PFAS Lesson Plan

Stakeholder Role Play on PFAS Regulation

Objective:
Students will understand the complexities of environmental regulation by role-playing as stakeholders involved in determining essential versus non-essential uses of PFAS. They will learn about different perspectives, consider the impact of their decisions, and practice negotiation and critical thinking skills.

Grade Level:
High School (Grades 9-12)

Duration:
2-3 class periods (each 45-60 minutes)

Materials Needed:
- Internet-enabled devices (for research)
- Handouts with background information on PFAS and Minnesota's proposed regulations (https://www.pca.state.mn.us/air-water-land-climate/communications-toolkit-pfas-reduction-and-amaras-law)
- Role descriptions (prepared for each group)
- 20 Potential Uses of PFAS Sheet

Lesson Overview

Day 1: Introduction to PFAS and Minnesota's Regulation Process

1. Introduction (15 minutes):
  - Briefly introduce PFAS (per- and polyfluoroalkyl substances) and their environmental and health impacts.
  - Discuss Minnesota's approach to regulating PFAS, including their proposed rule to determine "essential" versus "non-essential" uses.
  - Show students a short video or provide an article to contextualize the issue (e.g., news reports on PFAS pollution). (https://www.youtube.com/watch?v=5N5Qpl3AkM4)

2. Group Assignment and Stakeholder Roles (30 minutes):
  - Split the class into groups, with each group representing a different stakeholder in the PFAS regulation process. Examples of stakeholders include:
    - Environmental advocacy groups
    - Chemical industry representatives
    - Small business owners
    - Health professionals
    - Local government representatives
    - Consumer product manufacturers
  - Provide each group with a detailed role description, including their key interests, potential concerns, and what they would want from the PFAS regulation process.
  - Provide each group with the list of 20 Potential Uses, have them decide whether their stakeholder group feels each use is essential or not.

3. Research and Preparation (15 minutes):
  - Allow students to conduct research on PFAS and the perspectives of their assigned stakeholders.
  - Each group should outline their main priorities and concerns regarding the proposed regulations.

Day 2: Stakeholder Meeting Role-Play

1. Stakeholder Meeting Simulation (45 minutes):
  - Set up the classroom like a meeting room with a table or designated space for each stakeholder group.
  - Each group presents its perspective and argues why certain uses of PFAS should be considered "essential" or "non-essential." Encourage students to use persuasive language and support their points with evidence.
  - After all presentations, allow time for an open debate where groups can ask each other questions or make counterarguments.

2. Reaching Consensus (15 minutes):
  - Guide students to discuss and negotiate which PFAS uses should be classified as "currently unavoidable" or essential.
  - Have a moderator (teacher or a selected student) facilitate this discussion to ensure all viewpoints are heard.

Day 3: Reflection and Evaluation

1. Reflection Activity (20 minutes):
   - Ask students to reflect individually on the experience. Have them write a short response to questions like:
     - What was the most challenging part of representing your assigned stakeholder?
     - How did your views on PFAS regulation change as you listened to other groups?
     - What compromises did you have to make?

2. Class Discussion (25 minutes):
   - Facilitate a class discussion on what they learned about the complexity of environmental regulation.
   - Discuss the importance of considering various perspectives in policy-making and the balance between health, economic, and environmental factors.

3. Wrap-up and Assessment (15 minutes):
   - Have each group present the final decision they reached and justify why they chose to classify certain uses as essential or non-essential.
   - Assess student participation, understanding of the issue, and ability to collaborate with peers.

Assessment Criteria

- Group Presentation: Clarity in presenting stakeholder positions and supporting arguments with evidence.
- Participation: Engagement in the group discussion, negotiation, and debate.
- Reflection: Depth of personal insight in written reflection, understanding of other perspectives, and ability to articulate the complexities of the issue.

Extensions

- Research Project: Assign students to research current products containing PFAS and evaluate alternatives. They could present their findings to the class.
- Guest Speaker: Invite a local environmental expert or industry representative to talk about PFAS and answer student questions.
- Action Project: Encourage students to create informational campaigns for their school or community on reducing PFAS exposure.

This lesson allows students to engage with real-world environmental challenges and understand the perspectives of different stakeholders involved in complex regulatory decisions.

Detailed Role Descriptions for Stakeholder Groups

These role descriptions can be distributed to students to help them understand the motivations and concerns of each group, providing a framework for their role-play activities. Each group can use this information to craft their arguments, determine negotiation points, and better understand the complexity of real-world regulatory decision-making.

1. Environmental Advocacy Groups

- **Key Interests**: Protecting public health and the environment by reducing or eliminating harmful chemicals like PFAS. They aim for stricter regulations and prefer the elimination of non-essential uses of PFAS to prevent pollution and long-term environmental damage.

- **Potential Concerns**: They are concerned about the persistence and bioaccumulation of PFAS, which leads to water contamination and health risks such as cancer and developmental issues.

- **What They Want from the Process**: They want clear and comprehensive guidelines that minimize PFAS use to only truly essential cases, encourage alternative solutions, and ensure transparency and accountability in regulation.

2. Chemical Industry Representatives

- **Key Interests**: Protecting business interests, profitability, and jobs. The chemical industry is interested in continuing the use of PFAS where it is economically beneficial and technologically required, especially in sectors like manufacturing and medical applications.

- **Potential Concerns**: They are worried about the potential economic impact of banning PFAS, the cost of transitioning to alternatives, and how regulations could limit their ability to produce certain products effectively.

- **What They Want from the Process**: They want flexible regulations that consider economic impacts, provide sufficient time for transitioning, and define essential uses broadly to protect industry interests.

3. Small Business Owners

- **Key Interests**: Ensuring their businesses remain viable amidst regulatory changes. Small businesses that use products containing PFAS may be affected by the availability and cost of alternatives.

- **Potential Concerns**: Small businesses often lack the resources of larger corporations to quickly adapt to regulatory changes. They may be concerned about the cost of compliance, including switching to alternative materials, potential fines, and the complexity of new regulations.

- **What They Want from the Process**: They want longer timelines for compliance, financial support (like grants or subsidies) to transition away from PFAS, and clear guidance on which products will be impacted.

4. Health Professionals

- **Key Interests**: Protecting public health by minimizing exposure to harmful chemicals like PFAS, which are linked to various health issues, including cancer, immune system suppression, and developmental problems.

- **Potential Concerns**: Health professionals are concerned about the direct health impacts of PFAS, especially among vulnerable populations like children, pregnant women, and those with pre-existing health conditions.

- **What They Want from the Process**: They advocate for stringent regulations that prioritize public health, comprehensive monitoring of PFAS levels, and widespread public awareness campaigns on PFAS risks and safety measures.

5. Local Government Representatives

- **Key Interests**: Balancing public health with economic development and maintaining the quality of life for residents. Local governments must implement and enforce regulations, often managing the balance between protecting citizens and supporting local businesses.

- Potential Concerns: Concerns include the cost and logistics of enforcing regulations, potential resistance from local businesses, and the financial impact of PFAS pollution on public infrastructure (such as water treatment systems).

- **What They Want from the Process**: They want practical and enforceable regulations, support from the state government in implementation, and sufficient resources to address any local contamination and infrastructure needs.

6. Consumer Product Manufacturers

- **Key Interests**: Ensuring their products remain safe, marketable, and compliant with regulations. PFAS are used in a wide range of consumer products (e.g., water-resistant clothing, non-stick cookware), and manufacturers want to maintain product performance while complying with regulations.

- **Potential Concerns**: They are concerned about the availability and performance of alternatives to PFAS, the potential cost of reformulating products, and the impact of negative public perception if their products contain PFAS.

- **What They Want from the Process**: They want well-defined criteria for essential uses, extended timelines to develop or find suitable alternatives, and collaboration opportunities with regulators to ensure compliance without sacrificing product quality or marketability.

Here are 20 potential uses of PFAS that each group will assess and decide whether they think it is essential or non-essential:

20 Potential Uses of PFAS
1. Non-stick cookware coatings (e.g., Teflon pans)
2. Water-repellent clothing (e.g., outdoor gear and jackets)
3. Firefighting foam used for emergency fire suppression (AFFF)
4. Food packaging with grease-resistant liners (e.g., fast food wrappers)
5. Carpet and upholstery stain repellents
6. Medical devices (e.g., implantable defibrillators and catheters)
7. Semiconductor manufacturing (e.g., etching materials)
8. Cosmetics (e.g., waterproof mascara and foundation)
9. Pesticides and herbicides with PFAS for coating or protection
10. Dental floss with PFAS for smoother application
11. Waterproof electronics (e.g., cell phone coatings)
12. Lubricants and sealants used in aerospace applications
13. Insulation in electrical cables and wiring
14. Ski wax for high-performance skis and snowboards
15. Wind turbine blades for reduced friction and enhanced durability
16. Waterproof shoes and boots
17. Anti-fogging sprays for glasses and windshields
18. Industrial surfactants used in metal plating
19. Waterproof paints for exterior use
20. Fishing lines and gear for improved durability and reduced friction

Each stakeholder group will assess these 20 uses based on the criteria of necessity for health, safety, societal functioning, availability of alternatives, and environmental and health impacts. Some uses, like firefighting foam for critical situations, may be deemed essential due to safety requirements, whereas others, like dental floss with PFAS, may be deemed non-essential if suitable alternatives exist.

This assessment will require careful consideration of economic feasibility, technological needs, environmental safety, and public health—challenging students to weigh the benefits and drawbacks of each use case from their assigned perspectives.