SDG 14: Life Below Water:

This module focuses on SDG 14 which aims to “conserve and sustainably use the oceans, seas and marine resources for sustainable development.” The framing stories relate to the sustainable management of marine resources, with a focus on sustainable fisheries management, protected marine areas, and the importance of local community advocacy. The activities include student presentation on climate change; student research on local climate impacts; and a student showcase of mitigation and adaptation practices solutions.

Link to Subjects	Biology	Link to Competencies	
Link to Indiana High School Core	TBD HS-LS2-7 HS-ESS3-4	Link to International Baccalaureate	TBD
Stories	#1: New regulations help protect whales from entanglement in fishing gear in the Indian Ocean #2: A Fisherman's Call: Safeguarding African Fisheries		
Activities	Activity #1: Marine Biodiversity Data Analysis	Activity #2: Marine Conservation Public Art Project	Activity #3: Marine Conservation Debate
Type of Activity	Data Analysis	Art Project	Debate
Time of Activity	1 or 2 classes	1 class	2 classes

Key Questions & Terms

Key Questions	Key Terms & Concepts
What is marine biodiversity, and why is it important for ecosystem health, sustainable livelihoods, and cultural identity in the Caribbean? What are the main threats facing marine ecosystems in the Caribbean, and how do they impact marine biodiversity and coastal communities? How do human activities, such as overfishing, pollution, and coastal development, contribute to the degradation of marine habitats? What conservation strategies are being implemented in the Caribbean to protect marine biodiversity and promote sustainable coastal management? How effective are marine protected areas, sustainable fishing practices, and pollution reduction measures in mitigating threats to marine life? How can coastal communities be empowered as stewards of marine resources in the Caribbean? What role do education, capacity building, and participatory decision-making play in promoting community engagement in marine conservation?	**Marine Conservation:** The protection and preservation of marine ecosystems, habitats, and species to maintain biodiversity and ecosystem health. **Overfishing:** The practice of catching fish at a rate faster than they can reproduce, leading to depletion of fish stocks and disruption of marine ecosystems. **Coral Bleaching:** A phenomenon where coral reefs lose their vibrant colors due to stressors such as increased water temperatures, leading to the expulsion of symbiotic algae and potential coral death. **Marine Pollution:** The introduction of harmful substances into the marine environment, including plastics, chemicals, oil spills, and agricultural runoff, causing ecological harm and threatening marine life. **Marine Protected Area (MPA):** Designated zones in oceans, seas, or coastal areas where human activities are regulated to protect marine biodiversity, habitats, and ecosystems. **Sustainable Fisheries Management:** Practices and policies aimed at ensuring the long-term viability of fish stocks and marine resources while minimizing environmental impacts and supporting the livelihoods of fishing communities. **Marine Debris:** Human-made waste, such as plastics, metals, and other materials, that enters marine environments, posing threats to marine life through ingestion, entanglement, and habitat degradation.

Story #1: New regulations help protect whales from entanglement in fishing gear in the Indian Ocean

The Indian Ocean tuna fisheries, vital for regional food security and economic growth, pose a grave threat to marine mammals like whales due to the use of dangerous fishing gear. Estimates suggest over 300,000 cetaceans perish annually in these nets, making it the leading cause of mortality for these species. Urgent action and improved reporting mechanisms are essential to mitigate this crisis and protect marine biodiversity.

Full original article: WWF. (2024, March 26) New regulations help protect whales from entanglement in fishing gear in the Indian Ocean. World Wildlife Fund (WWF). Retrieved from: https://bit.ly/3VEiVlO

Story #2: A Fisherman's Call: Safeguarding African Fisheries

In Dakar, Senegal, seasoned fisherman Aliou Diop advocates for sustainable fisheries policies off the African coast. He engages local leaders and international forums, championing measures to curb illegal fishing, protect marine habitats, and empower coastal communities, embodying SDG 14's call for ocean conservation and responsible management. (Full story #2)

Opening Discussion:

1. Have students read one of the above stories. Working in pairs or small groups, students should respond to the the following questions
    a. What problems are the people in the story facing?
    b. How do they respond to these problems?
    c. What principles and ideas shape their solutions/responses to the problems?
    d. How do these stories about Marine Conservation relate to other SDGs?
2. In a large group, discuss the answers to these questions, drawing out key concepts:
    a. The importance of preserving marine biodiversity for ecosystem health, sustainable livelihoods, and cultural identity.
    b. Activities such as overfishing, coastal development, pollution, and climate change-induced coral bleaching threaten the health of Marine Ecosystems.
    c. Implementing marine protected areas, sustainable fishing practices, and pollution reduction measures to mitigate threats to marine life.
    d. Engaging local communities, scientists, and policymakers in collaborative conservation efforts to address the root causes of marine degradation.
    e. The importance of human intervention in supporting ecosystem resilience and adaptation through proactive conservation measures.
    f. Empowering coastal communities as stewards of marine resources through education, capacity building, and participatory decision-making.
    g. Fostering partnerships between stakeholders to promote inclusive and equitable management of marine resources for the benefit of all.

Activity #1: Marine Biodiversity Data Analysis

In small groups, students analyze data on fisheries and marine ecosystem health to identify patterns, trends, and potential threats to marine biodiversity. They then present their findings and propose conservation strategies based on their analysis.

Activity Learning Objectives

1. Interpret and analyze datasets, identifying trends and patterns
2. Evaluate fisheries management strategies.

Teacher preparation

1. Share data sets from Our World in Data
    a. Global Fisheries: Ritchie H. & Roser M. (2021). Fish and Overfishing. *OurWorldInData.org*. Retrieved from https://bit.ly/3RJ5ZKv.
    b. Caribbean Coral Extent: https://bit.ly/4aYGFXk
    c. Global Bleaching Events: https://bit.ly/3Vl7eAr

2. Include any other additional data that the teacher wants to include, especially local data if available.

Lesson Flow

1. Introduction: Teacher explains the need for data-driven policy, and the importance of correctly interpreting scientific data. Teacher invites students to take on the role of scientists and policy makers.
2. Divide class into groups and assign subsections of the data sets to different groups for analysis.
3. Students spend 30-40 minutes reviewing data, identifying patterns and trends, and researching policy suggestions to recommend.
4. Following class, students present their conclusion and recommendations, referring to data sets.

Possible Enrichment

The data sets in Our World In Data include substantial interpretation already. However, data set presentation can be varied to alter the level of challenge for this activity. Charts can be provided with no interpretive support to provide more robust interpretive opportunities. For science classes focused on more technical and statistical skills, the data can be provided in tabular form, requiring students to construct charts and engage in quantitative analysis.

Data sets can be curated to focus on a specific region, and can be part of a larger case study of that region (i.e., the Caribbean), connecting this activity with the others in this unit.

References

- Ritchie H. & Roser M. (2021). Fish and Overfishing. *OurWorldInData.org*. Retrieved from https://bit.ly/3RJ5ZKv.
- Figure from https://bit.ly/4aYGFXk. Data from Cramer, K. L., Jackson, J. B., Donovan, M. K., Greenstein, B. J., Korpanty, C. A., Cook, G. M., & Pandolfi, J. M. (2020). Widespread loss of Caribbean acroporid corals was underway before coral bleaching and disease outbreaks. *Science Advances*, *6*(17), eaax9395.
- Figure from https://bit.ly/3Vl7eAr. Data from Hughes, T. P., Anderson, K. D., Connolly, S. R., Heron, S. F., Kerry, J. T., Lough, J. M., ... & Wilson, S. K. (2018). Spatial and temporal patterns of mass bleaching of corals in the Anthropocene. *Science*, *359*(6371), pp. 80-83.

Activity #2: Marine Conservation Public Art Project

Students develop public art pieces that communicate both the beauty and importance of marine ecosystems, along with the policies that can help conserve them. They then curate an exhibition showcasing their artworks and write reflective essays or artist statements discussing the significance of their creations in promoting marine conservation awareness.

Activity Learning Objectives

1. Identify and Explain major issues in Marine conservation, along with policies that address them.
2. Create artwork and public art pieces that communicate the need to act to Conserve Marine Ecosystems.

Teacher preparation

1. Gather art making supplies (collaboration with Art teacher may be helpful here)
2. Work with school administration to plan for exhibition space in the public area of school or elsewhere.

Student preparation

1. Review Marine Conservation Issues discussed in previous class sessions and pick one that they feel particularly passionate about or drawn to that would make sense to address in a public art campaign.

Lesson Flow

1. Lead introductory framing discussion on the role of public art in educating and mobilizing people to take action for social and environmental issues.
2. Have students work in pairs to outline their Marine Conservation Issue, using the Marine Conservation Campaign and Public Art Project Template as a guide.
3. Allow ample time for students to work on their pieces (out of class assignment)
4. Organize the display of student work around school campus, in a local community venue, or another appropriate location.

Possible Enrichment

Consider a range of possibilities for the display of student work. Instead of displaying the completed works in school, they could be presented in a public community space, like a library, community center or public building. Some pieces might be site specific, or may only be able to be displayed as a concept or plan due to the nature of the project (ie: too large, immersive, participatory).

Ideally, this project could be carried out in collaboration/conjunction with an art class could help provide students with more time, supplies and technical support.

Final Notes

- Encourage students to conduct research and gather data to inform their campaign focus and art concepts.
- Foster creativity and experimentation in the artistic process, allowing students to explore different mediums, styles, and formats, including street art and digital media.
- Provide guidance on ethical considerations, such as cultural sensitivity, environmental impact, and inclusivity, in the creation and presentation of public art.
- Emphasize the importance of storytelling and narrative in conveying complex issues and engaging the audience emotionally and intellectually.

Activity #3: Marine Conservation Debate

In this activity, students engage in marine conservation debates to explore diverse perspectives on pressing environmental issues. Through research, argumentation, and public speaking, they develop critical thinking skills while considering ethical reasoning and environmental values. Encouraging open-mindedness and respectful dialogue, students delve into complex topics to foster a deeper understanding of marine conservation challenges.

Activity Learning Objectives

1. Encourage critical thinking and research skills.
2. Foster understanding of diverse perspectives on marine conservation issues.
3. Develop argumentation and public speaking skills.
4. Promote ethical reasoning and consideration of environmental values.

Lesson Flow

1. Assign students into groups for the Marine Conservation Debate
2. Give students time in class or between classes for research and preparation
3. Conduct the Marine Conservation Debates
    a. See Marine Conservation Debate activity outline, in Resources below, for details.

Final Notes

- Encourage students to approach the debate with an open mind and willingness to consider opposing viewpoints.
- Provide guidance and support to students throughout the research and argument development process.
- Foster a collaborative and inclusive classroom environment where all students feel comfortable expressing their opinions and engaging in respectful dialogue.
- Emphasize the importance of active listening, critical thinking, and evidence-based argumentation in the debate format.

Advanced Approaches

Threat Assessment Simulation and Policy Brief:

Objective: Students to conduct a simulation, assuming various stakeholder roles, to assess threats to a Caribbean marine ecosystem and propose solutions.

Instructions:

1. Assign each student a role to play in the simulation (scientist, policymaker, local community member, environmental NGO representative, or tourism operator).

2. Provide students with background information about the Caribbean marine ecosystem and the specific threats it faces, including climate change, pollution, overfishing, and habitat destruction.

3. In their assigned roles, students will participate in a threat assessment exercise, discussing the priority threats to the Caribbean marine ecosystem and their potential impacts on different stakeholders.

4. Based on the information provided and the perspectives of their roles, students will collaboratively develop a policy brief outlining proposed conservation measures and recommendations for policy action to address the identified threats.

5. Encourage students to consider the interests and concerns of all stakeholders and to work together to find solutions that are socially, economically, and environmentally sustainable.

Student Instructions for Simulation in the Resources section below.

Community Engagement Campaign Design:

Challenge students to design a comprehensive community engagement campaign aimed at raising awareness and promoting action for marine conservation in a Caribbean coastal community.Students create a campaign strategy that includes targeted messaging, interactive workshops, social media outreach, and collaborative initiatives with local stakeholders. They present their campaign plans to the class, emphasizing creativity and effectiveness.

Policy Advocacy Workshop and Presentation:

Guide students through a workshop on policy advocacy techniques, focusing on effective communication, stakeholder engagement, and policy analysis. In small groups, students select a specific marine conservation issue relevant to the Caribbean and develop a policy advocacy

campaign plan. They create persuasive presentations advocating for policy changes and present their proposals to a panel of peers or community members acting as policymakers.

Full Story Texts

Story #2: A Fisherman's Call: Safeguarding African Fisheries

Source: This story was created by Ben Gillock with input from ChatGPT.

In the bustling coastal town of Dakar, Senegal, Aliou Diop rises before dawn, his footsteps echoing through the narrow streets as he makes his way to the harbor. For decades, Aliou has been a stalwart presence in these waters, as captain of his fishing vessel, the "Alizé." As the salty breeze tousles his graying hair, Aliou's eyes scan the horizon, searching for signs of the day's catch. But beyond the tranquil facade of the Atlantic Ocean lies a tumultuous reality—one of dwindling fish stocks, encroaching industrial fleets, and the looming specter of overfishing.

Aliou knows this reality all too well. He has witnessed the gradual decline of the once-thriving fisheries off the African coast, where traditional fishing practices have given way to industrial-scale operations driven by profit and short-term gains. With each passing year, the catch becomes scarcer, the fish smaller, and the struggle to make ends meet more arduous for Aliou and his fellow fishermen.

Yet amidst these challenges, Aliou remains undeterred. His connection to the sea runs deep, rooted in a lineage of fishermen who have relied on its bounty for sustenance and survival. But now, as the delicate balance of marine ecosystems teeters on the brink of collapse, Aliou feels compelled to act—to become not just a guardian of the sea, but a voice for change in a world where the fate of the ocean hangs in the balance.

Driven by a sense of duty to his community and a profound reverence for the ocean, Aliou begins his journey as an advocate for sustainable fisheries management. He starts by engaging with local leaders and fisheries experts, seeking to understand the root causes of the crisis facing African fisheries and exploring potential solutions. Together, they examine the impact of overfishing, illegal fishing practices, and the lack of effective governance on marine ecosystems and coastal communities.

Through these discussions, Aliou learns about the critical role of policy in addressing the myriad challenges facing African fisheries. He discovers that while traditional conservation measures such as marine protected areas and fishing quotas can help mitigate some of the damage, a more holistic approach is needed—one that takes into account the interconnectedness of economic, social, and environmental factors.

Inspired by these insights, Aliou sets out to advocate for policies that promote sustainable fishing practices while empowering coastal communities to thrive. He draws on real-life examples from around the world, where innovative policies have successfully restored fish stocks, protected marine habitats, and revitalized coastal economies.

One such example is the case of Namibia, where the government implemented a system of community-based fisheries management to empower local fishing communities and ensure the long-term sustainability of marine resources. By granting fishing rights to coastal communities

and involving them in decision-making processes, Namibia was able to curb overfishing and promote responsible stewardship of marine ecosystems.

Another example comes from the Pacific island nation of Palau, which took a bold stance against illegal fishing by establishing one of the world's largest marine sanctuaries. Spanning over 600,000 square kilometers, the sanctuary not only protects marine biodiversity but also serves as a model for international cooperation in the fight against illegal, unreported, and unregulated (IUU) fishing.

Inspired by these success stories, Aliou works tirelessly to build support for similar policies in Senegal and across the African continent. He collaborates with government officials, NGOs, and fellow fishermen to develop comprehensive fisheries management plans that prioritize sustainability, equity, and resilience.

One key policy proposal put forth by Aliou and his allies is the establishment of a network of marine protected areas along the African coast. These protected areas would serve as sanctuaries for marine life, where fishing and other extractive activities are carefully regulated to allow damaged ecosystems to recover and thrive.

Additionally, Aliou advocates for the implementation of traceability and certification schemes to combat IUU fishing and promote transparency in the seafood supply chain. By ensuring that fish products are sourced from legal and sustainable fisheries, these schemes help protect both marine ecosystems and the livelihoods of responsible fishermen like Aliou.

As Aliou's advocacy efforts gain momentum, he finds himself at the forefront of a growing movement for change in African fisheries. Together with his fellow fishermen and allies, he campaigns for stronger enforcement of existing regulations, increased investment in sustainable fishing technologies, and greater support for small-scale fisheries.

By leveraging satellite tracking technologies, onboard observers, and port inspections, authorities can enhance their capacity to detect and deter illicit fishing practices, thereby safeguarding marine resources and ensuring compliance with fisheries regulations.

Technological innovation plays a pivotal role in enhancing the sustainability and efficiency of fishing operations. Initiatives such as the development of eco-friendly fishing gear, such as biodegradable nets and non-entangling fishing lines, reduce bycatch and minimize environmental impact. Similarly, the adoption of precision fishing technologies, such as fish aggregating device (FAD) tracking systems and underwater drones, enables fishermen to target specific species with greater precision, reducing wastage and maximizing resource utilization.

Investment in small-scale fisheries represents a cornerstone of the coalition's strategy to promote inclusive and sustainable economic development. By providing financial support for infrastructure development, capacity building, and market access initiatives, governments and development agencies empower local fishing communities to enhance their resilience and livelihood opportunities. Examples include the establishment of community-managed fisheries cooperatives, the provision of microfinance loans for small-scale fishers, and the development

of value-added processing facilities to diversify income streams and improve market access for locally sourced seafood products.

Collectively, these policies and practices constitute a comprehensive framework for advancing sustainable fisheries management in Dakar and beyond. By leveraging the synergies between strengthened enforcement, technological innovation, and investment in small-scale fisheries, stakeholders can foster a more equitable and resilient marine ecosystem that benefits both present and future generations of coastal communities.

Resources

The Role of Public Art in Environmental and Social Justice Activism

Introduction:
Public art has long been recognized as a powerful tool for conveying messages, sparking conversations, and inspiring action on a wide range of social and environmental issues. Today, we'll explore the role and significance of public art in environmental and social justice campaigns.

Role of Public Art:

- Public art serves as a visual representation of societal values, beliefs, and aspirations, making complex issues more accessible and relatable to diverse audiences.
- It creates spaces for dialogue and reflection, inviting individuals to engage with challenging topics and consider alternative perspectives.
- Public art has the potential to mobilize communities, galvanizing collective action and fostering a sense of solidarity and empowerment among participants.

Significance in Environmental Campaigns:

- Public art can raise awareness about environmental degradation, climate change, and biodiversity loss, making the invisible impacts of human activities visible and tangible.
- It promotes a sense of stewardship and connection to the natural world, encouraging individuals to reconsider their relationship with the environment and take meaningful action to protect it.
- Public art projects often engage local communities in the creation process, fostering a sense of ownership and responsibility for environmental conservation efforts.

Significance in Social Justice Campaigns:

- Public art amplifies marginalized voices and narratives, challenging dominant narratives and highlighting social injustices such as systemic racism, inequality, and discrimination.
- It serves as a platform for advocacy and solidarity, providing a space for underrepresented communities to express their experiences, aspirations, and demands for change.
- Public art projects can catalyze social movements, galvanizing public support and political momentum for policy reform and social transformation.

Conclusion:

- Public art plays a vital role in environmental and social justice campaigns, bridging divides, building empathy, and inspiring collective action towards a more just and sustainable future.

Class Questions:

1. What comes to mind when you think of public art? How do you define it, and what forms can it take?
2. Can you think of any examples of public art projects that address environmental or social justice issues? What messages do they convey, and how do they engage the audience?
3. In what ways can public art influence public perception and behavior towards environmental conservation and social justice?
4. How does the location of public art impact its effectiveness in conveying messages and engaging the community? Can you think of examples where location enhances or detracts from the impact of public art?
5. What role does collaboration play in the creation and presentation of public art projects? How can diverse perspectives and experiences enrich the artistic process and contribute to more inclusive narratives?
6. How do you think public art can contribute to building a sense of community and fostering dialogue on complex issues such as climate change, racial injustice, or gender equality?
7. Can public art serve as a catalyst for social change? What conditions or factors contribute to the success of public art projects in mobilizing communities and influencing public discourse?
8. As future leaders and activists, how do you envision leveraging public art in your own advocacy efforts for environmental and social justice causes?

Some Examples:

"The Climate Ribbon" by Katie Holten - This participatory art project invites individuals to write messages of love, grief, and hope for the planet on colorful ribbons, creating a visual representation of collective concern for climate change. Archived at: https://bit.ly/4egyKYf.

"Washed Ashore" by Angela Haseltine Pozzi - This traveling exhibit features larger-than-life sculptures made from marine debris collected from beaches, raising awareness about ocean pollution and the impact of plastic waste on marine life. Archived article: https://bit.ly/3KH8iJK. Archived homepage: https://bit.ly/4ejkEWq.

"Border Bedazzlers" - This community-based art project empowers undocumented immigrants and activists to decorate border walls with brightly colored yarn, reclaiming public space and challenging narratives of division and exclusion. Source: Blust, K. (January 5, 2017). Meet the Border Bedazzlers. *Arizona Daily Star*. Retrieved from https://bit.ly/3VAIrK4.

Marine Conservation Campaign and Public Art Project Template:

1. Campaign Focus:
    a. What specific marine conservation issue will your campaign address? (e.g., coral reef degradation, plastic pollution, overfishing).
    b. Why is this issue important, and what are its environmental, social, and economic implications?
    c. Who is the target audience for your campaign, and what are their interests, concerns, and motivations related to marine conservation?

2. Campaign Objectives:
    a. What are the primary goals of your campaign? (e.g., raising awareness, promoting behavior change, advocating for policy action)
    b. How will you measure the success of your campaign objectives? (e.g., increased public engagement, policy changes, measurable reductions in environmental impact)

3. Artistic Expression:
    a. How will you use public art as a medium to convey your message and engage the audience?
    b. What artistic elements and techniques will you incorporate into your art pieces to evoke emotions, provoke thought, and inspire action?
    c. How will you ensure that your art pieces are accessible, inclusive, and culturally relevant to your target audience?

4. Collaborative Process:
    a. How will you collaborate with peers, teachers, local artists, and community members in the development and execution of your art project?
    b. What roles and responsibilities will each team member have in the creative process, from conceptualization to installation?
    c. How will you leverage diverse perspectives, skills, and resources to enrich the artistic and thematic aspects of your campaign?

5. Engagement Strategies:
    a. How will you engage the public and create interactive experiences around your art pieces? (e.g., artist talks, workshops, social media campaigns)
    b. What partnerships and outreach initiatives will you pursue to maximize the reach and impact of your campaign beyond your immediate community?
    c. How will you facilitate ongoing dialogue and participation from stakeholders to sustain momentum and foster long-term change?

6. Reflection and Evaluation:
    a. How will you reflect on and evaluate the effectiveness of your campaign and art project?
    b. What feedback mechanisms will you implement to gather input from the audience, stakeholders, and participants?

c. How will you incorporate lessons learned and adjust your approach to improve future campaigns and art projects?

Marine Conservation Debate

Preparation:

1. Divide the class into small groups, ensuring each group has an equal distribution of students.
2. Assign each group a controversial topic related to marine conservation ethics in the Caribbean. Example topics include sustainable seafood consumption, marine protected areas vs. fishing rights, marine tourism impacts, coral reef restoration methods, etc.
3. Provide research guidelines and resources to assist students in gathering information and developing arguments.
4. Set a timeline for research, argument preparation, and debate practice sessions.

Research and Argument Development:

1. Instruct students to conduct thorough research on their assigned topic, considering multiple perspectives and ethical considerations.
2. Encourage students to analyze scientific evidence, case studies, policy documents, and ethical frameworks relevant to their topic.
3. Guide students in developing arguments that address key points, counterarguments, and ethical implications of different positions.
4. Emphasize the importance of using credible sources and citing evidence to support their arguments during the debate.

Structured Debate Format:

1. Introduce the debate format to students, explaining the rules, time limits, and roles of participants.
2. Consider using a structured debate format such as the following:
    a. Opening Statements: Each group presents their arguments in favor of their position on the topic (5 minutes per group).
    b. Rebuttals: Groups have the opportunity to respond to opposing arguments and refute counterpoints (3 minutes per group).
    c. Cross-Examination: Groups engage in a moderated exchange of questions and answers with the opposing side (2 minutes per group).
    d. Closing Statements: Each group summarizes their key points and reinforces their position (3 minutes per group).
3. Allocate time for preparation and practice debates within small groups to ensure students are familiar with the format and confident in presenting their arguments.

Debate Execution:

1. Facilitate the debate session, ensuring that students adhere to the established format and time limits.
2. Encourage active listening and respectful engagement among participants, reminding students to focus on the substance of the arguments rather than personal attacks.
3. Moderate the debate, keeping track of time, facilitating transitions between speakers, and ensuring equal participation from all groups.
4. Provide opportunities for audience questions and feedback following the formal debate to further engage students in critical thinking and reflection.

Evaluation and Reflection:

1. After the debate, lead a discussion on the strengths and weaknesses of each group's arguments, considering evidence, reasoning, and presentation skills.
2. If so desired, use a debate rubric or criteria aligned with learning objectives to evaluate student performance in the debate.
3. Encourage students to reflect on their experience, considering what they learned, how their perspectives may have shifted, and areas for improvement in future debates or discussions.

Potential Topics for Debate:

1. Implementation of Marine Protected Areas (MPAs) vs. Open Access Fisheries Management
2. Sustainable Seafood Consumption: Wild-Caught vs. Farmed Fish
3. Effectiveness of Coral Reef Restoration Methods: Natural vs. Artificial Techniques
4. Regulation of Marine Tourism Activities in Sensitive Ecosystems
5. Indigenous Rights and Traditional Fishing Practices vs. Conservation Regulations
6. Impact of Plastic Pollution on Marine Ecosystems: Bans vs. Recycling Initiatives
7. Oil and Gas Exploration in Marine Protected Areas: Economic Development vs. Environmental Protection
8. Climate Change Adaptation Strategies for Coastal Communities: Managed Retreat vs. Coastal Engineering
9. Deep-Sea Mining: Resource Extraction vs. Biodiversity Conservation
10. Shark Conservation: Protection Measures vs. Sustainable Harvesting Practices
11. Marine Debris Cleanup Efforts: Local Community Initiatives vs. Government-led Programs
12. Endangered Species Conservation: Marine Mammals vs. Sea Turtles vs. Sharks
13. Ocean Acidification: Mitigation Strategies vs. Adaptation Measures
14. Sustainable Fisheries Management: Quotas vs. Seasonal Closures
15. Marine Renewable Energy Development: Offshore Wind Farms vs. Wave Energy Converters
16. Ecotourism in Marine Protected Areas: Balancing Conservation and Economic Growth
17. International Cooperation on High Seas Conservation: Governance Models and Treaty Compliance
18. Regulation of Commercial Shipping: Ballast Water Management vs. Vessel Speed Reductions

Debate Rubric

Criteria	Excellent (4)	Good (3)	Fair (2)	Poor (1)
Content				
- Accuracy and Relevance of Information	Provides accurate, relevant, and comprehensive information that effectively supports the position.	Presents mostly accurate and relevant information that adequately supports the position.	Includes some accurate and relevant information but lacks depth or clarity in supporting the position.	Provides limited or inaccurate information that does not effectively support the position.
- Integration of Multiple Perspectives	Incorporates multiple perspectives and considers opposing viewpoints in a balanced and nuanced manner.	Integrates some alternative perspectives but may lack depth or consistency in considering opposing viewpoints.	Presents limited consideration of alternative perspectives or fails to address opposing viewpoints effectively.	Shows little to no consideration of alternative perspectives or fails to acknowledge opposing viewpoints.
- Clarity and Coherence of Arguments	Presents arguments in a clear, logical, and coherent manner, with well-developed reasoning and supporting evidence.	Articulates arguments clearly and coherently, with adequate reasoning and supporting evidence.	Expresses arguments with some clarity and coherence but may lack depth or consistency in reasoning.	Presents arguments that are unclear, disjointed, or lack sufficient reasoning and evidence.
- Rebuttal and Counterargument	Offers compelling rebuttals that effectively address opposing arguments and counterpoints.	Provides adequate rebuttals that address some opposing arguments but may lack depth or effectiveness in countering counterpoints.	Offers limited or weak rebuttals that fail to effectively address opposing arguments or counterpoints.	Provides little to no rebuttal or fails to effectively counter opposing arguments or counterpoints.

- Oral Presentation	Delivers a confident, engaging, and articulate presentation with clear enunciation and effective use of voice and body language.	Presents information in a clear and engaging manner, with good enunciation and appropriate use of voice and body language.	Delivers information with some clarity and engagement but may lack consistency or confidence in presentation.	Presents information in a manner that is unclear, monotonous, or lacking in engagement.
- Organization and Time Management	Organizes arguments effectively and manages time efficiently, ensuring that all key points are addressed within the allocated time.	Organizes arguments reasonably well and manages time effectively, covering most key points within the allocated time.	Demonstrates some organization and time management skills but may struggle to cover all key points within the allocated time.	Shows little to no organization or time management skills, resulting in incomplete or rushed arguments.
- Active Participation and Collaboration	Actively participates in the debate, engaging with both the topic and other participants, and collaborates effectively within the group.	Generally participates in the debate, contributing to discussions and interactions, and collaborates adequately within the group.	Shows limited participation or engagement in the debate and may struggle to collaborate effectively within the group.	Demonstrates little to no participation or engagement in the debate and fails to collaborate effectively within the group.

Overall Performance Level:

- Excellent (16-18): Provides a comprehensive, well-reasoned, and engaging presentation that effectively addresses the topic, incorporates multiple perspectives, and demonstrates exceptional oral communication skills.
- Good (12-15): Presents a solid and coherent presentation with adequate supporting evidence and engagement but may lack depth or consistency in argumentation.
- Fair (8-11): Offers a basic presentation with some relevant points and engagement but may lack clarity, coherence, or depth in argumentation.
- Poor (4-7): Presents a weak or ineffective presentation with limited supporting evidence, engagement, or coherence in argumentation.

Threat Assessment Simulation: Caribbean Marine Ecosystem

Introduction

In this activity, you will role-play as stakeholders (scientists, policymakers, local community members, etc.) involved in a threat assessment exercise for a specific marine ecosystem in the Caribbean. Based on your assigned roles and the information provided, you must collaboratively develop a policy brief outlining priority threats, proposed conservation measures, and recommendations for policy action.

Overview of the Caribbean Marine Ecosystem:

The Caribbean Marine Ecosystem is one of the most diverse and economically important marine regions in the world. Its coral reefs, seagrass beds, and mangrove forests provide habitat for a wide variety of marine species, support fisheries, and attract tourists from around the globe.

The Caribbean Sea is bordered by the islands of the Caribbean and the surrounding coasts of Central and South America. It is known for its rich biodiversity, including coral reefs, seagrass beds, mangrove forests, and a variety of marine species.

The Caribbean marine ecosystem supports numerous ecological functions and services, such as providing habitat for marine life, supporting fisheries, protecting coastlines from erosion, and generating tourism revenue.

Coral reefs are particularly important in the Caribbean, as they are among the most biologically diverse ecosystems on the planet and provide critical habitat for fish, invertebrates, and other marine organisms.

However, this ecosystem faces numerous threats that jeopardize its health and sustainability. In this activity, students will identify, assess and respond to these threats, from the perspective of a range of stakeholders

For additional information and resources, students can refer to scientific publications, government reports, and reputable websites such as:

- Caribbean Marine Biodiversity Program: https://caribbeanbiodiversity.org/
- Caribbean Coastal Ocean Observing System: https://caricoos.org/
- Caribbean Coral Reef Watch: https://www.coralreefwatch.noaa.gov/
- Caribbean Environment Programme: https://cep.unep.org/

Role of Stakeholders:

Scientists: Marine biologists, ecologists, and environmental scientists conduct research and monitoring to assess the health of the Caribbean marine ecosystem and identify threats.

Policymakers: Government officials and legislators enact laws and regulations to address marine conservation and resource management, balancing the interests of various stakeholders.

Local Community Members: Residents of coastal communities rely on the marine ecosystem for their livelihoods, food security, and cultural identity, and are directly impacted by environmental degradation.

Environmental NGOs: Non-governmental organizations advocate for marine conservation and environmental protection, conducting research, raising awareness, and pressuring governments to take action.

Tourism Operators: Businesses in the tourism industry, such as dive shops, snorkeling tours, and resorts, contribute to the economy but may also impact the marine ecosystem through tourism activities.

Threat Assessment Simulation Instructions

Conduct research and discuss the following in your group, making sure to approach the topic from the perspective of your role,

1. Identify Priority Threats:

- List prioritized threats to the Caribbean marine ecosystem, along with a brief description of each threat and its potential impacts.
- Explain why each threat was selected as a priority for action, citing evidence and scientific data.

2. Propose Conservation Measures:

- Identify potential policy responses, management strategies, and conservation measures to address each prioritized threat.
- Describe how each proposed measure aims to mitigate the identified threat and promote sustainable management of the marine ecosystem.

3. Recommend Policy Actions:

- Provide specific policy recommendations aimed at addressing the identified threats and achieving the objectives outlined in the policy brief.
- Consider the interests and perspectives of different stakeholders and emphasize evidence-based approaches to policy development.

4. Conclusion:

- Summarize the key findings and recommendations presented in the policy brief.
- Reinforce the importance of collaborative action and stakeholder engagement in conserving the Caribbean marine ecosystem.