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Teacher's Corner Lesson Plans

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School Ground Naturalization Project*

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Grade level: Grade 7-9.

Provincial curriculum links: Ontario.

Subject: Science/Environmental Science.

Keywords: School naturalization, Plant plan.

Description

The purpose of this project is to involve the students in choosing the best location for a potential naturalized project and developing a plant plan for a school ground naturalization project.

Curriculum Framework

Topic: Life Systems: Interactions Within Ecosystems (Grade 7)

Strand: Science and Technology

Specific Lesson Goals: Understanding Basic Concepts

- identify living (biotic) and non-living (abiotic) elements in an ecosystem
- identify populations of organisms within an ecosystem and the factors that contribute to their survival in that ecosystem
- investigate ways in which natural communities within ecosystems can change, and explain how such changes can affect animal and plant populations

Developing Skills of Inquiry, Design, and Communication

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- formulate questions about and identify the needs of various living things in an ecosystem, and explore possible answers to these questions and ways of meeting these needs (e.g., research the population levels of a species over time and predict its future levels on the basis of past trends and present conditions; determine how the structure of specific plants helps them withstand high winds, live on the surface of water, or compete for sunlight);
- plan investigations for some of these answers and solutions, identifying variables that need to be held constant to ensure a fair test and identifying criteria for assessing solutions;
- compile qualitative and quantitative data gathered through investigation in order to record and present results, using diagrams, flow charts, frequency tables, bar graphs, line graphs, and stem-and-leaf plots produced by hand or with a computer (e.g., use a chart to record the number of producers and consumers in a particular habitat);
- communicate the procedures and results of investigations for specific purposes and to specific audiences, using media works, oral presentations, written notes and descriptions, charts, graphs, and drawings

Relating Science and Technology to the World Outside the School

- describe the conditions in an ecosystem that are essential to the growth and reproduction of plants and micro-organisms, and show the connection between these conditions and various aspects of the food supply for humans;
- explain the long-term effects of the loss of natural habitats and the extinction of species (e.g., loss of diversity of genetic material, both plant and animal);
- identify and explain economic, environmental and social factors that should be considered in the management and preservation of habitats

Topic: Cells, Tissues, Organs, and Systems (Grade 8)

Strand: Science and Technology

Specific Lesson Goals: Understanding Basic Concepts

- describe, using their observations, differences in structure between plant and animal cells;
- explain how the structure of the roots, stem, and leaves of a plant permit the movement of food, water, and gases;

- compare the structure of different plants (e.g., cactus, coniferous tree, moss) and show how their structure enables them to live in specific conditions;

Developing Skills of Inquiry, Design, and Communication

- plan investigations for some of these answers and solutions, identifying variables that need to be held constant to ensure a fair test and identifying criteria for assessing solutions;
- compile qualitative and quantitative data gathered through investigation in order to record and present results, using diagrams, flow charts, frequency tables, graphs, and stem-and-leaf plots produced by hand or with a computer (e.g., use a diagram to present an estimate of the number of cells in a petri dish);
- communicate the procedures and results of investigations for specific purposes and to specific audiences, using media works, oral presentations, written notes and descriptions, charts, graphs, and drawings (e.g., create a simulation illustrating movement of water and nutrients between cells and through various organs and systems).

Topic: Chemistry (Grade 9)

Strand: Science

Specific Lesson Goals: Understanding Basic Concepts

- recognize compounds as pure substances which may be broken down into elements by chemical means;
- describe, through observations, the evidence for chemical changes (e.g., changes in colour, production of a gas, formation of a precipitate, production or absorption of heat, production of light);

Developing Skills of Inquiry, Design, and Communication

- select and integrate information from various sources, including electronic and print resources, community resources, and personally collected data, to answer the questions chosen;
- gather and record qualitative and quantitative data using an appropriate format, and analyse the data to explain how the evidence gathered supports or refutes an initial hypothesis
- communicate scientific ideas, procedures, results, and conclusions using appropriate SI units, language, and formats, and evaluate the processes used in planning, problem solving, decision making, and completing the task

Preparation

Preparation time: If possible, allot 1-2 class periods to introduce the concepts of a school ground naturalization project as well as the project requirements. In addition 2-3 class periods will be required for students to work on the assignments for each of the following sections: microclimates, soil information and current vegetation. The teacher should allow students to work outside at the site that is to be naturalized to allow the students to become familiar with the site. Each group should determine the best potnetial naturalized project area and be prepared to back up their choices. The teacher should encourage students to gather the background research/resource information ahead of time and to bring the resources with them for outside work at the site.

Length of Lesson: 6 hours (approximate)

Resources required:

- thermometer
- La Motte Soil Testing Kit
- magnifying glass

Background Information/Skills

All students should be familiar with the Environment Canada website and the steps required to obtain weather related information from the site.

Grade 9 students should understand fundamental acid/base concepts and salinity concept (ie: the effects of salt levels on plant and soil, the origins of salt found on certain sites)

All students should know how to correctly use the thermometer

All students should have some background knowledge on the use of pesticides

Grades 8 and 9 students should have some knowledge on the different parts of a plant and different soil types.

Safety Concerns

Remind students to:

- stay within assigned boundaries
- dress suitably for weather conditions when working outdoors (ie: wear hats and sunscreen)

Teachers must carry Epipens if students have severe bee/wasp/plant allergies

Procedure

1. Teacher should divide the class into 3 groups.
2. The first 2 classroom sessions should be background research into the project and should focus on microclimate and research on native plants to the area and their specific soil requirements.
3. The outdoor component will focus on evaluating current vegetation on-site and evaluating the soil based on the variables listed on the work sheet, determining microclimates and ultimately choosing the best potential garden area.

See Appendix A for a detailed list of tasks.

Group Management Strategies

- When assigning groups, teacher should group students who are academically stronger with students who are academically weaker.
- Teachers should try to avoid grouping students from the same friendship groups together. This will allow students to get to know other students who may not be in their 'circle of friends'.
- For a mixed grade grouping each group should consist of 2 grade 7 students, 2 grade 8 students and 3 grade 9 students. The purpose of grouping students from different grade levels is for older students to help and teach the younger students while the younger students learn from the older students.

Discussion and Questions

Initially, for the background research, discussion will take place within small groups. The small groups will then present their ideas for a school ground naturalization plan to the larger group for discussion. Groups should focus on the main concepts and principles and formulate questions that will generate discussions within the class.

Student Evaluation

How well did the students understand the lesson? Students can be rated.

Follow up Activities

'When all assignments have been submitted and graded, teachers should display all the work in the school cafeteria. Teachers, students and community members can then look at the display and vote for the best/favourite ideas to use for the naturalization project (i.e., type of plants to use, type of soil to use, the store to purchase the soil from, the choice of letters to mail out)

Students can do the soil tests when the project has completed and compare the before/after results.

Students can compare the types of wildlife found in the area before and after the project.

What connections can be made to school ground naturalization project? How can concepts be reinforced in a practical way? What are the connections to the outdoor classroom?

References

Environment Canada - weather. http://weatheroffice.ec.gc.ca/canada_e.html/.

Climate Change - weather. http://www.davidsuzuki.org/.

SCHOOL YARD NATURALIZATION

SCIENCE/ENVIRONMENTAL SCIENCE

Group # that I belong to:

Names of my group members:

Science/Environmental Science

Collect and research for the data requested below and write or type out the information on separate sheets of paper.

Microclimate

Find the average temperature of the area for each month of the year (use Environment Canada web site as a resource)

Find the average rainfall of the area for each month of the year (use Environment Canada web site as a resource)

Find the average wind speed of the area for each month of the year (use Environment Canada web site as a resource)

Soil Information

Dig up a bit of soil from the ground and compare the soil with the different sample types and determine the type of soil it is.

Use the soil pH kit to determine the pH of the soil.

Use the La Motte Soil Testing Kit to determine the Nitrogen, Phosphorous and Potassium content of the soil.

Dig a small but deep hole in the ground and insert the thermometer to determine the temperature of the soil. Do the test in the morning, midday and in the afternoon and record results, time of test and dates of test.

Use a magnifying glass and find any small insects that live in the area.

Previous and current vegetation and pesticide

Determine type of grass currently planted (whether it is native species, where the species came from)

Find out from school administrators or custodians the type of pesticides previously and/or currently used (before the start of the project) on the grass area. Write a 1 page report on the effects of the pesticides and the danger of the pesticide on plants, animals and human.

Types of plants to be used

Using all the information gathered on climate and soil, determine the possible types of plant that would grow in the soil.

Choose 5 possible plants and for each plant, write a 100-200 words information about the plant.

- physical description of plant
- types of wildlife that plant attracts and repel
- the plant's optimal growing temperature and climate
- possible cost to purchase the plant (cost of seed, cost of seedlings, cost of grown plant)