Class Time: Varies
Assignment Type: Class Room/Homework

Grade Level: High School and Undergraduate
Author: Lycurgus L. Muldrow

Brain Eating Amoeba

Lesson Overview:

The Brain-Eating Amoeba Research Simulation Case Study (RSCS) explores environmental sampling for the pathogenic amoeba *Naegleria fowleri. N. fowleri* causes the waterborne disease primary amoebic meningoencephalitis (PAM) or amoebic meningitis which can fatally infect individuals who swim in contaminated water. *N. fowleri* infections have been linked to thermally polluted waters. This RSCS has students identify potentially contaminated sites as well develop a protocol for testing the water from these sites.

Materials:

1. Scientific Literacy Course video lecture and PowerPoint for Research Simulation Case Study
2. Handouts of the Brain Eating Amoeba Research Simulation Case Study
3. Optional, show one of the dozens of YouTube videos on "brain eating amoeba."

High School

National Standards

A: Science as Inquiry
B: Physical Science
C: Life Science
E: Science and Technology

GA Standards

SB1. Students will analyze the nature of the relationships between structures and functions in living cells.
SB4. Students will assess the dependence of all organisms on one another and the flow of energy and matter within their ecosystems.
SPS7. Students will relate transformations and flow of energy within a system.
SPS9. Students will investigate the properties of waves.
SP1. Students will analyze the relationships between force, mass, gravity, and the motion of objects.
SP4. Students will analyze the properties and applications of waves.
SC3 Students will use the modern atomic theory to explain the characteristics of atoms.
MM1A1. Students will explore and interpret the characteristics of functions, using graphs, tables, and simple algebraic techniques.

Undergraduate

Best Practices for Scientific Literacy

1. An understanding of the nature and development of scientific research and knowledge
2. Knowledge of the interdisciplinary nature of STEM
3. Possessing the ability to evaluate scientific evidence and explanations
4. Having the ability to participate productively in scientific discourse
5. Demonstrating an aptitude for scientific reasoning, quantitative literacy and critical thinking
6. Possessing a relevant knowledge of career opportunities in STEM
7. Possessing a scientist identity and STEM self-efficacy, as well as other relevant attitudes and behaviors for success in STEM
8. The ability to participate in team learning and discovery

Scientific Literacy Center

Research Simulation Case Study Activity

Teaching Notes

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Lesson Objectives:

- Develop a real understanding of the scientific method.
    - Increase understanding of the nature and development of scientific research and knowledge acquisition (experimental design, appropriate use of controls, data collection).
    - Practice in the analysis and evaluation of scientific evidence (data interpretation).
- Impart a greater clarity on the interdisciplinary nature of STEM.
    - Assist in acquiring a better understanding of varying STEM disciplines (environmental science, pathology, biochemistry, cell biology, physics-optics etc).
- Learn to participate in the team learning and discovery process.
    - Actively participate in scientific discourse.
- Improve aptitude for quantitative literacy/reasoning, scientific reasoning and critical and creative thinking.
- Increase scientist identity and STEM self-efficacy (via actively solving research problems).