**Introduction**

This curriculum framework is a brief statement that provides the foundational worldview from which an Adventist teacher delivers the Australian National Curriculum. It is a concise statement of principles, values and threads that undergird and guide what we consider to be real, true and good. This worldview is shaped and permeated with our belief that Jesus is “the Way, the Truth, and the Life.” John 14:6.

We also believe strongly that each teacher must teach from within their own authentic Christian journey and that their experiential relationship with Jesus will permeate all they say and do. This framework endorses the notion that rather than being Christians who happen to teach, we are wanting to teach Christianly. We wish to reveal a God who loves unconditionally.

“To think Christianly is to accept all things with the mind as related, directly or indirectly, to man’s eternal destiny as the redeemed and chosen child of God.” Harry Blamires, ***The Christian Mind: How Should a Christian Think?*** *,* p. 44

Teaching is more than imparting information. Effective Christian teaching is transformational. It will take Romans 12:1-2 as its focus and try to nurture a discipleship response to God’s love in the lives of our students. This provides the basis for the term “threads” used in the Values and Response Threads section. Threads are simply the qualities or characteristics we desire as responses from our students. They help provide cohesion and linkage to everyday living. These Response Threads, like Values, will often overlap in various subject areas, and provide a discipleship response to God’s love.

The document is intended to be practical and succinct with a clear focus on the transforming role that the Adventist teacher can play in the lives of their students. It commences with:

* A challenge to maximise the transforming teachable moments.
* An overview Adventist curriculum statement.
* A subject-specific rationale followed by the objectives for that KLA.
* A section focused on just how values and threads, with appropriate essential questions, can challenge the teacher to maximise an Adventist worldview and seek transformational experiences for their students.
* Three pro forma options for developing units with an embedded Adventist worldview.
* Sample units – for both primary and secondary – that illustrate this.

The Transformational Teaching documents are designed to assist teachers in being intentional in including an Adventist Worldview in their Learning Areas. The suggestions included in each framework can also support teachers in achieving the following **Adventist Identity Teaching Standards** (Supplement to the AITSL National Professional Standards for Teachers). Further elaborations of these standards can be obtained from your principal or your Director of Education. They can also be found on the ASA website <http://asa.adventist.edu.au>

|  |  |
| --- | --- |
| **Adventist Identity Teaching Standards** | **Proficient Standard** |
| 1.7 Understand how students learn about God | Design and implement teaching programs to promote and support students’ learning about God. |
| 2.6 Knowledge of the content of the Bible and its teachings | Use effective teaching strategies to integrate Bible stories and themes into specific content in appropriate and meaningful ways. |
| 2.7 Reflect an Adventist Worldview | Understand and differentiate the various worldviews to integrate a genuine Adventist Christian Worldview into classroom and school activities. |
| 3.8 Integrate Faith and Learning | Plan and implement effective strategies for the integration of Faith and Learning to engage students in their learning about God. |

**A Challenge**

While these curriculum documents have been put forth as suggestions of how topics of faith, God, and values might be interwoven into Mathematics classes, anecdotal research indicates that when people are asked about their “best" teacher, by far the most influential aspects for 70-80% of responses relate to the kind of person the teacher was, and how his/her personal faith and experience with God was talked about, lived, modelled and shared with students. This idea is backed by one Valuegenesis report that recommends that since young people are wanting a deeper personal relationship with God, “church leaders need to consistently model life lived in relationship to God, and teach that religion is basically a matter of relationships with God and fellow humans rather than a system of beliefs or a code of behaviour.” More recently the current generation’s desire for authenticity, wants to know how this God thing works and to see how it is lived out in everyday life.

**Examples of Powerful and Transforming Teachable Moments**

**In STORIES, teachers share ways that God works and is at work through…**

1. Object lessons, metaphors, word pictures, illustrations
2. Teachers or students providing personal stories involving understandings of God, His intervention, His answers…
3. Teacher exemplifying values in his/her own life which students might model – e.g. patience, perseverance, joy of learning, humility, wonder of God’s ways , fairness, equity, mercy, and grace for the challenging students.

**In FAITH EXPERIENCES in which…**

1. Teachers and students have opportunity to share aspects of their personal walk with God with each other (e.g. sharing with a student how God had directed your thinking in certain ways).
2. Students and teachers explore ways of building relationships with other people through community work, cooperation and service.
3. Class activities/assignments that include opportunities for students to communicate God’s message through writing, speaking, audio-visual presentations and other appropriate ways.

I**n the SCHOOL SETTING,** **opportunities to acknowledge God exist in…**

1. What is written in words, official policies, documents, newsletters, and signage.
2. What is visually displayed in terms of bulletin boards, displays, neat and tidy classrooms without rubbish on the floor, manicured lawns and gardens, large posters with a Bible text, inspirational quotation … etc.
3. The ‘hidden curriculum’ – what is ‘felt’ when one comes into the school – warmth, belonging, sharing; how discipline and deviant issues are solved, a caring community that looks out for each other and rallies around in disaster and need…

**Curriculum in an Adventist School**

This statement represents the heart of Adventist Curriculum in Australia, providing a context and orientation for the learning areas that make up the full curriculum.

Seventh-day Adventist education begins with recognition of the eternal, loving and personal God who has always existed, is all powerful, and is the source of all life, truth, beauty and what is of value. It is based on the premise that God has provided insights into His character and what He has created. It believes that as created beings, humans are dependent on God for such insights in order to know how to grow, function and develop in keeping with His ideal for mankind. This need is because of humanity’s separation from God through sin, and God’s initiative in re-establishing a relationship with humanity through the coming of Jesus Christ, the perfect expression of what God is like.

Adventists believe that humans were created by God to be perfect and in His image, but people exercised their God-given powers of choice and rebelled against God. Mankind is now naturally depraved, dependent on the divine initiative of God for salvation and the restoration of former God-man relationships. Mankind’s true value is only found in his relationship with God and not in isolation from Him. This view asserts that an infinite God, through Christ, created this world as part of a perfect universe which He continues to sustain by His power, through the law He has ordained. Although created perfect in God’s likeness, humanity’s free choice led to alienation from the Creator. This broken relationship resulted in a fallen nature out of harmony with God, and a blighted creation. Through His infinite love, God instituted a plan of salvation through the life, death and resurrection of His Son, Jesus Christ. This plan provides for the restoration of a harmonious relationship between humanity and the Creator, and gives hope of eternal life.

The curriculum in Adventist schools is seen as contributing to the restoration process towards God’s ideal. It is, therefore, a needs-based curriculum, covering a range of knowledge, skills, attitudes, behaviours and values through teaching and learning experiences designed to facilitate holistic development – spiritually, mentally, physically, emotionally, creatively and socially. It endeavours to provide this foundation through a comprehensive range of *learning areas*. These learning areas (or LAs) represent the various *facets* of God’s creation, how each aspect functions, and how created elements within them interrelate. Although they stand with their own distinctive form and character, and may be studied as such, they also allow for integration with one another, thus acknowledging holism in God’s created order. These learning areas, therefore, are like ‘windows’ in two senses – windows through which students may gain views of God’s character and action, and windows of opportunity to respond to God in ways that reflect His character and the values that are part of His Kingdom.

God’s design for enjoyment of a full and abundant life is realised in acceptance of His laws and values as revealed in the unselfish life of Christ and is expressed in His teachings. These values impact on all people’s cultural activities and reflect their relationship with God, other people and the natural world entrusted to their care as well as providing a foundation for an eternal life lived in God’s presence. Related aesthetic values shape their appreciation of beauty and creativity. From this perspective, the development of Christian faith pervades all of life, so every activity within every learning area has spiritual significance.

**The Purpose of Teaching and Learning Mathematics in an Adventist School**

God’s creativity is diverse. Everywhere in nature there are evidences of mathematical relationships. His consistency, order and structure can be seen and appreciated through the patterns and rules of Mathematics. These are shown in ideas of number, form, design and symmetry, and in the constant laws governing the existence and harmonious working of all creation. As the language of the universe, Mathematics helps show us how God is made manifest there. It expresses this part of God’s quality in its patterns of space and number that are partly aesthetic and spiritual. The spiritual dimension of Mathematics transcends logic and reason. It asks ultimate questions, reveals the marvels of human imagination, presents amazing ideas, and challenges the way we think about the world.

Through opportunities to recognise, describe, copy, extend and appreciate these patterns and rules, students’ understanding of God and His world grows. Mathematics develops analytical and creative thinking, reasoning and problem solving skills which are skills God intended His intelligent creation to develop and use responsibly in everyday life. Whereas the student cannot understand the absolute unchangeable nature of God, mathematical dependability demonstrates clearly the consistency of God and His perfect creation.

While Mathematics is a pure science, it opens possibilities of knowledge that defy either proof or disproof, as illustrated by infinite smallness and infinite greatness. This unusual balance between the unexplained and the clearly evident provides the student with an accurate picture of an infinite and eternal God, whom we can neither prove nor disprove, yet in whom we believe. However, God has created rules, functions and patterns that can be demonstrated as an evidence of His presence.

Mathematics may also develop students' capacity to use appropriate thought processes to more clearly identify aspects of truth which relate to natural laws and design. Such truth is predictable, in that, given a set of axioms and the appropriate mathematical processes; the result is always as expected. Therefore when students learn mathematical processes, axioms and laws, they may be further enabled to more clearly identify God's design and handiwork in nature.

“Who else has held the oceans in his hand?

Who has measured the heavens with his fingers?

Who else knows the weight of the earth or has weighed the mountains and hills on a scale?

Who is able to advise the Spirit of the LORD?

Who knows enough to give him advice or teach him?”

Isaiah 40:12, 13

**Mathematics Objectives**

The study of ­**Mathematics** in a Seventh-day Adventist school will…

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **\*The Four Lenses** | **Creation** | **The Fall** | **Redemption** | **Restoration** |
| **The Symbol** |  |  |  |  |
| **The Focus**  | **Purpose** | **Problem** | **Response** | **Hope** |
| **The Descriptor**  | *The meaning of a particular learning concept and God’s purpose.* | *What went wrong because of rebellion?* | *How to respond, using learning for God’s purpose in everyday life.* | *Points to the future when “all will be made new”* *i.e. present actions being shaped by the future ideal.* |
| **Mathematics****Objectives** | Assist students to see God as the intentional Creator of an ordered Universe in which attributes of God, such as consistency, infinity and ordered thought, are embedded. Appreciate that Mathematics provides a language to facilitate our understanding on the intricacy and aesthetics of the world around us. | Promote awareness that Mathematics is not immune from the effects of sin and can be used to deceive, exaggerate, confuse and misrepresent. | Guide students to be open to the world of Mathematics so they can be enabled to live fully and do works of service for the Kingdom. Nurture a recognition that Mathematics can be used to observe, describe and shape culture. | Foster in students an attitude of awe as God’s character and nature are revealed through the range of thinking skills, problem-solving, understandings and concepts explored in Mathematics. |

**Note:** The team developed four objectives after discussions about the book “Connecting Learners with God’s Big Story” from Christian Schools Australia, 2015. This books suggests four ‘lenses’ through which to view the world. These align with our understanding of the Great Controversy and provide a useful tool to assist with integrating faith and learning.

**Linking Values for Adventist Schools and Action Responses**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Values for****Adventist Schools** | **Action Response**(Thread Number) | **Description of Action Response** | **Biblical Foundation** | **Key Essential Questions****for Students**Adapted from *Transformation by Design* | **Further Questions****for Teachers**Adapted from *Transformation by Design* | **Sample Teaching and Learning Ideas** **that reflect an adventist worldview** **in this value** |
| **Compassion, Respect & Responsibility** | **Love God (1)****Build Community (2)****Celebrate Life (4)** | Students respond to God’s love by loving God in return and their neighbour as themselves.Students are active contributors and encouragers of others as the community is built up.Students embrace the full suite of God’s provisions in life and live in such a way that all may flourish. | 1 John 4:7-9Romans 5:8John 15:1-41 Thess 5:12-15Col 3:12-14Eccles 9:10Esther 9:22Luke 10:25-37 | * I obeying God the same as loving God?
* What does Love look like?
* What does God’s love look like?
* How do we respond to God’s love?
* What does it mean to ‘love God with all your heart, mind and soul? (See Matthew 22:37)
* What makes a community?
* Who is our neighbour?
* How do I make sure that my classmates feel supported?
 | * What does love look like in my classroom?
* Am I capitalising on teachable moments so that students can appreciate God’s love in this unit or my classroom?
* Do we see God’s love while studying this unit?
* How can we encourage our students to build each other up and to share burdens?
* How do we ensure that our classrooms are inclusive so that each student has a role to play?
* What opportunities are we providing for students to enhance their local and global communities?
 | * Problem solving

**Data Representation and Interpretation*** Surveys of similarities and difference in features, families and countries etc.
	+ Statistics
	+ Data collection
	+ Data representation

**Money and Financial Mathematics*** Financial planning for a service activity e.g. community garden, morning tea for …
	+ Planning
	+ Budgeting
	+ Money
	+ Purchasing

**Measurement*** Gardening, cooking, planning an event
	+ Mass
	+ Length
	+ Capacity
	+ Time
 |
| **Discernment, Service & Responsibility** | **Embracing Diversity (7)****Practising Hospitality (14)****Shaping Culture (19)** | Students respect and celebrate the built in differences between cultures and peoples given for the enhancement of all.Students welcome and accept others, and use their gifts to embrace others into community.Students understand their cultural context, discern its errors and its virtues, and seek to ‘shake and shape’ it for the Kingdom. | Gal 3:26-29Romans 12:4-8Heb 13:2-31 Peter4:8-10Acts 4:34-35Eph 4:15-162 Cor 5:17 | * Why are we all different?
* What good comes out of diversity?
* Is shaping culture possible?
* How do we discern what is good and bad in our culture?
* How can we be others-centred in our culture?
 | * Have I established a positive learning environment that celebrates the successes of others?
* How are we creating a service-orientated culture in our classroom?
* How are we allowing our students to express their gifts of hospitality?
* How do we celebrate and reward students with all different capabilities?
 | * Statistics
* Modelling

**Differentiation*** Accepting individuality
* Learning styles

**Measurement*** Work and rest
	+ Days of the week, seasons
 |

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| **Values for****Adventist Schools** | **Action Response**(Thread Number) | **Description of Action Response** | **Biblical Foundation** | **Key Essential Questions****for Students**Adapted from *Transformation by Design* | **Further Questions****for Teachers**Adapted from *Transformation by Design* | **Sample Teaching and Learning Ideas** **that reflect an adventist worldview** **in this value** |
| **Hope, Humility, Respect & Discernment** | **Discovering Patterns (6)****Imagining Innovations (10)** | Students explore and discover God’s patterns and designs for delighting in and / or using for the benefit of all. Students innovate and renew for good purposes and thereby praise the Master Designer | Gen 8:22Ps 8:3Ps 19:1-7Rev 21:1,5John 1:1-3Job 38:4-7 | * What makes a pattern a pattern?
* What can we learn from patterns?
* Can you safely mess with natural patterns?
* How do patterns show the Great Designer at work?
* Are all innovations improvements and who decides that?
* Where do new ideas come from?
 | * How do patterns and order reflect God’s character?
* Are students given opportunities to create and explore some of God’s patterns?
* Have you been able to use patterns to develop a deeper mathematical understanding?
* How do I know that I am teaching Christianly?
* Is my innovative teaching approach providing an appreciation for nurture and care of the global community?
* Were in our programs are we giving students the opportunities to innovate?
* Where are we teaching our students the skills of the design process?
 | * Linear and non-linear relationships
* Data representation and interpretation
* Geometric reasoning

**Patterns*** God’s world is patterns (fingerprints/zebra’s coat, comparing animals)
	+ Number patterns (repeated addition)
	+ Fractions
	+ Tessellations
	+ Tangrams
* God’s world is a place of order
	+ Sunset/sunset, Day/night, Seasons

**Number****Measurement** * Looking at measurement from microscopic to ginormous e.g. distance between planets, light years
	+ Length
	+ Time
	+ Large numbers
	+ Designing spaces

**Shape*** Designing spaces
 |
| **Hope, Justice & Compassion** | **Seeking Justice (18)** | Students act as agents of change by identifying and responding to justice. | Amos 5:24Deut.16:202 Kings 9:8Ps 9:16 | * Shat is true justice?
* How do we respond to injustice?
* How are justice and fairness achieved?
* Do we treat our classmates with fairness and justice?
* How do we act when we see someone being treated unjustly?
 | * Are we equipping our students to show God’s love to others?
* Are we equipping our students so that they operate with integrity and are comfortable living in a world that does not live by the sane Christian values?
* How is our lifestyle an outworking of our understanding of justice? How are we applying this to our classroom?
* Are we treating our students with fairness and justice?
 | * Financial mathematics
* Chance and data
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| **Values for****Adventist Schools** | **Action Response**(Thread Number) | **Description of Action Response** | **Biblical Foundation** | **Key Essential Questions****for Students**Adapted from *Transformation by Design* | **Further Questions****for Teachers**Adapted from *Transformation by Design* | **Sample Teaching and Learning Ideas** **that reflect an adventist worldview** **in this value** |
| **EXCELLENCE** | **Pondering Creation (13)****Reflecting Creativity (16)** | Students contemplate both the Creator and His handiwork and respond in delight and praise.Students praise God by reflecting their Creator in making expressive and inspiring things and ideas. | Rev 4:11Col 1:16Ps 8:3-4Exodus 31:1-11Matt 6:28-31 | * How did god make me creative?
* Does everyone had the gift of creativity?
* Where can you see the fingerprints of God in creation?
* What does Creation tell us about God / ourselves?
* If God created the whole universe, why does He care about us?
 | * How does Maths encourage students to be creative?
* How do mathematical concepts show the aesthetics of God’s creative world?
* What do patterns and order reveal about the character and nature of God?
* What opportunities are we creating for students to play with patterns?
* Where do we see patterns that extend beyond physical Creation?
* What opportunities are we giving students to explore and create through innovation?
* How are we recognising God’s extreme artistry in Creation?
* How can we draw our students’ attention to this in our units?
* While pondering creation, what do we learn about our relationship with our Creator?
* In what ways are we incorporating moments to pause, reflect, and contemplate in this unit?
 | * Fibonacci
* Golden rectangle
* Rule of thirds

**Patterns*** God’s world is patterns (fingerprints/zebra’s coat, comparing animals)
	+ Number patterns (repeated addition)
	+ Fractions
	+ Tessellations
	+ Tangrams
* God’s world is a place of order
	+ Sunset/sunset, Day/night

**Number****Measurement** * Looking at measurement from microscopic to ginormous e.g. distance between planets, light years
	+ Length
	+ Time
	+ Large numbers
* Designing spaces

**Probability*** Evolution, Sun/Rain
 |
| **HUMILITY DISCERNMENT RESPECT** | **Growth in Mathematical Understanding (9)****Relishing Play (17)** | Students can go deeper than understanding and knowledge to seek the insight of God.Students have an attitude of joyful play as they respond to what God has provided and Christ has restored | Col 2:2-3James 1:5Prov 4:7Prov 8:27-31Eph 5:202 Sam 6:12-15 | * Does play have a purpose?
* Why is play important?
* Should all classes have the opportunity to play?
* What is wisdom and mathematical intelligence?
* What makes a good learner?
* Do I have to know God to be truly wise?
* Am I equipped to make a wise decision?
 | * Are we noticing and celebrating the joy and satisfaction in moments of ‘serious learning’?
* What perspective do we gain from learning when others are disappointed with outcomes?
* What is the relationship between knowledge, understanding and insight?
* Am I preparing my classes in step with the Spirit of God so that the students can see my own Christian relationship reflected in how I teach?
* How are we practising wisdom in our classrooms?
 | * Geometric reasoning
* Algebra
* Problem Solving

**Mathematical Games*** Hands on games
* Problem solving
* Feeling a sense of achievement
* Celebrating the joy in Maths
* What perspective do we gain from learning when others are disappointed with outcomes? Learning from mistakes
 |
| **Values for****Adventist Schools** | **Action Response**(Thread Number) | **Description of Action Response** | **Biblical Foundation** | **Key Essential Questions****for Students**Adapted from *Transformation by Design* | **Further Questions****for Teachers**Adapted from *Transformation by Design* | **Sample Teaching and Learning Ideas** **that reflect an adventist worldview** **in this value** |
| **Responsibility, Excellence, Integrity & Discernment** | **Challenging Distortions (5)****Overcoming Setbacks (12)****Transforming Thinking (21)** | Students identify and critique areas impacted by sin and then discern God’s purposes.Students overcome setbacks through the strength of the Spirit and live in hope and faith.Students let every thought be captive to Christ so that their thinking is transformed by the renewing of their minds. | Titus 2:11-14Acts 17:22-24Rom 1:25Romans 5:4James 5:11-12Matt 511-12Rom 12:1-2Is 55:8-92 Cor 5:17 | * Why do we love things that are bad for us?
* Is it true that we all worship something?
* What does perseverance look like?
* How do we respond to setbacks?
* How do we support others who are going through difficult times?
* How do patterns of thinking shape our attitudes and behaviours?
* What impact does our thinking have on others?
 | * How do we identify the idols of this world?
* Are our students encouraged to appropriately critique the culture?
* How do we highlight / bring out the goodness of God’s way of doing things?
* Are we aware of the ideas that have shaped our thinking / teaching practices / unit content?
* How can I encourage my students to develop perseverance in the classroom?
* How can knowing God build strength and resilience?
* How do we encourage our students to think about their thinking?
* How does a renewed mind help to ‘test and approve’ or discern and critique?
* Am I developing a sense of personal responsibility when undertaking tasks?
 | * Data representation and interpretation

**Mathematics*** Consumerism – Is God in our choices, idols,
	+ Earnings
	+ Expenses
	+ Needs & Wants
	+ Creating budgets

**Problem Solving*** Formulating, modelling, comparing and making a choice
	+ Using a variety of mental strategies
	+ Making the correct choice is wisdom
	+ Checking how reasonable is your answer
	+ Peer tutors
	+ Solving authentic problems
	+ Learning from trial and error
	+ Thinking outside the box
	+ Changing our point of view

**Statistics*** Using statistics to support wise choices
	+ Data

**Algebra*** Understanding concepts not procedures
 |

Key *Values* of the scriptural story can be woven through the curriculum and thereby ‘draw together’ meaning and purpose in learning.

These numbers in the Action Responses column correspond to the Threads in ‘*Transformation by Design*” by the National Institute for Christian Education, 2015

**Please Note:**

The pro formas and samples that follow are not meant to be prescriptive.  Each Conference has its own set format for programs and documentation.  However, if these would help then please feel free to utilise them.  The important thing is that there is embedded in our documentation a clearly articulated Adventist worldview and reference to a desired student response of threads and values.  If this is not inherent in existing documentation, then the “God in my Unit” sheet is possibly the easiest way to ensure that this criteria is met. Formats in both portrait and landscape are available on the Adventist Schools Australia website <http://asa.adventist.edu.au>

***God in my Unit* Template**

*To be used with existing unit documentation to assist in intentionally including an Adventist worldview*

|  |
| --- |
| **1. UNIT FOCUS***What is the main focus of the unit / key questions?* |
| **2. WINDOW ON THE ADVENTIST WORLDVIEW***What are the main connections between the Biblical themes and the unit?* |
| **3. THREADS/VALUES***What main values are in this unit? How might students respond to these values?* |
| **4. APPLIED THROUGH THE UNIT:***Where will the Adventist worldview and threads / values be applied specifically through the unit?* *i.e. p 2 – reflect on the mercy of God as the story unfolds*  |

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| ***The Big Picture* Template** |
| **1. THE MAIN IDEA***Summarise the Main Idea* |
| **2. WINDOW ON THE ADVENTIST WORLDVIEW***Articulate the connections between the biblical story and the unit* |
| **3. THREADS/VALUES***Choose the relevant response threads* |
| **4. ENDURING UNDERSTANDINGS***Identify the enduring understandings**Identify misunderstandings* | **5. ESSENTIAL QUESTIONS***Shape the essential questions* |
| **6A. KNOWLEDGE***Note the relevant key knowledge and skills* | **6B. SKILLS** |
| **7. PRESCRIBED CURRICULUM***List the relevant content heading and descriptors* |

Both templates based on: National Institute for Christian Education, (2015) *Transformation by Design,* p19 The Big Picture Template

**Sample Unit** using ***The Big Picture*** template

**Patterns in our World [Year 1]**

|  |
| --- |
| **1. THE MAIN IDEA***Summarise the Main Idea*Identify, describe and create everyday patterns. |
| **2. WINDOW ON THE ADVENTIST WORLD VIEW***Articulate the connections between the biblical story and the unit*When God created the universe, He created it with natural laws. Embedded throughout God’s created order are patterns, structures, and systems. God also created us to have reason – to observe, perceive, conclude, discern, question, think and organise ideas. Because of these gifts, we are able to explore all areas of God’s creation and discover His patterns and designs. We seek the inspiration of the Holy Spirit so as not to come to distorted conclusions. Our inspired learning can inform the basis of new discoveries that seek to benefit our communities.‘Patterning is fundamental thinking – in fact, Mathematics has been defined as the study of patterns in number, shape and arrangements. Patterning activities that build on the use made of shapes and colours from the Early Years provide a ready entry to algebraic thinking as children identify and understand the relationships within a pattern through discussion, prediction, justification and reflection, and communicate the generalisations they find to others’. (Booker, Bond , Sparrow and Swan 2014)God is a God of order who has created rules, functions and patterns that can be demonstrated as an evidence of His presence. Through the world He has created harmony, beauty, symmetry and patterns in living things and the way we live our daily lives. These patterns within our world are evidence of a Designer, who is God, our Creator.*When I consider Your heavens, the work of Your fingers, the moon and the stars, which You have set in place.* Psalms 8:3 |
| **3. THREADS/VALUES***Choose the relevant response threads*Threads - Discovering patterns; Overcoming Setbacks and Pondering CreationValues - Humility, Respect, Discernment |
| **4. ENDURING UNDERSTANDINGS***Identify the enduring understandings**Identify misunderstandings*Students will:* Explore, discover, and delight in God’s patterns and designs.
* Understand that God is the Master Designer
* How great is our God that He created everything and He created me in His image.
 | **5. ESSENTIAL QUESTIONS***Shape the essential questions** What makes a pattern a pattern?
* What can we learn from patterns?
* Where can we see the fingerprints of God in creation?
* What does creation tell us about God / ourselves?
* If God created the whole universe, why does he care about us?
 |
| **6A. KNOWLEDGE***Note the relevant key knowledge and skills** Students will be able to continue simple patterns involving numbers and objects.
* Skip counting
* Number chart to 100 and the patterns within it
 | **6B. SKILLS*** To recognise, describe, copy and extend patterns
* Explain patterns that have been created
 |
| **7. PRESCRIBED CURRICULUM***List the relevant content heading and descriptors*Investigate and describe number patterns formed by skip counting and patterns with objects (ACMNA018)* using place-value patterns beyond the teens to generalise the number sequence and predict the next number
* investigating patterns in the number system, such as the occurrence of a particular digit in the numbers to 100
 |

From: National Institute for Christian Education, (2015) *Transformation by Design,* p19 The Big Picture Template

**Pro Forma for Unit Development using Understanding by Design**

|  |
| --- |
| **Stage 1 – Desired Result** |
| **Established Goals** | **Transfer** |
| *Students will be able to independently use their learning to:* |
| **Window on the Adventist Worldview**  | **Values / student response** |
| *Share the way an Adventist world impacts on:* | *Identify the values / desired student response:* |
| **Meaning** |
| Understandings: *Students will understand that:* | Essential Questions*Students will keep considering:* |
| **Acquisition of Knowledge and Skill** |
| *Students will know:* | *Students will be skilled at:* |
| **Stage 2 - Evidence** |
| **Evaluative Criteria** | *Students will show their learning by:* |
|  | Performance Tasks: |
|  | Other evidence: |
| **Stage 3 – Learning Plan** |
| *Summary of Key Learning Events and Instructions* |
|  | *Progress Monitoring* |

Based on: Wiggins, G. P., & McTighe, J, (2011) *the Understanding by Design Guide to Creating High Quality Units*, Moorabbin, Victoria: Hawker Brownlow Education.

**Sample Unit** using **Understanding by Design** template

**Linear and Non-Linear Relations [Year 9]**

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| **Stage 1 – Desired Result** |
| **Established Goals / Standards**Find the distance between two points located on a Cartesian plane using a range of strategies, including graphing software *(ACMNA214)*Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies, including graphing software *(ACMNA294)*Sketch linear graphs using the coordinates of two points and solve linear equations *(ACMNA215)*Graph simple non-linear relations with and without the use of digital technologies and solve simple related equations *(ACMNA296)* | **Transfer** |
| *Students will be able to independently use their learning to:** Identify differences between lines, circles and parabolas
* Analyse relationships and sketch graphs in given contexts
 |
| **Window on the Adventist world view**  | **Values / thread** |
| *Share the way an Adventist world view impacts on:** How patterns and order reflect God’s character?
* Students’ opportunities to create and explore some of God’s patterns.
 | *Identify the values / desired student response:***Values:** Hope**Threads:** Discovering Patterns (6) |
| **Meaning** |
| **Understandings:** *Students will understand that:*1. Graphs are a way of modelling shapes and events that occur in the built and natural world.
2. A graph is a visual representation of the relationship between variables.
3. The previous learning of mathematics is used in the development of linear and non-linear relations.
 | **Essential Questions***Students will keep considering:*1. Why and when do we graph linear and non-linear equations?
2. What do we need to consider when modelling?
 |
| **Acquisition of Knowledge and Skill** |
| *Students will know:*1. How to use the Cartesian plane.
2. What relations can be graphed on a Cartesian plane.
3. How to use technology to plot linear graphs
 | *Students will be skilled at:*1. Plotting points on a Cartesian plane.
2. Sketching linear graphs.
3. Calculating gradients, midpoints and distances.
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| **Stage 2 - Evidence** |
| **Evaluative Criteria** | *Students will show their learning by:* |
| AccurateDetailedLogicalProficient ClearDetailedJustifiedAccurateCompetent | **Performance Tasks:***Students will show that they really understand by evidence of:*1. Their ability to explain the make-up of a linear equation in terms of gradient and position.
2. How they identify and use graphical representations of linear and non-linear equations.

**Example Task:**Picture Perfect: Take a photo of either a static or motion event and convert it into a series of coordinates and using either traditional or ICT techniques find an equation for the relation.Test: Demonstrating an ability to sketch graphs, plot points, and find distances, midpoints and gradients of a line. |
| CoherentThoughtful | **Other evidence:**Providing written or oral responses to one of the essential questionsCompleting exercise work from the textbook |
| **Stage 3 – Learning Plan** |
| *Summary of Key Learning Events and Instructions* |
| **Pre-assessment**Verify what is known from the following (e.g. quiz, homework, discussion):* Plot linear relationships on the Cartesian plane
* Solve linear equations using algebraic and graphical techniques
* Verify solutions by substitution
* What effects change the steepness and position of a graph?
* Application of Pythagoras

**Learning Events*** Distance between two points
	+ Using a rectangular nature of the Cartesian plane
	+ Labelling two points, and identifying the right angled triangle between them
	+ Use of Pythagoras to find the distance between the two points
	+ Application of formula
* Midpoint of a line segment
* Linking of a line segment to a continuous line
* Definitions
* Equation of a straight line
	+ The gradient of a line
		- Slope (including positive and negative)
		- Rise/Run
		- $m=\frac{y\_{2}-y\_{1}}{x\_{2}-x\_{1}}$
	+ Identifying and showing the y-intercept
		- Position
	+ $y=mx+c$
	+ Horizontal and vertical lines
* Sketching a linear equation
	+ From $x and y$ intercepts
	+ From gradient-intercept method
* Non-Linear relations
	+ Parabolas and Circles
		- Definitions
		- Equations
		- Graphs
 | *Progress Monitoring***Predictable gaps and misunderstandings that need monitoring.**Using the two points correctlyPositive and negative gradientsConfusing the elements of a linear equationFinding the $x$-interceptScale on the $x and y$ axisUsing the gradient to find the second point of the lineFinding points |

Indebted to Christian Schools Australia “The Big Picture Model” and Wiggins, GP., & McTighe, J, (2011) *The Understanding by Design Guide to Creating High Quality Units*, Moorabbin, Victoria: Hawker Brownlow Education.

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