Teacher Version

Framing your Message

Objectives

- Understand the importance of framing one's message in science communication
- Practice framing scientific messages effectively
- Practice communicating a data supported message in a debate format

Introduction

- Begin the class by explaining—How information is framed can significantly impact how it is understood and received by one's audience.
- Provide examples of how different framing can influence perception, such as:
  - presenting scientific findings in terms of benefits versus risks
  - using language that emphasizes uncertainty versus certainty
- Ask students to think of real-life examples of scientific topics that are framed in different ways, depending on who is presenting them to the public. Emphasize the idea that how scientific ideas are framed shapes how the public perceives and responds to complex issues, thereby influencing attitudes, beliefs, and policy decisions. Examples of topics—

Robotics in Manufacturing:

- Framing as Innovation and Efficiency: Robots improve precision, reduce human error, and increase productivity—helping industries grow and remain competitive in a global market.

- Framing as a Job Displacement Concern: Automation is changing the nature of jobs—workers need re-skilling and access to training programs to adapt to evolving industries.

Ocean Exploration:

- Framing as a Scientific Frontier: We've only explored 5% of the ocean—discovering new species and ecosystems could unlock knowledge about Earth's climate, geology, and life itself

- Framing as an Economic Opportunity: The deep ocean may hold resources like rare minerals or potential medicines—sustainable exploration could benefit future generations

Drones in Environmental Monitoring:

- Framing as a Conservation Tool: Drones help us monitor wildlife, track deforestation, and respond quickly to environmental changes—enabling better protection of ecosystems.

- Framing as a Technological Education Tool: Using drones in schools helps students learn about geography, coding, and engineering—making science engaging and hands-on..

Part I—Practice Framing Scientific Messages In A Variety of Ways (Worksheet)

- As a class, brainstorm different topics relating to drinking water, including locally relevant issues. Write the list on the board so that students can use it for the worksheet.
- Divide students into small groups of 3-4 and have them complete the associated worksheet.

Part II—Frame Opposing Messages of a Drinking Water Topic (Communal Class Exercise)

- As a class, brainstorm drinking water issues that could have opposing sides. Then, for each topic, identify two clear opposing viewpoints. Have students practice framing messages for each viewpoint.
- Examples of topics are below. A list containing each topic and their associated pros and cons is on the following pages. It can help you guide students as they prepare for the debate in the next part of the lesson.

    - Should water testing for private homes with wells be mandatory?
    - Who should bear the responsibility of paying to test private well water—the homeowner or the government?
    - Discuss the pros and cons of public versus private control of water resources.
    - Maine's primary drinking water standard for arsenic is 10 micrograms per liter (10ug/L), while New Hampshire’s is 5 ug/L. Should Maine change its standard for arsenic to 5 ug/L?
    - Should there be stricter regulations on agricultural runoff to protect drinking water sources?
    - Is water a human right or a commodity?

Part III—Debate

1. As a class, decide which drinking water related issue you would like to debate.

2. Divide the class into two teams, assigning each a side to argue (pro or con).

3. Research and Preparation: Allow time for teams to choose a frame and research their assigned positions. They should gather data, statistics, expert opinions, and real-world examples to build strong arguments that support their frame.

4. Execute the debate in a structured format. A suggested structure is as follows—

- **Opening statements:** Each side will have the opportunity to make an opening statement. The order of which team presents first will be chosen at random. Opening statements will not exceed 1 minute. The opening statement can be given by one member of the group or divided among multiple members.

- **Further Argument**: After the opening statement from both teams, the first group will be given 3 minutes for further argument. Then, the second group will have 3 minutes for their argument. Responsibility to present can be given to one speaker or divided among the group members, but only one speaker may talk at a time.

- **Rebuttal Preparation:** Allow students 5 - 10 minutes to prepare rebuttals.

- **1st Rebuttal:** The first group will defend their case and attempt to defeat the opposing team's arguments without adding new information (4 minutes). Then, the second group will do the same (4 minutes).

- **2nd Rebuttal:** There will be a second rebuttal (3 minutes) from each team.

- **Discussion:** Allow an opportunity for back and forth discussion.

- **Closing Statement:** Similar to an opening statement, each team will support their case using evidence (2 minutes).

5. Reflection and Discussion: After the debate is completed, hold a class discussion to reflect on the arguments presented. Discuss what was learned, which arguments were most convincing, and the overall importance of the issues debated.

Five Drinking Water Issues and their Pros & Cons

Should well water testing for private homes be mandatory?

Pro (Mandatory well water testing):

- "Public Health Protection" Frame: Regular testing can identify harmful contaminants such as bacteria, nitrates, heavy metals, and pesticides, preventing health issues. This ensures that homeowners are aware of potential health risks in their drinking water, reducing the incidence of waterborne diseases and chronic health conditions. Regular testing also reduces the risk of contaminated water affecting nearby homes and communities, promoting overall public health and safety.
- "Environmental Benefits" Frame: Regular testing can help track and mitigate environmental pollution, ensuring the long-term sustainability of groundwater resources. Moreover, mandatory testing provides valuable data that can be used to identify and address broader environmental issues affecting water quality.
- "Equity and Safety" Frame: Mandatory testing ensures that all private wells meet minimum safety standards, protecting vulnerable populations (i.e., children, immunocompromised individuals) who may not have the knowledge to test their water regularly.

Con (Mandatory well water testing):

- "Cost and Financial Burden" Frame: Mandatory testing can be costly, placing a financial burden on homeowners, particularly those in rural or low-income areas. Additionally, government programs to enforce and subsidize testing could be expensive, diverting funds from other critical public services.
- "Privacy and Autonomy" Frame: Some homeowners may feel that they should have the right to decide whether to test their water, rather than being compelled by government regulations. Mandatory testing could be viewed as an overreach of government authority, infringing on individual property rights and personal freedoms.
- "Logistical and Practical Challenges" Frame: Implementing and enforcing mandatory testing regulations can be challenging, requiring significant resources for monitoring and compliance. Moreover, ensuring that all testing is conducted to a high standard can be difficult, and there may be disparities in the quality and reliability of tests performed by different providers.

Who should bear the responsibility of paying to test private well water—the homeowner or the government?

Pro (Government should pay):

- "Public Health" Frame: Ensuring clean water is a public health priority, and government funding should guarantee consistent and thorough testing to protect entire communities.
- "Equity" Frame: Not all homeowners can afford testing, and government-funded programs ensure that all citizens, regardless of income, have access to safe drinking water.
- "Prevention" Frame: Government involvement can lead to early detection of widespread issues, preventing larger public health crises.

Con (Homeowner should pay):

- "Personal Responsibility" Frame: Homeowners should take responsibility for their own water quality, especially if they choose to use private wells.
- "Financial Burden" Frame: Government funds are limited and could be better spent on other public services. Homeowners testing their water reduces the financial burden on the state.
- "Efficiency" Frame: Private testing may be more efficient and less bureaucratic than government programs, leading to quicker results and actions.

Discuss the pros and cons of public versus private control of water resources.

Pro (Public control):

- "Public Good" Frame: Water is a public resource, and public control ensures that it is managed in the best interest of all citizens, not for profit.
- "Equity" Frame: Public control can ensure fair distribution and access to clean water for all, regardless of socio-economic status.
- "Accountability" Frame: Public agencies are accountable to the public, ensuring transparency and responsiveness.

Con (Private control):

- "Efficiency" Frame: Private companies can often operate more efficiently, reducing waste and improving service delivery through innovation and competition.
- "Investment" Frame: Privatization can attract significant private investment, leading to better infrastructure and service improvements.
- "Flexibility" Frame: Private companies may be more flexible and quicker to adapt to changing circumstances and technologies.

Maine's primary drinking water standard for arsenic is 10 micrograms per liter (10ug/L), while New Hampshire's is 5 ug/L. Should Maine change its standard for arsenic to 5 ug/L?

Pro (Lowering the standard to 5 ppb):

- "Health Benefits" Frame: Lowering the arsenic standard decreases exposure to a known carcinogen, potentially reducing the incidence of cancers and other health problems linked to arsenic. It also enhances protection for vulnerable populations, such as children and pregnant women, who are more susceptible to the harmful effects of arsenic.
- "Long-term Cost Savings" Frame: Investing in cleaner water now can reduce healthcare costs in the future by preventing arsenic-related illnesses.
- "Environmental Protection" Frame: Lowering the allowable arsenic level encourages better environmental practices and monitoring, improving overall water quality.
- "Alignment with Neighboring States" Frame: Aligning with New Hampshire's standard can simplify regulations for companies operating in both states and can foster regional cooperation on water quality issues.
- "Increased Public Confidence" Frame: Stricter standards can increase public trust in water safety and regulatory bodies.

Con (Lowering the standard to 5 ppb):

- "Increased Costs" Frame: Water treatment facilities and private well owners may face significant expenses to upgrade systems and meet the stricter standard. More resources will be needed for monitoring and enforcement, which could strain state and local budgets. The financial burden of compliance may be especially challenging for small communities and low-income households.
- "Economic Impact on Industries" Frame: Industries that rely heavily on water, such as agriculture and manufacturing, may face higher operational costs, potentially affecting their competitiveness.
- "Public Resistance" Frame: Homeowners and businesses may resist the change due to the perceived or actual increase in costs and regulatory burden.
- "Logistical Challenges" Frame: Achieving and maintaining the lower standard requires more frequent and rigorous testing, as well as enhanced infrastructure and technology.

Should there be stricter regulations on agricultural runoff to protect drinking water sources?

Pro (Stricter regulations):

- "Health Protection" Frame: Stricter regulations reduce the risk of contaminants like pesticides and fertilizers entering drinking water, protecting public health.
- "Environmental Benefits" Frame: Reducing runoff improves the overall quality of water bodies, benefiting ecosystems and biodiversity.
- "Long-Term Savings" Frame: Cleaner water reduces the need for expensive water treatment, leading to long-term cost savings for municipalities and taxpayers.

Con (Stricter regulations):

- "Economic Impact" Frame: Stricter regulations can increase costs for farmers, potentially reducing their competitiveness and profitability.
- "Productivity" Frame: Farmers may face reduced productivity if they are required to limit the use of certain chemicals or implement costly runoff prevention measures.
- "Implementation Challenges" Frame: Ensuring compliance with stricter regulations can be difficult and costly, requiring significant monitoring and enforcement resources.

Is water a human right or a commodity?

Pro (Water is a human right):

- "Basic Need" Frame: Access to clean water is essential for survival, health, and well-being, and should be guaranteed for all individuals.
- "Equity" Frame: Treating water as a human right ensures that even the poorest and most vulnerable populations have access to safe drinking water.
- "Moral Responsibility" Frame: Society has a moral obligation to provide essential resources like water to all people, regardless of their ability to pay.

Con (Water is a commodity):

- "Value Recognition" Frame: Treating water as a commodity recognizes its value and encourages responsible use and conservation through pricing mechanisms.
- "Investment and Innovation" Frame: Viewing water as a commodity can attract private investment, leading to improved infrastructure, efficiency, and technological advancements.
- "Sustainability" Frame: Pricing water appropriately can discourage waste and overuse, promoting sustainable management of water resources.