Argumentation on Marine Bacteria

Description of the Activity

My students will be working with three different strains of bacteria collected by last year's AP Biology class, during our trip to the UGA Marine Institute at Sapelo Island.

The students will be presented with a research question and will be given data to support their claim (hypothesis). We are also including the sequences of the 16S rRNA gene for each strain of bacteria. Having these information the students can identify their strain using BLAST and learn about the biology of the organism they are working with.

The students will follow the format described by Victor Sampson and Sharon Schleigh, in their book; Scientific argumentation in Biology 30 Classroom Activities NSTA press 2013.

This exercise addresses Big Ideas 2 and 3 and science practices (SP) 1-7 of the AP Biology curriculum.

Activities like this one will teach students to analyze data, graph data, interpret graphs, and use statistics to find if apparent differences are significant. The last part of the assignment gives this activity the writing component needed in a science class.

Generating an Argument Instructional Model

(Information taken from Scientific argumentation in Biology 30 Classroom Activities by Victor Sampson and Sharon Schleigh, NSTA press 2013)

1. **The identification of a problem and the research question** (teacher). The activity should include a brief introduction of the research (problem) and a research question to answer.
2. **Generation of a tentative argument.** Students will use raw data to develop and answer the research question (claim), Students will give evidence that supports the claim (analyzed data and interpretation of data), students will justify the evidence (why the evidence used by the student is relevant).
3. **The argumentation session.** Students will share and evaluate their argument.
4. **Reflective discussion.** Students will regroup and discuss what they learned from other groups and they will rethink and modify the initial claim.
5. **Production of a final written argument.** Each student will produce a final argument in writing (students will use prompt).

Prompt

In the space below, write an argument in order to persuade another biologist that your claim is valid and acceptable. As you write your argument, remember to do the following:

- State the claim you are trying to support.

- Include genuine evidence (data, analysis, interpretation)
- Provide a justification of your evidence that explains why the evidence is relevant and why it provides adequate support for the claim.
- Organize your argument in a way that enhances readability.
- Use a broad range of words including vocabulary learned.
- Correct grammar, punctuation, and spelling errors.

Question: (This is the question provided in the task.)

Claim: (Often you can use part of the question to formulate your claim. In an extended response, this will be your topic or thesis sentence.)

Evidence: (This is data gathered from text or graphics that help you answer the question provided in the task. Choose a quote or other evidence that directly supports your claim. If you use a quote, then be sure to credit the quote properly.)

Reasoning: (This is the most important part of your answer. It provides your reader with the explanation for your claim, and it explains how your evidence supports your claim. This is also where you should draw on key ideas and concepts from the discipline to tie your evidence to your claim.)

The evidence shows: I know (relevant disciplinary ideas – i.e., scientific facts and concepts that help answer the question), I can apply (relevant crosscutting concepts-i.e., big ideas that connect the concepts and evidence), therefore, I can conclude that.

References

1. Scientific argumentation in Biology 30 Classroom Activities NSTA press 2013
2. http:bit.ly/NEGAScienceHigh