Student C. elegans Research Project

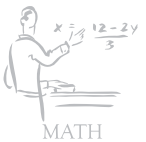
This project is ideal for allowing students to conduct an original research project and learn how science investigations are carried out. Students are able to learn the true nature of science and apply it, rather than just learn about science.

9-12

GRADE LEVEL

ARTS

LANGUAGE



MATH

Misc

MISCELLANEOUS

SCIENCE

HISTORY

SOCIAL STUDIES

3-4

MONTHS

$1000

TOTAL BUDGET

Curriculum/State Standard

EALR 2.1, 3.3 Develop abilities necessary to do scientific inquiry. Use effective communication strategies to prepare and present science information.

Overview

This research program involved students analyzing genetic differences among important agricultural strains of soil roundworms (C. elegans) obtained from the C. elegans Genetics Center (CGC). Our school is located in a rural farming community, and soil organisms are of great importance to the regions economy.

Objectives

- The student will become knowledgeable in the scientific experimental design process.
- The student will learn fundamental skills and techniques used in molecular biology.
- The student will gain knowledge in recording and communicating their research findings.

Materials

Basic items for culturing and maintaining the roundworms, such as petri dishes, growth media, and microbiological handling tools for analyzing DNA, electrophoresis equipment and reagents are required, along with basic molecular biology equipment, such as micropipetors and a microcentrifuge.

Readiness Activity

Students initiated the project by researching the importance of soil organisms to agricultural practices and crop yields. Information was gathered on various strains of C. elegans from the C. elegans Genetics Center, and organisms were ordered for studying genetic differences among the selected strains. Before arrival of the soil roundworms, students designed experiments and protocols for studying their particular strains. The staff involved mentored students with their experimental design process.

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Kids In Need

THIS WINNING LESSON PLAN WAS SUBMITTED BY:

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"Student C. elegans Research" project continued...

Strategies/Activities

Students performed background research on soil organisms and C. elegans.

Mentoring teachers provided guidelines for research objectives and gave input for the experimental design through pre-lab seminars with student groups.

Research on C. elegans strains available from the CGC was completed, and organisms were ordered in writing by the student groups.

Research protocols based on the obtained strains were finalized by students/mentors.

Growth media were prepared, and strains of C. elegans were cultured in the lab.

DNA was isolated from the various strains cultured in lab, and analyzed using electrophoresis techniques.

DNA results were documented using a digital image analysis system (Kodak EDAS 120).

Students maintained a detailed research notebook of the entire project.

The final project was presented through a PowerPoint presentation by groups.

Culminating Activity

Student groups presented their research findings through a PowerPoint presentation to other groups involved with the project, along with the staff members. Each group worked together to analyze their data, determine the significance of their results, and put together the presentation. Each member also turned in their completed research notebook, which included a formal summary of their research project and findings.

Evaluation

Evaluation of student achievement was measured directly through successful completion of the principle objectives listed. These were evaluated through a rubric system for each objective. Presentation of the overall research process and results through PowerPoint also served as a primary evaluation tool. Student research notebooks were also accounted for.