

Clean Air in the Classroom

The project has been a great success and the students were inspired. We had good success because we were able to take an invisible world and make it visible right before the students' eyes. The 'stuff' we collected from our air cleaner was actually growing, living, and thriving on the nutrient agar. The technical skill and analytical thinking the students achieved were excellent.

Curriculum/State Standard

Alaska Standards / Department of Education pages 17-19, pub 2000

Section A: A student should understand scientific facts, concepts, principles and theories.

Section B: The student should possess and understand the skills of scientific inquiry through experiment.

Section D: The student should be able to apply scientific knowledge and skills to make reasoned decisions about the use of science and scientific innovations.

Overview

The current EPA mold remediation in our public schools inspired this unique project. My purpose was to generate personal scientific interest in the students for different aspects of their health and environment. This project has succeeded in making the students qualitatively and quantitatively aware of the unseen world of the microbes. We also created an appreciation for the power of their immune systems.

Objectives

- The students will understand indoor air quality standards.
- The students will quantitatively analyze the amount of airborne particulate matter in their classroom.
- The students will weigh and tare using an analytical electronic balance.
- The students will understand the power of a healthy functioning immune system.
- The students will publish a Web page detailing the project
- The students will understand four methods of air filtration including prefiltration, electrostatic attraction, collection plates and carbon filtration. (Friedrich C-90A).

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7-8

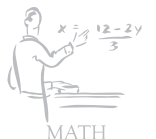
GRADE LEVEL



ARTS



LANGUAGE



MATH

Misc

MISCELLANEOUS



SCIENCE



HISTORY



SOCIAL STUDIES

?

MONTHS

\$1000

TOTAL BUDGET



THIS WINNING LESSON PLAN WAS SUBMITTED BY:

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“Clean Air in the Classroom” project continued...

Materials

Air cleaner, filtration system for separating particulates to be measured, analytical balance weighing to four decimal places (borrow or buy used), nutrient agar and petri dishes, access to autoclave

Readiness Activity

Presentation of the mold issue in any schools as shown by the EPA (see Web sites)

Presentation on common microbes with history: basic shape, size and reproductive methods of bacteria (e. coli, botulism, yersinia pestis (black plague), anthrax, lactobacilli, salmonella,

penicillium, aspergillums

What is asthma?

Human immune system

Strategies/Activities

Present the mold issue in schools as it pertains to student health/immune system. There's so much information available online.

Introduce asthma.

A mold problem may not exist in your school, but microbes are ubiquitous and can be easily cultured for general viewing and confirmation of presence.

Present common microbes with history and current status of activity, including: basic shape of bacteria and reproductive methods (e. coli, botulism, yersinia pestis (black plague), anthrax- (recent USA threat), lactobacilli, salmonella, penicillium, aspergillums.

Introduce the air filtration system and study the various methods trapping the airborne particulates.

Discuss the human immune system and what an immune response amounts to.

Introduce a method of collecting the trapped particulates and weighing them. We used a bath system and a Buchner funnel to filter the particulates. We dried and re-weighed our filters to see the difference in mass.

Make nutrient agar and setup sterile culture dishes.

Introduce the importance of a control group to validate results.

Take a sample of particulates collected at entrance side of air cleaner and one from the exit side and then inoculate the agar.

Prepare a chart in Word or some other program to collect observations of growth over a seven-day period.

Photograph the growth and consult with a book to generalize what might be growing in your petri dish (i.e. mold or bacteria).

Summarize project by creating a Web page with Dream Weaver. This presses the student to really understand what he/she has been studying by having to communicate it to the world.

Nearly all the information needed to complete this project came from the Web, so it is available to any willing teacher.

Culminating Activity

The construction of a Web page and presentation of the project at our annual science fair finalizes the project.

Evaluation

Students were tested by a written exam, oral presentation and production of a Web page.