Teacher(s)	SSENYONGA DERRICK	Subject group and discipline		Math		
Unit title	Linear relationships	MYP year		3	Unit duration (25 hrs)	

Inquiry: Establishing the purpose of the unit

Key concept	Related concept(s)		Global context	
Relationships	Change, models, representation		Globalization and sustainability: Impact of human decision-making	

Statement of inquiry

Representing patterns of change as relationships can help determine the impact of human decision-making on the environment.

Inquiry questions

Factual— What is a pattern? What is slope?

Conceptual— How can you represent changing relationships? What makes a good representation?

Debatable— How does human decision-making affect the environment? How are we held accountable for our decisions?

Objectives	Summative assessment	

A: Knowing and understanding
 	
  i. select appropriate mathematics when solving problems in both familiar and unfamiliar situations
 	
  ii. apply the selected mathematics successfully when solving problems
 	
  iii. solve problems correctly in a variety of contexts.
 	
B: Investigating patterns
 	
  i. select and apply mathematical problem- solving techniques to discover complex patterns
 	
  ii. describe patterns as relationships and/or general rules consistent with findings
 	
  iii. verify and justify relationships and/or general rules.
 	
C: Communicating
 	
  i. use appropriate mathematical language (notation, symbols and terminology) in both oral and written explanations
 	
  ii. use appropriate forms of
	Outline of summative assessment task(s) including assessment criteria:
	
	Unit Test: (criterion A)
	
	In this task, students will answer a wide range of questions, from simple to complex to challenging (in both familiar and unfamiliar situations), all based on linear patterns of change and how they can be represented. Questions will focus on representing lines in a variety of forms, graphing lines, finding the equation of a linear pattern and applying these skills to solve real-life problems. The test will be done individually in class during one period.
	
	Investigation: Gradient of a Line (criterion B)
	
	In this task, students will generalize the relationship between the coordinates of two points on a line and the steepness of
	
	that line (its gradient or slope). They will first work with specific points on several
		Relationship between summative assessment task(s) and statement of inquiry:
		
		The Unit Test will allow students to apply the content they have learned to a wide range of questions and verify that they can represent patterns of change as relationships and apply these to make decisions. Many of the questions will
		
		include applications to real-life situations focused on how decisions made by
		
		humans affect the planet on which we live.
		
		Generalizing the relationship between the coordinates of two points and the slope of the line joining them is the building block for being able to identify patterns of
		
		change and then representing them in a

mathematical representation to present information
iii. move between different forms of mathematical representation
iv. communicate complete and coherent mathematical lines of reasoning
v. organize information using a logical structure.

D: Applying mathematics in real-life contexts

i. identify relevant elements of authentic real-life situations
ii. select appropriate mathematical strategies when solving authentic real-life situations
iii. apply the selected mathematical strategies successfully to reach a solution
iv. explain the degree of accuracy of a solution
v. explain whether a solution makes sense in the context of the authentic real-life situation.

lines to see how the steepness can be calculated and then they will generalize that relationship to arrive at a formula for gradient/slope of a line that joins any two points. The investigation will be done individually in class during one period, under test conditions.

Feeding a Growing Planet: (criteria C, D)
In this task, students become part of a task force to analyse and report on the problems associated with meat production and deforestation in light of the fact that the world's population is predicted to be 8.5 billion people by 2030. Students use linear models to describe patterns of change that help inform the recommendations made by the task force.

variety of forms. Without knowledge of slope, students would not be able to identify and describe the relationship between certain human decisions and their effects on the environment.

In the Feeding a Growing Planet task, students will use the mathematics that they have learned in order to describe the patterns of change in meat consumption and rainforest destruction. The decisions humans have made in these areas have a direct impact on our planet and students are asked to not only assess what they are, but also suggest ways to minimize (or reverse) these patterns. This brings the statement of inquiry to life and takes it one step further as students realize that knowledge can lead to the power to make changes just in the nick of time.

Approaches to learning (ATL)

In order to develop students to develop as reflective risk-takers, students will identify obstacles and challenges. (Thinking: Critical thinking skills) The strategy students will learn and practice is "challenge yourself", where they will identify at least one challenge to changing behaviour. Minimizing our effect on the planet begins with the small, daily decisions and understanding what prevents us from making them. Students are asked to identify obstacles to making a new decision despite its positive effects on the environment.

In order for students to be successful in the "Feeding a Growing Planet" task, students will locate, organize, analyze, evaluate, synthesize and ethically use information from a variety of sources and media (including digital social media and online networks) (Research: Media literacy skills). The strategy students will learn and practice is "justified research", where they will search for reputable sources of information, cite them and justify how they know the source is reliable.

Action: Teaching and learning through inquiry

Content	Learning process
- Linear relationships, - slope, - Pattern recognition, - Graphing lines, - equation of a line, - Real-life applications of linear relationships.	**Learning experiences and teaching strategies** - Hands-on activities such as graphing linear equations using manipulatives. - Inquiry-based investigations into real-world scenarios involving linear relationships. - Use of technology tools for graphing and analyzing linear data. - Socratic questioning to promote critical thinking and reflection. - Peer teaching and collaborative problem-solving tasks. - Mini-lectures to introduce new concepts followed by guided practice and application

Formative assessment

- Exit tickets to gauge understanding at the end of lessons.

- Peer feedback during collaborative activities.

- Observation of student participation and engagement.

- Quizzes or short assessments after key learning milestones.

- Student reflections on their learning process and understanding.

Differentiation

- Provide choice in how students demonstrate understanding (e.g., written explanations, visual representations, presentations).

- Offer varied levels of challenge through extension activities or optional tasks.

- Provide additional support for struggling learners through guided practice or small group instruction.

- Use flexible grouping strategies to accommodate diverse learning needs.

- Provide accommodations such as extra time, modified tasks, or alternative assessments as needed.

Resources

1. Student textbook: Amlin,I, Bateson,R.2018.MYP:By concept 3. Banbury,UK.Hodder Education.
2. David Weber, Talei K, Fatiima. 2018. MYP Mathematics 3 Course Book. Oxford, UK. OUP Oxford.
3. YouTube videos are available using the search terms "MYP 3 LINEAR RELATIONSHIPS"

Reflection: Considering the planning, process and impact of the inquiry

Prior to teaching the unit	During teaching	After teaching the unit
Prior to teaching the unit: Reflect on student interests, prior knowledge, and learning goals to inform unit planning.	During teaching: Reflect on the effectiveness of instructional strategies, student engagement, and understanding.	After teaching the unit: Reflect on student learning outcomes, areas for improvement, and adjustments for future teaching.

SERIVICE LEARNING USING THIS UNIT (CAS)

1. **Community Environmental Awareness Campaign**:
   - **Service Opportunity**: Students could organize a community awareness campaign on environmental issues related to linear relationships, such as the impact of carbon emissions on climate change.
   - **Service Outcome**: This opportunity fulfills the service outcome of raising awareness and promoting understanding of environmental sustainability within the local community.
   - **Explanation**: By engaging in this service activity, students apply their understanding of linear relationships to real-world environmental issues. They demonstrate their ability to communicate complex concepts in a clear and accessible manner, contributing to community education and action on sustainability.
2. **School Recycling Initiative**:
   - **Service Opportunity**: Students could initiate a school-wide recycling program, collecting and sorting recyclable materials to reduce waste and promote sustainability.
   - **Service Outcome**: This opportunity fulfills the service outcome of taking responsible action to address environmental challenges and promote sustainable practices within the school community.
   - **Explanation**: Through this initiative, students apply their understanding of linear relationships by analyzing data on waste generation and recycling rates. They use mathematical models to predict the potential impact of increased recycling efforts on reducing waste and conserving resources, demonstrating their ability to apply mathematical concepts to real-world problems.
3. **Energy Conservation Campaign**:
   - **Service Opportunity**: Students could lead an energy conservation campaign within the school, encouraging classmates to reduce energy consumption and adopt energy-saving practices.
   - **Service Outcome**: This opportunity fulfills the service outcome of promoting responsible behavior and decision-making to minimize environmental impact and promote sustainability.
   - **Explanation**: In this service activity, students apply their understanding of linear relationships by analyzing energy usage data and identifying patterns of consumption. They use mathematical models to estimate potential energy savings from adopting more efficient practices, empowering their peers to take action to reduce their environmental footprint.

MORE RESOURCES
- Graphing calculators or software for visualizing linear relationships. (DESMOS, GEOGEBRA)

- Real-world data sets for analysis and interpretation. (AMERICAN STATISTICAL ASSOCIATION, MATHS24SEVEN)

- Manipulatives such as graph paper, rulers, and algebra tiles.

- Supplementary readings or videos on topics related to linear relationships and sustainability. (KHAN ACADEMY, KOGNITY)