Lesson Plan

Title
How small is small?
Primary Subject Area
Cell Biology
Grade Level
Grade 7
Overview
The lesson will be integrated into the cellular biology unit of the 7th grade curriculum.
Approximate Duration
1 class period
MA Framework
Life Science (Biology), Grades 6-8 Structure and Function of Cells 2. Recognize that all organisms are composed of cells, and that many organisms are single-celled (unicellular), e.g. bacteria, yeast. In these single-celled organisms, one cell must carry out all of the basic functions of life
Interdisciplinary Connections
This lessons ties in closely with mathematics. This lesson will require collaboration with the mathematics teachers in order to ensure enrichment of content and not unnecessary repetition between math and science subject areas. I will check with the math department to make sure that long division and multiplication has been covered and perfected by the students.
Lesson Objectives
• Students understand scale of size in metric units • Students will demonstrate knowledge by creating models for bacteria and viruses • Students will compare the sizes of bacteria and viruses to the sizes of objects provided in the activity. • Students will connect their math knowledge in order to fully grasp the concept of metric scale
Lesson Materials and Resources
• Photos of different sized objects (half as many photos as there are students, so students can pair up) • Rulers • Possibly PowerPoint, projector, and computer
Technology Tools and Materials
Students will look at images of bacteria and viruses and draw their own models and then draw conclusions about the scalar relationships (in metric units) between their own models and the actual size of the microbiology organisms. The teacher will then lead a discussion emphasizing the importance of scale in science, and how size is not always what it seems.
Background Information
Bacteria are larger organisms than viruses, yet at Boston University, my RET partner and I were able to use the same laboratory set up to run experiments testing for and quantifying the presence of bacteria and viruses. This information is essential for students to understand when continuing with their biology education.
Lesson Procedures
Engagement: • In pairs, students look at images of organisms and then students must 'silently' place themselves in

the correct order of size from largest to smallest.

Exploration:

- Stations: Student will rotate through the classroom calculating the scalar relationship of models of organisms
- Students look at images of the correct sizes of microbiological organisms and produce models of the organisms and then calculate the scalar relationship between the actual size and their model.

Assessment Procedures

Exit Slip:

- 3: Three things the students learned about today
- 2: Two things the students are still confused about
- 1: One thing they want to learn more about

This exit slip will allow me to gauge the amount of information learned in class today. I will also be able to use the confusing points of today's lesson to build upon the class tomorrow.

Accommodations/Modifications

- Graphic organizer for students who need and/or want help organizing their ideas and answers
- The graphic organizer will help students visualize the scalar relationship between the actual size of the organisms and their models, the organizer will also help the students keep their work and answers neatly organized.

Reproducible Materials

Students will have a series of images and models that they need to replicate models of the bacteria and viruses. The students will be able to compare which models are the best representation of the bacteria and viruses.

Explorations and Extensions

Students observe different shapes. Students must calculate the volume of the shape and calculate how many bacteria and viruses could fit inside the shape. (Volume and/or surface area).

Lesson Development Resources

In the BSAIL laboratory in the Photonics building of Boston University.

Reflections

If students have lab notebooks for science, students can reflect on their original concepts of size with any new observations that they make after constructing models and figuring out the scalar relationships to the actual size of bacterium and viruses.

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