum, as Bothmer Gymnastics (sometimes known as Spatial Dynamics)	

² See the Educational Foundations Paper and Attachment 3a

AUSTRALIAN STEINER CURRICULUM FRAMEWORK

CLASS 8	
SCIENCE UNDERSTANDING: Biological sciences	
Australian curriculum	Steiner curriculum
1. Cells are the basic units of living things and have specialised structures and functions (ACSSU149)	CONVERGENCE: Science 7.4 The Human Being in the Environment Science 8.1 Physical Laws:Human Organs; Science 10.5: Biology –Circulatory System and the Inner Organs
2. Multi-cellular organisms contain systems of organs that carry out specialised functions that enable them to survive and reproduce. (ACSSU150)	CONVERGENCE: Science 7.4 The Human Being in the Environment Science 8.1 Physical Laws:Human Organs; Science 10.5: Biology –Circulatory System and the Inner Organs
SCIENCE UNDERSTANDING: Chemical sciences	
Australian curriculum	Steiner curriculum
The properties of the different states of motion and arrangement of particles (ACSSU151)	Science .10.3 Salt Chemistry 10.4 Chemistry Technology <i>Fully convergent Year 11</i>
Differences between elements, compounds and mixtures can be described at a particle level (ACSSU152)	Science 10.3 Salt Chemistry 10.4 Chemistry Technology <i>Fully convergent Year 11</i>
SCIENCE UNDERSTANDING: Earth and space sciences	
Australian curriculum	Steiner curriculum
Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales (ACSSU153)	CONVERGENCE: Science 6.1 Introduction to Geology; Science 9.6 Geology: The Forces that Shape the Earth;

History Stage 3

Strengths of the Steiner Approach

- Content themes match the students' interest in expanding knowledge and include history stories of new perceptions, world explorations and discoveries.
- The approach to teaching history of the Middle Ages and the Renaissance period is intellectually stimulating and emotionally enriching. It fosters in the students, who are now experiencing unrest in their inner lives, a balancing and healthy interest in global perspectives and the outer world.
- The approach to teaching history of the Middle Ages and the Renaissance period with its emphasis on new ideas and cultural advances is intellectually stimulating and emotionally enriching. It offers the students who are now experiencing unrest in their inner lives, a balancing and healthy interest in global perspectives and the outer world. The students examine, discuss and reflect on issues raised through historical inquiries
- Historical biographies remain an important vehicle for the introduction of historical material. Information is presented through narrative using images that will touch the students' imagination and feelings.

CRITICAL AND CREATIVE THINKING

While activities that exercise the maturing intellect are now important, creative and imaginative responses to historical material form an essential part of their experience. Class 7 students are quick to decide whether they like or don't like a particular historical figure. This can be used to spark discussions about bias in research and writing. The study of history in class 8 requires the students to consider sometimes conflicting evidence of human action in the past. They evaluate and make informed judgements about tempestuous and emotional events. In doing so they learn how to question and assess evidence and to distinguish between evidence and interpretation. They are presented with a multiplicity of perspectives and contrasting interpretations. They learn move around events and human experiences and regard them from many points of view. Discussions and debates give students opportunities to refine both their thinking skills and their ability to communicate their ideas and opinions

PERSONAL AND SOCIAL COMPETENCE

Biographical studies play a significant role in the presentation of historical information. In studying the lives of individuals who exemplify inspiring qualities or who have struggled with obstacles and failings, students recognise and reflect on human attributes and on questions of social responsibility. They examine and discuss issues raised through historical inquiries. They examine multiple perspectives of events and consider the background, the human experience behind those perspectives. They listen to the points of view of their class colleagues and through reflection and discussion clarify their own. Students participate in various class activities that involve team learning and group interaction. They consider multiple perspectives of events and consider the background, the human experience behind those perspectives. They listen to the points of view of their class colleagues and through reflection and discussion clarify their own. They carry out discussions and research co-operatively in teams, and in this way nurture positive social

LINKS TO OTHER LEARNING AREAS

Historical studies are integrated with learning in other subject areas such as related elements of music and art, the exploration of Medieval and Renaissance technologies in science, poetry, literature and language in English and the Voyages of Discovery in Geography. The themes related to the Middle Ages and the Renaissance are extended in Year 8 to the Industrial Revolution and the Age of Romanticism. The English curriculum includes studies of Middle Ages and the Renaissance literature and the study of a Shakespearean work. The historical studies of Class 8 are integrated with other subject areas particularly English, Art and music. Students will study classic novels of the period along with the poetry of the Romantics.

Factors of the Approach which influence Assessment

The holistic orientation means that the educational goals include cognitive, socio-emotional and moral elements which are integrated into the subject areas, and designed to meet the developmental needs of the students. When making decisions on what knowledge, understanding and skills should be assessed, and how, it is necessary, from a Steiner perspective, to ensure that the strategies support goal achievement. In particular the Steiner approach is concerned to ensure that assessment methods are aligned with the Melbourne Goals.

Significant differences in regard to the Steiner History curriculum in Stage 3 include:

- Different sequencing of topics
- The study of Ancient history is begun in Class 5 largely through narrative, biography and practical and artistic cultural experiences, mapping and exploration of primary literary and artistic sources.
- A more formal and analytical study of Ancient civilisations forms the theme for Class 10 history.
- During the Primary school the Steiner curriculum gradually builds up a sequential overview of the development of the main historical epochs. The unfolding panorama continues into Classes 8 and 9. In the High School several of the earlier themes and topics are revisited; at the same time, the Modern period of history moves into centre stage.

WHERE TOPICS FOLLOW A DIFFERENT SEQUENCE

The Australian and Steiner Curricula are in alignment at the end of Stage 3 in History in most areas. The main difference, apparent in the category of Historical Knowledge and Understanding, relates to curriculum topic choice. Many of the topic choices are strongly supported by both tradition and research relating to developmental indications. The Steiner curriculum is an internationally based one and there is some level of accord between curricula in different countries.

The table below identifies the related convergences between the Australian and Steiner curricula and highlights areas where there are variations in emphasis and interpretation.

End of Stage 3: Classes 7 and 8

CLASS 7 HISTORICAL KNOWLEDGE and UNDERSTANDING	
Australian curriculum	Steiner curriculum
The Ancient World Overview content identifies important features of the period (approximately 60 000 BCE – c.650 CE) as part of an expansive chronology that helps students understand broad patterns of historical change.	CONVERGENCE: 5.1 Ancient Cultures 5.2 Ancient Greece 6.1 Ancient Rome 10.1 Early Human Societies 10.2 Ancient Cultures
Explanation: The study of Ancient history is begun in Class 5 largely through narrative and biography. A more formal and analytical study of Ancient civilisations forms the theme for Class 10 history.	
DEPTH STUDIES AND ELECTIVES	
Australian curriculum	Steiner curriculum
Investigating the ancient past Students build on and consolidate their understanding of historical inquiry from previous years in depth, using a range of sources for the study of the ancient past	CONVERGENCE: 6.1 Ancient Rome and The History of the Roman Empire 10.1 Early Human Societies 10.2 Ancient Cultures
Explanation: The study of Ancient history is begun in Class 5 largely through narrative and biography. A more formal and analytical study of Ancient civilisations forms the theme for Class 10 history.	

AUSTRALIAN STEINER CURRICULUM FRAMEWORK

CLASS 8	
HISTORICAL KNOWLEDGE and UNDERSTANDING	
Australian curriculum	Steiner curriculum
The Ancient to the Modern World Overview content identifies important features of the period (c.650 CE – 1750) as part of an expansive chronology that helps students understand broad patterns of historical change.	CONVERGENCE: 7.1 The Middle Ages 7.2 The Renaissance World 8.1 The Age of Revolutions
Explanation: During the Primary school the Steiner curriculum gradually builds up a sequential overview of the development of the main historical epochs. The unfolding panorama continues into Classes 8 and 9. In the High School several of the earlier themes and topics are revisited; at the same time, the Modern period of history moves into centre stage.	

Geography Stage 3

All Stage 3 Australian Curriculum Geography Content Descriptors and Achievement Standards are convergent within Stage 3 except

The reasons for and effects of internal migration in Australia (some coverage in Year 6)

The reasons for and effects of internal migration in China

The reasons for and effects of international migration in Australia (some coverage in Year 6)

The management and planning of Australia's urban future

All Australian Curriculum Content in Stage 3 is introduced within Stage 3 however some areas are introduced through description and practical methods in Stage 3 but not developed at a deeper conceptual level until Stage 4. Areas where we do not converge until stage 4 are centred upon our understanding of the developmental capacity of the student. (See High School Child Development Paper Educational Foundations)

In classes 7 and 8 the focus in the Australian Steiner School Curriculum Framework is on the cultural connection of people to the land and the response to the landscape that arises out of such a connection.

In year 8, (Topic 8.2) this may include the influences on the development and distribution of urban centres, and regional towns in rural environments. Such a study includes consideration of differences in population size and density, in urban concentrations and settlement patterns, and their consequences but is explored in project work and therefore not specifically with the United States.

While the students are beginning to have the necessary skills to form a judgement on topics such as comparison of urban settlement between countries, planning for an urban future and migration patterns as part of a guided conversation and reflection that arises, a more conceptual examination of such topics occurs in Stage 4 at which time such topics are thoroughly examined. It is felt that these issues require the maturity of Stage 4 students to be dealt with deeply.

All Australian Curriculum Content Descriptors and Achievement Standards for Stage 4- Years 9 and 10 are convergent within Stage 4.

Comparison at the end of Stage 4 - Classes 9 and 10

English Stage 4

Strengths of the Steiner Approach

An appreciation of the historical development of language and of the art of communication is helpful in guiding students towards responsible and imaginative language usage. When students pay attention to the inner landscape of language they learn how to enliven the way they use written and spoken words to communicate with others. The creative power of the living word has the potential to revitalize the 'wasteland' in culture (T.S. Eliot, 1963). The Steiner approach suggests that there is a close connection between nurturing the living qualities of language (Steiner, GA 299) and using sustainable practices in regard to caring for the world of nature.

The Class 10 units provide an overview of the relationship between the development of human consciousness and literary forms. Students are given the opportunity to develop an understanding of the importance of literary expression by tracing the evolutionary growth of the mythological sagas through significant cultural periods.

INTERCULTURAL UNDERSTANDING

The Australian literature unit (9.1) offers students the opportunity to better understand their roots and to strengthen their relationship with their community and country. By exploring the development of Australian identity students are better able to build their own developing sense of self. The inclusion of Aboriginal, Torres Strait Islander and migrant literature presents students with material that can inform their sense of justice. By appealing to their imaginative faculties the unit also encourages students to develop empathy and respect for people who have different cultural values and beliefs.

Literature learning in general plays an essential role in the development of the students' self-identity in relation to society and their place in the world. Literary texts are therefore selected in the light of their potential for enriching students' lives and expanding the scope of their experience. Students learn about the world vicariously through the characters in the story – by following the characters' experiences of they learn about different historical periods, distant places and foreign cultures, and gain insight into the inner worlds of other human beings. This learning supports the growth of empathy; while the inclusion of texts drawn from multi-cultural contexts provides students with the opportunity to train their sense of social justice, the conscious fostering of the imaginative capacity greatly assists the development of flexible, resilient and enlivened thinking skills, problem solving abilities and the growth of moral awareness.

PERSONAL AND SOCIAL COMPETENCE

The Class 10 student yearns to understand the world and to find their sense of purpose within it. The Class 9 search for balance and harmony begins to bear fruit. The development of increased clarity of thought and an increasing ability to form balanced judgments helps pupils to extricate themselves from the unstable nature of their emotional lives. There is a greater capacity for reflection, which can lead on the one hand to self consciousness and the pain of growing existential awareness, on the other they become capable of great feats of compassion, endurance, intellectual and physical prowess. The students begin to discover their own inner freedom to determine their pathway through life. Relationships between the sexes form; social relationships can be healthy or get lost in group activities. It is very important for students to develop self-esteem.

The Birth of Literature unit (10.1) focuses on the birth pangs of a new stage in human development – one that aptly mirrors the students' own awakening intelligence. Odysseus, as an early example of an intellectually rigorous, ego-directed hero who undergoes hazards equivalent to the contemporary allure of "sex, drugs, and rock 'n roll" successfully manages *anagnorisis* – self-recognition that can lead to individual growth. In the Drama unit (10.3) the stage-focused content and the opportunities for acting, character development and role-play assist the students to build a firm foundation to develop initiative, co-operation and other social skills.

Factors of the Approach which influence Assessment

The holistic orientation means that the educational goals include cognitive, socio-emotional and moral elements which are integrated into the subject areas, and designed to meet the developmental needs of the students. When making decisions on what knowledge, understanding and skills should be assessed, and how, it is necessary, from a Steiner perspective, to ensure that the strategies support goal achievement. In particular the Steiner approach is concerned to ensure that assessment methods are aligned with the Melbourne Goals.

Significant differences in regard to the Steiner English curriculum in Stage 4 include:

- The sequence of skills relating to complex levels of analysis is introduced more gradually in the Steiner approach.
- The Steiner approach to the ACARA descriptors varies due to the emphasis placed on *process* rather than *product* which may have implications in relation to assessment and reporting and the way in which the skills are measured. The subjective and artistic nature of the skills call for a qualitative and descriptive reporting style.

Rationale of the approach to Step One: Experiential learning

During this stage the teacher scaffolds learning experiences based on tacit forms of knowing; it is important to note however that in the high school students take responsibility for and direct their learning more than in the primary school during this stage. 'Warm up' activities: word/rhythm games (clapping/drumming), singing, choral speaking, role play may be included. The objective is to enliven and warm the students' interest in the content topic by firing their 'will' nature. This may include *physical* activities but the underlying intention is to awaken the students to *inner activity*: to spark their intellectual curiosity by first enlivening their responses on the level of their bodies (senses, sentience, sensibility) and feelings.

In relation to the phenomenological methodology the introduction to the unit's topic may begin with a focus on outer, *structural* or *physical* frameworks, for example timelines, historical overviews, description of period clothes, homes, activities. The close observation may move into the *life and living* qualities of the content and learning experience: students may notice what is life-giving and what is not; they may look closely at gestures and movements in illustrations of the period or in stories. As the three stages of content elaboration are repeated several times over the course of a unit, the framework of the study is systematically reinforced and deepened. Teachers may vary their pathway through the content selecting to first follow one strand through on the three levels before starting a further threefold process, or they may systematically introduce new content so that there is an overlap of the stages in every lesson, or they may move the content as a whole through the three stages. The main guideline is for the teacher to use a combination of artistic judgement and a form of teacher action research: to closely observe what activities are most enlivening during this phase (what works and why and for which students) so that their creative response to action in the moment is linked to a systematic process of reflective sharing and questioning. It is possible that a complete lesson plan may need to be put aside because of particular students' needs or the creative potential of a situation that arises.

Step Two incorporates a core element of the Steiner approach and provides a basis for 'heart' intelligence which is understood to embrace emotional, moral, and soul-spiritual aspects. One of the learning objectives of the artistic and multimodal activities is to support the *individuation* process of students – to assist them to express their individual voice, opinions, feelings and developing values; in this way the skills provide the foundation for the development of sociol-emotional and spiritual-moral growth. While the ability to represent ideas and opinions creatively and visually is understood to foster the development of *higher order thinking skills*, during this stage students are expected to stay on the experiential level and not begin analytical interpretation too soon in terms of the process of learning in a single lesson unit.

Step Three: The Steiner approach strongly supports the view that students should be encouraged to think for themselves. Lesson objectives strive towards rigour in relation to thinking skills. However, as noted above, complex levels of analysis are introduced more slowly.

AUSTRALIAN STEINER CURRICULUM FRAMEWORK

The ASCF English is fully convergent at the end of Year 10..

OVERVIEW OF THE RELATIONSHIP BETWEEN THE AUSTRALIAN ENGLISH CURRICULUM STRANDS AND THOSE USED IN THE STEINER ENGLISH CURRICULUM

ASCF English Step One: Learning Experience – <i>observing, taking in, describing</i>	ACARA ENGLISH STRANDS AND SUB-STRANDS		
	LANGUAGE	LITERATURE	LITERACY
STRAND ONE: Aesthetics theme – evolutionary development of the English language	Language for variation and change	Literature and context	Texts in context
STRAND TWO: Interacting with others	Language for interaction	Responding to literature	Interacting with others
STRAND THREE: Reading, comprehending and responding to a wide range of texts	Text structure and organisation	Examining literature	Interpreting, analysing, evaluating
ASCF English Step Two: Multimodal and artistic activities - <i>characterising; responding on a feeling level</i>			
STRAND FOUR: Artistic and creative responses to literary texts; characterisation		Responding to literature Creating literature	Creating texts
ASCF English Step Three: Conceptual knowledge and skills – <i>interpreting, analysing, evaluating</i>			
STRAND FIVE: Applying language and literacy skills in the editing and evaluating of written and spoken assignments	Expressing and developing ideas Text structure and organisation	Creating literature Examining literature	Creating texts Interacting with others Interpreting, analysing and evaluating
STRAND SIX: Interpreting, analysing and evaluating elements of style and context in written and spoken assignments	Language for interaction	Responding to literature	Interacting with others
STRAND SEVEN: Publishing and presenting written and spoken assignments Review Aesthetics theme	Language variation and change	Literature and context	Texts in context Interpreting, analysing and evaluating Interacting with others

Mathematics Stage 4

Strengths of the Steiner Approach

During this stage students increasingly display an ability to make balanced judgements that can be articulately justified. They seek for deeper insight into situations, and apply the conceptual tools of analytical thinking to practical contexts and more complex processes. More accurate observation and deeper understanding allows the students to identify connections and make inferences about the more subtle aspects of a situation. They work with more accuracy and become more adept at dealing with problems requiring the application of a sequential progression of logic. ICT is increasingly used in Mathematical contexts, and students use technology confidently and responsibly as a tool to manage, interpret and represent data. All the topics are imbued with a creative element that encourages the students to look at mathematics from a variety of perspectives. Creative thinking skills are encouraged as a means of developing original or alternative approaches to problem statement and solution. Geometry is appreciated both as an accurate visual and artistic representation of form, but also as a collection of theorems developed out of the application of sequential logic that can be employed to solve problems.

CRITICAL AND CREATIVE THINKING

The increased exposure to concepts that move out of the practical and into the abstract serves to nourish cognitive processes within the students that allow them develop confidence in the power of their thinking. This provides students with the impetus to become confident, creative individuals, who are enterprising, show initiative, explore ideas, and use their creative abilities to make discoveries about the worlds around and within them.

SOCIO-EMOTIONAL UNDERSTANDING

The Class 10 unit on Sequence and Series extends the student's concept of number beyond the finite. The Mathematical theory for Arithmetic, Geometric and Harmonic Sequences and Series is developed as a logical extension of the basic principles of number patterns. Practical applications of this theory are studied from sources as diverse as art, architecture and music, as well as the natural, built and business worlds. This topic brings the students to the realm of Mathematics that lies within but also extends beyond the boundaries of our direct experience. The patterns that express themselves in Mathematical Sequences find reflection in realms which can be experienced through our senses, such as nature, music, architecture and the human body. They form a continuum that extends to both the infinitesimal and the infinite. Through investigating patterns like the Fibonacci Sequence that give rise to the Golden Ratio, students can develop an appreciation for the role of Mathematics in describing the aesthetic elements of the world around them.

INTERCULTURAL UNDERSTANDING

The Class 10 unit on Trigonometry and Surveying focuses on the use and understanding of Trigonometry and its applications to areas as diverse as surveying, mechanics, navigation, engineering, physics, astronomy, mapping, military operations and construction. A thorough picture is presented of the historical significance and development of Trigonometry and Surveying, with emphasis on practical work, applications, mathematical theory and worked examples.

Australia has been surveyed and mapped by Indigenous peoples through their sacred song and oral ritual as long as there has been human habitation of the continent. Aboriginal and Torres Strait Islander peoples developed, recorded and transmitted an intimate knowledge of the land and their environment.

Elsewhere around the world, the Egyptians established farm boundaries five thousand years ago, and the builders of Stonehenge used simple surveying techniques five hundred years later. The basic principles of surveying have changed little since then, and students are brought a practical experience of an area of Mathematics that has contributed enormously to the knowledge human beings have gathered about the world around them.

Factors of the Approach which influence Assessment

The holistic orientation means that the educational goals include cognitive, socio-emotional and moral elements which are integrated into the subject areas, and designed to meet the developmental needs of the students. When making decisions on what knowledge, understanding and skills should be assessed, and how, it is necessary, from a Steiner perspective, to ensure that the strategies support goal

achievement. In particular the Steiner approach is concerned to ensure that assessment methods are aligned with the Melbourne Goals.

Significant differences in regard to the Steiner Mathematics curriculum in Stage 3 include:

- The sequence of skills relating to complex levels of analysis is introduced more gradually in the Steiner approach.
CONVERGENCE: The end of the stage.
- The theme of chance and probability is related to the natural and human worlds rather than being treated as a mathematical concept that does not connect with reality.

The ASCF Mathematics Curriculum is fully converge at the end of Year 10.

Science Stage 4

Strengths of the Steiner Approach

Building on the firm foundation of the previous stage students are now able to move to a new level of intellectual discernment and evaluation. Their ability to integrate their studies in different topic areas strengthens, as does their ability to synthesise disparate ideas and observations, and to predict likely outcomes. Towards the end of the stage their thinking reaches a new threshold as they prepare for the more philosophical level of understanding of the next stage.

CRITICAL AND CREATIVE THINKING

In Class 9 the type of discernment exercised in the understanding of phenomena requires a greater level of integration of experience. For example, the understanding of telecommunication, the transmission of voice by electrical impulses, involves integrating the understanding of the physics of sound transmission in air, the relationship between the elements of an electric circuit (voltage, current and resistance) in a microphone, the way that an electromagnetic field is used to amplify sound in a speaker, and the complex switching required in a telephone exchange. The understanding of the processes that accompany fermentation of sugar to alcohol and then to vinegar, ether and esters, requires the student to develop certainty in their own following of the process of transformation inwardly, based on the way that volatility increases, carbon content varies and solubility on water varies (Science 9.3 and 9.4). In Science 9.5 a sense for reading form and what it means is developed in the study of gesture in comparative anatomy. This exercising of inner experience in understanding, develops and aesthetic sense for the subject which invites a deeper engagement with science than the mere learning of information.

In year 10, the level of intellectual evaluation required for the integration of laws from different areas of science into the understanding of significant applications (Science 9.1-7), is now taken further into a more theoretical and fundamental level of understanding. Understanding the laws of force and energy, expressed, for example in Newtonian mechanics requires a degree of theoretical discernment that is more challenging than understanding the basic workings of a telephone. It enables thinking to grasp some of the happenings in the world in a predictive way. The various Class 10 Science units engage the students' thinking in qualitatively different ways, strengthening their ability to think creatively and confidently in preparation for the more philosophical discernment required for the topics of Classes 11 and 12.

LITERACY AND NUMERACY

The introduction of new theoretical concepts means that students expand their subject-specific vocabulary; laboratory lessons are introduced which require the students to increase their practical scientific literacy (Science 9.2 and 9.4). Topics now achieve a level of refinement and integration in their technological application, e.g. galvanic electricity and simple mechanics of Science 7.2, electromagnetism of Science 8.4, and the acoustics of Science 8.3 are interwoven in a way that demonstrates their contribution towards the foundation of systems of communication and transport that still form the main systems of our global society (see Science 9.1 and 9.2). The year 10 topics take the level of abstraction to a new level: the topic of mechanics from previous years, now becomes a study of motion (kinematics), forces and materials (statics) and forces in movement (dynamics), (Science 10.1). The chemistry of salts (Science 10.3 and 10.4) involves understanding that in the convention of naming, for example in the salt sodium sulphate, the base potential of the salt is referred to in the first part of the

name and the acid potential in the second part of the name. During this stage, the science subjects offer many opportunities for the furthering of numeracy

PERSONAL AND SOCIAL COMPETENCE

The additional laboratory work demands a new level of skill and responsibility, which increases the confidence with which the adolescent approaches learning. Students realise that they can carry out quite complex construction e.g. bending glass and carrying out simple glass blowing, to make apparatus that serves the chemical process. The integration of hand skills with intellectual understanding satisfies the need of the adolescent to feel that they can understand and carry out actions which are part of the technology around them (Science 9.2 and 9.4).

The study of their own anatomy in relation to other vertebrates leads to a new relationship to self and their own intentionality (Science 9.5); and the study of the Earth and its processes of transformation to a new relationship to the planet we occupy. This unit is further enriched if it extends the study of the subject into the landscape in the form of an expedition. Students of this age are keen to know that their own thinking is related to operative laws in the world, for this awareness builds a new level of trust in their own intentionality and ability to influence the world in a positive way.

Ethical Behaviour

The themes for this age group are consciously chosen as there is an innate interest and need on the part of the adolescent for education on these selected topics. Understanding of technology and substance is an effective way for the adolescent to develop a relationship to issues that goes beyond the sensual. The chemistry lesson offer possibilities to discuss the effects of alcohol on consciousness in a way that is not 'moralistic'. The study may for example involve inviting people from Alcoholics Anonymous to the class to describe the disease of alcoholism. The laboratory lessons of Science 9.4 allow the students to make alcohol and then transform it into a medicine – an experience that offers a relationship to the substance that is positive and enlightening. An ethical stance in relation to the environment is developed in the practical work that takes place in Science 9.7. Learning about salts, acids and bases can lead to an appreciation of how large scale effects can be the result of quite simple fundamental laws, for example the salinity crisis that effects large areas of Australia. The study of weather processes (Science 10.6) offers them the opportunity to understand one of the major contemporary controversies, global warming and the way that we understand it, while Science 10.2 and Science 10.7 provide practical ways that we can act in our modern world to address the problems e.g. carbon sequestration in the soil by organic humus building and sustainable building practice. This approach of both bringing awareness of large problems as well as ways of solving them are powerful incentives for adolescents to take up their growing responsibilities in relation to their life styles.

Factors of the Approach which influence Assessment

The holistic orientation means that the educational goals include cognitive, socio-emotional and moral elements which are integrated into the subject areas, and designed to meet the developmental needs of the students. When making decisions on what 'knowledge, understanding and skills' should be assessed, and how, it is necessary, from a Steiner perspective, to ensure that the strategies support goal achievement. In particular the Steiner approach is concerned to ensure that assessment methods are aligned with the Melbourne Goals.

Differences in regard to the Steiner Science curriculum in Stage 4 include:

- Human Biology: Whereas in class 8 the emphasis is placed on developing a relationship to the body as a part of the world, in class 9, the emphasis is on understanding the human being as a subjective being, and the bodily basis of Intentionality. This includes beginning to understand how intentionality is part of our bodily nature; neuronal networking - in its relationship to intentionality.
- Geology and Horticulture: In Class 9 the focus is on matter and energy flowing through ecosystems. Carbon sequestration is an important consideration in these times of carbon increase in the atmosphere as a greenhouse gas.
- In Class 9 the emphasis is on understanding organic compounds qualitatively in connection to their occurrence in the plant and between the polarities of Carbon and Hydrogen. From a social emotional perspective – this approach is much more inclusive of all students and allows an inner connection to the understanding of chemistry which often is felt to be barren because of the abstract mathematical models which are taught as the basis of the subject. See: Science 9.3 Chemistry -Transformation of Plant Substances; Science 9.4 Chemistry Technology: Transformation of Plant Substances (wine making to medicine making).
- In Class 10, the chemistry of salts and their role as the offspring and the origin of acids and bases, is highlighted. The emphasis is on a holistic approach to chemistry which connects substance to life and landscape.
- .For clarity for recognition purposes the curriculum identifies.the big bang theory, natural selection and genetics content inclusions by the end of Year 10.
- For recognition purposes atomic theory and the periodic table of elements have been included by drawing down the Year 11 Topics Science 11.1, 11.2 as 10.8, 10.9 .

The Australian Steiner Curriculum Framework: Science is convergent by the end of Year 10.

History Stage 4

Strengths of the Steiner Approach

Students have a rich historical understanding gained from the extensive use of mythological, historical and biographical content and stories during their primary school years. They bring to the increasingly complex conceptual content a wealth of imaginative pictures, flexible, resilient learning styles and the ability to weave together critical and creative thinking. Students are practiced in working with a multiplicity of perspectives, contrasting interpretations and competing historical accounts. They are accustomed to viewing History as a terrain that inspires ethical contemplation; they are open to studying the stories of individuals and situations in the past as a way of testing their own moral sense, of honing it against some of the real complexities individuals have faced in difficult settings.

CRITICAL AND CREATIVE THINKING

The reasoning skills that emerge with the adolescent's development of formal thought allow an abstract understanding of causality and the often complex patterns of relationships between historical events and their consequences. There is a continuing need for concrete illustrations and instructional approaches to enhance understanding of historical studies. The study of Archaeological evidence and evaluation of archaeological opinion and techniques offer both inductive and deductive learning experiences. The skills of critical social inquiry and investigation are important tools. The students can now examine how their own thinking is influenced by personal values, cultural and belief systems. They explain and evaluate their own values and ethical dilemmas. They apply conscious thinking strategies when examining personal values and beliefs. Students use strategies such as debate, discussion and building

consensus to examine complex issues. The Class 10 student is able to construct and test hypotheses. They are able to distinguish valid arguments and are prepared to change their position on issues or suspend judgement when it is challenged by factors including weight of evidence and reasoned argument. By the end of Class 10 students compare the present with the past evaluating the consequences of past events and decisions and determining the lessons that were learned.

PERSONAL AND SOCIAL COMPETENCE

The Class 10 student is examining his or her own thinking in a new, more adult way. Examining historical material brings questions about the nature of the human being, the nature of consciousness, relatedness and moral interactions. The teacher provides guiding questions rather than answers. Studies lead to discussion and consideration of the relationship between thinking and choices and the experiences produced by those choices. In analysing history and historical turning points they observe that new thoughts lead to new behaviours and may reflect on how they might think differently, how they make choices and the relationship between freedom and responsibility.

ETHICAL BEHAVIOUR

People who have weathered adversity in real, historical circumstances provide inspiration. "History teaching by example" is one phrase that describes this use of a study of the past—a study not only of certifiable heroes, the great men and women of history who successfully worked through moral dilemmas, but also of more ordinary people who provide lessons in courage, diligence, or constructive protest. They are encouraged to discuss, reflect and analyse in the process of exploring the relationship between opinion and thinking and truth

Factors of the Approach which influence Assessment

The holistic orientation means that the educational goals include cognitive, socio-emotional and moral elements which are integrated into the subject areas, and designed to meet the developmental needs of the students. When making decisions on what knowledge, understanding and skills should be assessed, and how, it is necessary, from a Steiner perspective, to ensure that the strategies support goal achievement. In particular the Steiner approach is concerned to ensure that assessment methods are aligned with the Melbourne Goals.

Significant differences in regard to the Steiner History curriculum in Stage 4 include:

- Different sequencing of topics
- The study of Ancient history

Rationale: As Modern History has been studied in Class 9, students return to Ancient history in Class 10. It is considered developmentally sound for them to explore the deep roots of their ancient past and to weave backwards and forwards between the past and the present; between imaginative dreaming into the stories of this far distant period and rigorous intellectual reasoning in relation to the geographical, political and economic forces that influenced the development of these early cultures.

The ASCF History Curriculum is convergent at the end of Year 10.

WHERE TOPICS FOLLOW A DIFFERENT SEQUENCE

The Australian and Steiner Curricula are in alignment at the end of Stage 4 in History in most areas. The main difference, apparent in the category of Historical Knowledge and Understanding, relates to curriculum topic choice. Many of the topic choices are strongly supported by both tradition and research relating to developmental indications. The Steiner curriculum is an internationally based one and there is some level of accord between curricula in different countries.

The table below identifies the related convergences between the Australian and Steiner curricula and highlights areas where there are variations in emphasis and interpretation.

End of Stage 4: Classes 9 and 10

CLASS 9: Convergent.	
CLASS 10 HISTORICAL KNOWLEDGE and UNDERSTANDING	
Australian curriculum	Steiner curriculum
The Modern World and Australia	9.1 The Making of the Modern World 9.2 Australian History to the Modern Era
<p>Explanation:</p> <p>As Modern History has been studied in Class 9, students return to Ancient history in Class 10. It is considered developmentally sound for them to explore the deep roots of the ancient past and to weave backwards and forwards between the past and the present; between imaginative dreaming into the stories of this far distant period and rigorous intellectual reasoning in relation to the geographical, political and economic forces that influenced the development of these early cultures.</p>	
DEPTH STUDIES AND ELECTIVES	
World War II Rights and freedoms The globalising world	9.1 The Making of the Modern World 9.2 Australian History to the Modern Era
Explanation: As above.	
Australian curriculum	Steiner curriculum
	10.1 Ancient Cultures 10.2 The Development of Human Societies
<p>Rationale for 10.1 Ancient Cultures:</p> <p>This unit focuses on the people who ushered in the dawn of major western and non-western ancient civilisations. Defining the approach to historical studies in class 10 is the question now arising in the young person, 'How did things come to be as they now are?' Connections are established with knowledge and understandings developed in earlier studies of Ancient History, particularly that of Ancient India, Persia, Egypt-Chaldea and Greece, undertaken in Class 5. Where these earlier experiences were built through image, story and biography Class 10 requires the students to use and evaluate primary and secondary sources, examine archaeology. Students develop high levels of critical thinking by considering why civilisations developed where and when they did, why they prospered and why they declined. The environment is of special significance in the development of the human story. The unit includes study of 'the immigrations of the nations and their dependence on the territories of the earth' (Ref. Rudolf Steiner Lecture: 'The Peoples of the Earth'). Students examine interactions among various cultures, emphasise their enduring contributions and the link between contemporary and ancient worlds. The students' thinking has become increasingly abstract and multidimensional. They are now able to engage in comparative analysis and will in this unit consider interrelationships of different aspects of the world and multiple cultures.</p>	

Geography Stage 4

The Australian Steiner Curriculum Framework is convergent in all Content Descriptions and Achievement Standards at the end of Year 10.