

Sunshine Experiment

Materials

- 1 or more grow lights (full-spectrum light bulbs available at garden centers and most supermarkets)
- several planting containers
- at least one packet of seeds from Group A (radishes, spinach, beets) and one packet of soybean seeds (see source list)
- Black paper or cloth for screening
- 1 timer (to control light), optional
- map or globe

Objective

To determine how long hours of sunlight in Alaska summers affect the growing of plants

Suggested grade levels

5-8



This project presented by Alaska Agriculture in the

Classroom through funding from the Alaska Division of Agriculture and the Alaska Farm Bureau. For information, visit www.agclassroom.org/ak



developed by Victoria Naegele

Note

To try this experiment in the dark months, set up the grow light to allow light to hit one container planted with each type of seed 24 hours a day, or slightly shorter increments to simulate summer sunshine. Have a second group exposed only to natural sunlight during the day by blocking off artificial light. A third group could be exposed to natural and artificial light during school hours, then closed in a closet or covered with a paper bag spray painted black during off hours.

To try this experiment in the lighter months, use timers to limit amount of grow light hitting the plants, and block them from ambient lighting.

Combinations of incandescent and florescent lighting simulate natural light well enough for plants to grow well indoors without special grow lights.

Introduction

How do Alaska's long hours of summer daylight affect Alaska agriculture? Alaska farmers and gardeners can grow a variety of crops successfully, depending on the area they live. But they have a hard time growing some crops because they require more time to mature than Alaska summers provide, even though some areas get nearly 24 hours of sunlight during the summer.

Discuss some of the crops Alaskans grow successfully without greenhouses — barley, cabbages, potatoes, carrots, summer squash and radishes — and some that are difficult or not possible to grow here — soybeans, sweet corn, cotton, tomatoes, canteloupe, apples, oranges, wheat, etc.

Directions

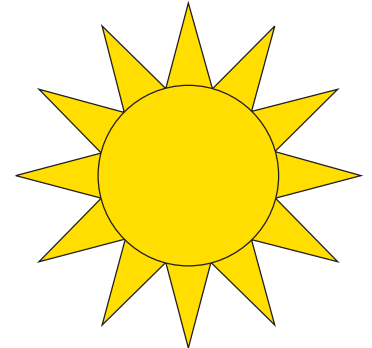
Plant seeds according to packet depth in containers, marking type of seed and date of planting on each container.

Expose the containers to light as described above.

See how flowering is affected by day length. Long-day plants like radishes, beets and spinach should flower sooner with more light. Soybeans, a short-day plant, will flower only on short days.

Students should keep detailed journals on how their experiment was set up, what was planted, how much light each plant received and how the plant grows.

Students may prepare a report on the conclusion of the experiment to summarize the experiment and hypothesize about what those results mean to Alaska agriculture. If the experiment fails, students should try to evaluate



Alaska Content Standards

Language Arts A4; C1-5;
 Science A14; B 1-4; C1-3;
 D1; Geography A1; B1; C1,2;
 Technology, A1; C1-2.

Terms to Define

short-day plants
 long-day plants
 flowering
 photosynthesis



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what may have gone wrong to cause the failure.

More discussion points

Which of the crops are not successful in Alaska because of the short growing season, or because of colder temperatures? What would have to change for Alaska to be a large apple producer, for instance?

How does the short growing season and limited production affect Alaska's economy? How do shipping costs affect prices of produce in Alaska?

What new types of crops might be developed by scientists that would expand growing opportunities in Alaska and reduce the state's dependence on imports?

What other areas of the world would get similar amounts of sunlight? Is the climate of those locations like that of Alaska's? Why or why not? (research other areas using library and/or Internet.)

Follow-up activities

Use the Alaska Ag in the Classroom website (www.agclassroom.org/ak) to post the results of your experiment. E-mail the webpage editor for details. Or post the results to a school webpage and link it to the AAITC page.

Seed Sources

Maple arrow is a soybean that arrives earlier than usual—about 80 days. Obtain it from Horus Botanicals, HCR Rt. 82; Box 29, Salem, AR 72576. or Vermont Bean Company, Garden Lane, Fair Haven, VT 05743; 803/663-0217

Prize variety from Botzum Seed Co., 43 E. Market Street, Akron, OH 44308; 800/208-7333 or Synergy Seeds, Box 787, Somes Bar, CA 95568; 530-469-3319

Tohya, another early variety: Synergy seeds (above) or Fedco Seeds, P.O. Box 520, Waterville, ME 04903; or Peaceful Valley Farm Supply, PO Box 2209, Grass Valley, CA 95945; 530-272-4769.

Pinetree Garden Seeds has a large selection of vegetable and flower seeds, and most of them are sold in small quantities for around \$1 a pack.

www.superseeds.com: Soybean varieties are listed under "Oriental Vegetables."

Other seed company websites:

www.trelay.com

www.eagleseeds.com

Related website

<http://eesc.orst.edu/agcomwebfile/garden/gardening/dayplants.html>

This lesson plan developed with assistance of Michele Hébert, University of Alaska Fairbanks Cooperative Extension Service.