MATHEMATICS & INDIVIDUALS AND SOCITIES INTERDISCIPLINARY UNIT PLAN

Teacher(s)	1. **MR. SSENYONGA DERRICK (MATHEMATICS)** 2. **MR. KIWALABYE HENRY (INDIVIDUALS & SOCIETIES-GEOGRAPHY)**	**Subject groups**	**INDIVIDUALS AND SOCIETIES** **MATHEMATICS**		
Unit title	**Bridging individuals and societies with mathematical insights on water pollution and what it takes to be a global citizen.**	**MYP year**	**3**	**Unit duration**	**15 HOURS**

Inquiry: establishing the purpose of an interdisciplinary unit

Purpose of integration
The purpose of integrating Individuals and Societies and Mathematics in the water pollution unit is to provide students with a comprehensive, interconnected learning experience that goes beyond disciplinary boundaries, fostering critical thinking, skills development, and a sense of global citizenship.

Key concept(s)/(related concepts)	Global context
Global interaction, Change, Relationships	Identities and relationships, Globalization and sustainability

Statement of inquiry

The impact of water pollution requires collaborative understanding and mathematical analysis for informed solutions and responsible citizenship.

Inquiry questions

Factual - What are the main sources of water pollution, and how do they vary globally?

- How do different societies prioritize and address water pollution issues?
- What statistical methods can be employed to analyse water quality data?
- What mathematical formulas describe the relationship between pollutant levels and environmental impact?

Conceptual - How does water pollution reflect the interconnectedness of human societies and the environment?

- What are the ethical considerations surrounding water pollution, and how do they shape societal responses?
- How can mathematical concepts be applied to model the complex dynamics of water systems?
- In what ways do mathematical principles contribute to the understanding of sustainable solutions to water pollution?

Debatable - To what extent do human activities contribute to water pollution, and how does it impact societies?

- How do cultural perspectives influence approaches to water pollution prevention and management?
- What mathematical models can be used to predict the spread and intensity of water pollutants?
- How does statistical analysis help us understand the correlation between human activities and water quality?

Summative assessment—interdisciplinary performance(s) of understanding	
1. CRITERION A: strands i to iv	Demonstrates a deep understanding of water pollution, integrating concepts from Individuals and Societies and Mathematics seamlessly. Clearly articulates the interrelationships between societal impacts, cultural considerations, and mathematical analyses of water quality.
2. CRITERION B: strands i to iv	Applies critical thinking skills to analyze and evaluate the causes and effects of water pollution, drawing insights from both disciplinary lenses. Utilizes mathematical models and statistical analyses to enhance the depth of analysis. **Interdisciplinary Summative Assessment Task:** **Task Title: "Aquatic Insight Exhibition"** **Task Description:** Students will collaboratively design and present an "Aquatic Insight Exhibition" where they showcase their understanding of water pollution through a combination of Individuals and Societies and Mathematics perspectives.

Approaches to learning (ATL)

Research skills will be cultivated as students investigate the historical, cultural, and mathematical dimensions of water pollution, emphasizing critical evaluation of sources. **Communication skills** will be honed through collaborative discussions and the creation of interactive displays for the "Aquatic Insight Exhibition," ensuring clear articulation of findings. **Critical thinking skills** will be central as students analyse the causes and effects of water pollution from societal and mathematical perspectives. **Self-management skills**, including time management and organization, will be crucial for balancing research, mathematical modelling, and exhibition preparation. **Social skills** will be fostered as students engage with diverse perspectives on water pollution, promoting cultural awareness and collaboration. **The transfer of** skills between Individuals and Societies and Mathematics will be emphasized, showcasing the ability to apply insights across disciplines.

Learner Profile: We will consider the different ways that people can make a positive difference to others and the planet.

1. **Inquirer (Individuals and Societies):**

    - **Application:** In the Individuals and Societies component of the unit, students are encouraged to be inquirers as they explore the historical, cultural, and societal aspects of water pollution. This involves researching the impact of water pollution on different communities, investigating cultural perspectives, and questioning how societal attitudes influence responses to water pollution. Inquirers will actively seek out information, engage in critical analysis, and develop a comprehensive understanding of the societal dimensions of the issue.

2. **Thinker (Mathematics):**

    - **Application:** In the Mathematics component of the unit, students are prompted to be thinkers as they apply mathematical concepts to analyze water quality data and model the dynamics of pollution. Thinkers in this context engage in critical thinking to select appropriate mathematical models, apply statistical methods, and analyze trends. They reflect on the mathematical relationships between variables, considering the implications for environmental understanding. Thinkers also explore how mathematical thinking contributes to developing solutions and strategies for managing water pollution.

Action: Teaching and learning through interdisciplinary inquiry

Disciplinary grounding	
Subject: Mathematics	**Subject**
MYP objective: Apply mathematical concepts to model and analyse water quality data, identifying trends and correlations. Effectively communicate mathematical insights and explore interdisciplinary connections with Individuals and Societies.	**MYP objective:** Develop a comprehensive understanding of water pollution by exploring its historical, cultural, and societal dimensions. Communicate findings effectively and collaboratively explore mathematical correlations related to societal impacts.
Related concepts: Relationship, Change, Form, Function.	**Related concepts**: Change, Identities and Relationships, Globalization and Sustainability.
Content How do mathematical models enhance our understanding of water pollution trends and correlations? What mathematical concepts and statistical methods can be applied to analyse water quality data effectively? In what ways does the application of mathematical thinking contribute to interdisciplinary solutions for managing water pollution? How can visual representations of mathematical relationships be effectively communicated in interactive displays for the "Aquatic Insight Exhibition"?	**Content** What are some of the issues facing the world today? How have different environments been damaged by human activities? What are the consequences of plastics in water? Solutions to plastics in water bodies such as lakes and oceans Deforestation

What insights and connections can be drawn by collaboratively exploring and refining mathematical models within small groups or pairs?	
Disciplinary learning engagements and teaching strategies 1. **Modelling Water Pollution Trends:** • *Description:* Students engage in hands-on modelling exercises to apply mathematical concepts, exploring how different models represent water pollution trends. This involves the use of statistical methods to analyse real-world water quality data and identify correlations. 2. **Statistical Analysis Workshop:** • *Description:* Conduct a workshop focusing on statistical methods relevant to water quality analysis. Students actively participate in analyzing datasets, applying statistical tools, and discussing the implications of their findings.	**Disciplinary learning engagements and teaching strategies** Introduction of lesson with **'**Think- pair- share**'** activity (using photograph) Students will research on website on human achievement and describe why it is an example of human achievement. PPT presentation on various issues that world facing today. Latest examples in the form of video presentation Interpretation of data, table and political cartoon – activity Case study **–** plastic in the ocean **–** discussion in the class Worksheet based on plastic oceans to develop critical thinking skill (individual activity) Circle of viewpoints **–** plastic in the ocean issue

3. **Interdisciplinary Problem-Solving Session:** • *Description:* Facilitate a collaborative problem-solving session where students work in interdisciplinary teams to apply mathematical thinking to real-world water pollution challenges. This engagement encourages the integration of mathematical concepts with insights from Individuals and Societies. 4. **Interactive Displays Design:** • *Description:* Students design interactive displays for the "Aquatic Insight Exhibition" to visually represent mathematical relationships related to water pollution. This engagement involves creating visualizations that effectively communicate mathematical insights to a diverse audience. 5. **Peer Review and Refinement:** • *Description:* Organize a peer review session where students exchange and critique each other's mathematical models. In pairs or small groups, students collaboratively refine their models based on feedback, emphasizing collective problem-solving and continuous improvement.	Exploring the first 3 factual questions A Plastic Ocean video clip to introduce the class If you drop plastic in the ocean, where does it end up video https://www.theguardian.com/environment/2017/jun/29/if-you-drop-plastic-in-the-ocean-where-does-it-end-up Group discussion on solutions in tabular form and finding major challenges in connection to key concept of global interaction. Exploring last factual question. Case study on deforestation **'**See- think- wonder activity**'** Video presentation on consequence of deforestation Worksheet on terminology matching activity presentation on solution to deforestation Infographic design activity on deforestation in group of four

Interdisciplinary learning process	
Interdisciplinary learning experiences and teaching strategies Students engage in field investigations, collaborative research projects, guest speaker sessions, Socratic seminars, and an "Aquatic Insight Exhibition" to explore the complex issue from both Individuals and Societies and Mathematics perspectives. Field investigations provide hands-on experiences, while collaborative projects foster discussions connecting societal aspects with mathematical modelling. Guest speakers offer real-world insights, and Socratic seminars encourage critical thinking. The culmination is the exhibition, showcasing integrated displays and research. Reflective journals promote metacognition. Teaching strategies emphasize regular collaboration, discussion facilitation, and guidelines for integrated displays, creating a dynamic and comprehensive learning environment.	**Formative assessment** Assessment on Plastic garbage patch in Atlantic ocean based on criterion D **Differentiation** Different group compositions and a variety of choice of media for different activities endeavour to cater for students of various levels of ability, learning styles and language acquisition.

Resources
https://www.youtube.com/watch?v=6zrn4-FfbXw https://www.theguardian.com/environment/2017/jun/29/if-you-drop-plastic-in-the-ocean-where-does-it-end-up https://misp.org/experiential-learning-blending-mathematics-and-individuals-and-societies/

Reflection: considering the planning, process and impact of interdisciplinary inquiry

Prior to teaching the unit	During teaching	After teaching the unit
The student should … - relate, connect with peers and identify some of the major global issues and find out about some of the possible solutions. - identify and relate with the cause and consequences of the global environment issues. - Evaluate the alignment of the interdisciplinary unit with curriculum standards, clarify and specify learning objectives for both disciplines, select diverse and suitable resources, and design assessments that capture the interdisciplinary nature of the inquiry.		