



Teacher's Corner Lesson Plans

*Helping Teachers and Students Make the Most of
their Outdoor Classroom*

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Changes to the Global Climate^{*†}

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Grade level: Grade 5.

Provincial curriculum links: Ontario.

Subject: Science and Technology.

Keywords: Global warming, Greenhouse effect.

Description

Students will conduct an experiment to demonstrate the greenhouse effect.

Curriculum Framework

Topic: Earth and Space Systems

Strand: Weather

Specific Lesson Goals: At the end of the lesson, students will be able to:

- Compile data gathered through investigation in order to record and present results, using tally charts, tables, and labeled graphs produced by hand or with a computer (e.g., record both qualitative and quantitative data from observations of weather over a period of time).
- Accurately use a thermometer to read temperature and record the results.
- Communicate the procedures and results of investigations for specific purposes and to specific audiences, using media works, oral presentations, written notes and descriptions, drawings, and charts (e.g., draw a labeled diagram of the water cycle).

^{*}This exercise is adapted from Lott, Steven *Patterns, Plants and Playgrounds, Educational Activities for School Grounds, Intermediate Grades 4 to 7*. Evergreen, 2000.

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Preparation

Preparation time: 5 hours

Length of lesson: 1.5 hours. Half an hour for conducting the experiments and an hour for constructing and interpreting graphs

Resources required: Quantities are based on a group of 4 students:

- thermometers - 3
- glass jars + lids - 3
- rulers - 4
- graph paper - 4 sheets
- pencils - 4

Procedure

Part 1

1. Take two clear jars and place a thermometer in each.
2. Cover one with a lid and leave the other open.
3. Place both in direct sunlight.
4. Record the temperature of each every 30 seconds for 10 minutes.
5. Graph the results and compare them.

Part 2

1. Tape a sheet of black paper onto the back of three jars.
2. Fill the first jar with clear water, leave the second jar empty and burn a candle in the third or capture exhaust fumes.
3. Cover each jar, with a thermometer placed inside.
4. Place all jars in direct sunlight.
5. Record the temperature of each every 30 seconds for 10 minutes.
6. Graph the results and compare them.
7. After 10 minutes, both gas-filled jars should have reached their maximum, but the water jar will still be warming up. Leave the jars in the sunlight until the temperature in the water jar stops rising.

8. With all of the jars at, or near their maximum temperature, place them in a well-shaded location.
9. Measure, record and graph the rate of temperature decline for each jar.

Discussion and Questions

Part 1

Discuss the principles of heat retention that have been demonstrated in this experiment and have the students come up with examples in the environment.

Part 2

Explain the results by thinking about the greenhouse effect, the mass of the substances in the jars and the science behind climate change.

Student Evaluation

Rubric or rating scale for students to determine how well they completed the goals of the lesson.

Enrichment and Extension Activities

This activity could be part of a unit on weather that explores the many factors that influence weather patterns and addresses how human activity is affected by weather (and climate). Discussions and activities that illustrate how human activity impacts various components of ecosystems e.g. climate, and thus all life on the planet are important extensions of this exercise.

Connections to the Outdoor Environment

Questions to ask? What impact does global warming have on our school ground project? If temperatures continue to increase what impact will this have globally.

Educator Notes

This lesson plan can be used as an introductory lesson before the project is complete or as a wrapup lesson plan upon the change of the seasons.

References

Environment Canada. *Climate Change Web Site*. <http://www.ec.gc.ca/climate/index.html>.

The David Suzuki Foundation. <http://www.davidsuzuki.org/climate/main.htm>.

The Climate Ark. <http://www.climateark.org/>.

Pembina Institute. <http://www.climatechangesolutions.com/english/individuals/default.htm>.