


Algebra – The maths of predictability - Transformation by design unit outline

Main idea	
<p>Algebra: In God's world, many things are consistent. We value and build expectations around these consistencies. Based on the consistencies of our world we can make predictions once we know the variables that affect it.</p>	
Biblical perspective (creation, fall, redemption, restoration)	
Creation	
<ul style="list-style-type: none">➤ God created a world of order with observable patterns.➤ Patterns in nature reveal some of the majesty and complexity of God	
Fall	
<ul style="list-style-type: none">➤ Humans no longer worship God as the creator of the world (2Cor. 4:4).➤ Some of God's created patterns have been disrupted because of our sin (global warming, weather patterns, tidal heights, populations of endangered animals disrupted etc...)	
Redemption	
<ul style="list-style-type: none">➤ Christ's victory over death and His saving work allows us to view life in a new light (2Timothy 1:10)	
Restoration	
<ul style="list-style-type: none">➤ Mathematics (algebra, functions, and graphs) are useful tools to model relationships in God's creation. These modelled relationships allow us to understand, care for, and steward God's creation in the way He intended.➤ Mathematical tools equip us to find patterns and relationships. Hence, we can question, think about, and organise ideas: make predictions and solve problems. It enables us, with God's help, to make wise decisions, so together we can help those in our community.	
<p><i>"As long as the earth endures, seedtime and harvest, cold and heat, summer and winter, day and night will never cease." Genesis 8:22</i></p> <p><i>"Jesus Christ never changes! He is the same yesterday, today, and forever" Hebrews 13:8</i></p>	
Threads	
Pondering Creation/ Discovering Patterns	
<ul style="list-style-type: none">• Mathematics is a tool for measuring and analysing all aspects of God's creation. God's creation includes natural growth patterns/ natural relationships/• Understanding and using patterns helps us interpret what is happening in God's world, especially where things are not 'right'. They also enable us to implement improvements to restore creation.	
Challenging Distortions/ Imagining Innovations	
<ul style="list-style-type: none">• Through graphing environmental trends, we can identify anomalies or changes in weather patterns, animal populations etc. that are concerning. The identification of these problems creates opportunity for new innovations to address them	

Essential questions
<ul style="list-style-type: none"> • What is consistent? What are variables? What do we need to know to make a prediction? • With enough information, can everything be predicted?
Misconceptions
Everything can be reduced to patterns
Life-long learning
<p>Heart: I'm amazed by the consistency of God and aspects of His creation</p> <p>Heart: When I contemplate the variables that can influence the functioning of God's world, it fills me with awe and wonder at how seamlessly everything does work together.</p> <p>Head: I can describe the relationship between variables in real-life contexts</p> <p>Head: I help others in their use of patterns and relationships to question, think about, and organise ideas</p> <p>Hands: I use patterns to plan and predict to better serve our community</p>
Australian Curriculum Outcomes
By the end of Year 8, students apply algebraic properties to rearrange, expand and factorise linear expressions. They graph linear relations and solve linear equations with rational solutions and one-variable inequalities, graphically and algebraically. Students use mathematical modelling to solve problems using linear relations, interpreting and reviewing the model in context. They make and test conjectures involving linear relations using digital tools.
Christian perspective: framing activities
<p>Note about the contexts of material – these are contexts my students are familiar with and understand. It is important to adapt these for your local contexts.</p> <ul style="list-style-type: none"> • Photo: in the Northern Territory of Australia dragonflies are an antidotally (unproven) 'sign' that locals rely upon to indicate that the much-anticipated dry season is coming. • Sunsets are a stunning feature of life in northern Australia. • Crocodiles in Adelaide River are always a talking point!
Unit outline
Cover page for worksheets (attached)
Self-reflection rubric to complete at the beginning and end of the unit of work.
Introductory PowerPoint: Algebraic relationships, patterns, and predictions – slides 1-11
<p>Discussion question</p> <p><i>Predictable patterns in God's creation: What is one pattern in God's creation that is predictable? Find a photo to match your ideas and upload it to the discussion board.</i></p> <p>Set this discussion question for homework and then show responses to the class. This fosters the rhythm of worship in your classroom. It also allows students to self-evaluate, for instance, if they have found a 'created' pattern such as financial predictions, they would not be meeting the outcomes for this task. Answers might include any life cycle of any living thing (plants, animals, humans); moon phases; earth's orbit around the sun etc...</p>

Predictability and variables information page and activity – including ‘how to predict a good sunset’:
<https://www.abc.net.au/news/2018-05-11/how-to-predict-good-sunrise-and-sunset/9737446>

Mathematical tools equip us to find patterns and relationships. Hence, we can question, think about, and organise ideas: make predictions and solve problems. It enables us, with God’s help, to make wise decisions, so together we can help those in our community.

Watch videos, explore resources, and investigate issues on the “Gapminder” website. Wonder, ponder, and ask questions e.g.

- How can the world population forecasts be so good: <https://www.gapminder.org/answers/how-can-the-world-population-forecasts-be-so-good/>
- How reliable is the world population forecast: <https://www.gapminder.org/answers/how-reliable-is-the-world-population-forecast/>
- Use survey and data from ‘Factfulness’ book as well as internet data on topics above to graph

Discussion question: How does graphing patterns help us understand and respond to patterns in the world appropriately?

Questions to include in an exam paper (attached)

Algebra

Y.8 Workbook



The maths of predictability

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*“Jesus Christ never changes! He is the same yesterday, today, and forever”
Hebrews 13:8*



Questions to ask on an exam

1. Describe one consistent pattern in creation? What do you find amazing about this? (2 marks for a thoughtful response)
2. What are the variables that go into the size that a crocodile will grow to? (2 marks for a thoughtful response)
3. What is one “real life” pattern that you could use to make a prediction that would help someone else? (2 marks for a thoughtful response)

Insert the self-reflection rubric on the next page

4. Fill in the self-reflection over the page – do you think you have more understanding of patterns and predictions now after doing this topic? Explain. (2 marks thoughtful response)