



Food for the Future

Who makes sure that there are always crop wild relative seeds available for plant breeders?

Skill Level: Intermediate (11-13 years old)

Learner Outcomes:
Understands the importance of saving seeds for future generations.

Understands possible careers related to saving seeds.

Education Standards:
NSES: Science as Inquiry; Life Science; Science and Technology; Science in Social and Personal Perspectives

NETS: Creativity and Innovation; Communication and Collaboration; Research and Information Fluency; Critical Thinking, Problem Solving, and Decision Making

Sunshine State Standards:
HE.6.C.1.3; HE.7.C.1.3;
HE.8.C.2.6; SC.6.N.1.4;
SC.6.N.1.5; SC.8.N.4.1;
SC.8.N.4.2; SS.7.C.2.12;
SS.7.C.2.13; SS.8.E.3.1

Success Indicator:
Can explain the importance of saving seed for future generations.

Life Skill(s): Teamwork; Decision Making

Tags: seed vault; seed saving

Time Needed: 90-120 minutes

Materials List: Copies of Save Those Seeds Scenario and Action Plan Template; pencils or pens

The need for plant breeders is increasing every day due to a growing world population, new plant diseases, and changes in climate. Plant breeders not only work to develop new plants that are disease resistant and more nutritious, but also to preserve genetic diversity. Genetic diversity is a measure of the total number of genetic characters that make up each species. Species are further divided into varieties. Rice alone has over 100,000 different varieties!

In the first lesson, you learned about centers of origin and crop wild relatives. As our world population increases, human development is destroying habitat in which many of these crop wild relatives live. Plant breeders and other scientists are collecting the seeds of crop wild relatives and storing them for future breeding purposes and to prevent these plants from becoming extinct. Identifying, collecting, and storing these seeds is a huge job for scientists all over the world.

Once these materials are collected, where do they go? Most countries have *seed banks* or *gene banks*. Like your hometown bank, seeds, instead of money, are deposited in the bank. In developing countries, seed banks may be nothing more than a room full of kitchen refrigerators. Cool, dry, air preserves seeds for many years, but every so often seeds must be planted, grown, and the seed harvested for fresh seed stock.

The Svalbard Global *Seed Vault* is dug deep into the mountainous permafrost of northern Norway. Some call it a doomsday

Learn More:

About the Svalbard Global Seed Vault at:

<http://savingearth.co.cc/worlds-green-steps/global-seed-vault/>

Virtual Fun

The Great Plant Escape!

<http://urbanext.illinois.edu/gpe/case3/c3facts1.html>



vault dug into the frozen mountain. Svalbard is built to survive the unthinkable should ocean levels rise or the earth's surface be compromised by a nuclear war or comet strike.

WHAT TO DO

Show a 3:26 video about the Svalbard Global Seed Vault entitled, *Doomsday Vault Protects World's Seed*. http://www.youtube.com/watch?v=IXW_vzOppGI. After watching the video, discuss the following questions with the group:

1. Why was this location chosen to build a "doomsday" seed vault?
2. What kind of problem(s) would necessitate a single country having to withdraw its seeds from this vault? What kind of problem would necessitate all countries withdrawing their seeds from this vault?

Next, divide the group up into smaller groups of 3-4 students and read the Save Those Seeds Scenario. Review the *Options* section and instruct them to discuss and decide as a group how to save as much of their countries crop diversity as quickly and inexpensively as possible. Make copies of the plan of action template and ask each group to complete the form once they have decided on the best options for the scenario.

TALK IT OVER:

Share. . .

- What were some of the decisions you had to make to complete this activity?
- Did everyone in your group agree on what to do? If not, how did you come to a consensus?
- What do *you* think is the single, most pressing need that plant breeders need to work on immediately? How does your answer differ from your classmates?

Reflect. . .

- What did you learn from this activity that you didn't know before?
- In the You-Tube video, *Doomsday Vault Protects World's Seeds*, why did it say that the vault's contents "took 10,000 years to develop"?
- How does the Svalbard Global Seed Vault differ from a seed bank in a developing nation?

Generalize. . .

- Why is it important for you to know about seed banks and what plant breeders do to preserve seeds?
- Why are plant breeders only one part of the global hunger problem/solution?

Did You Know?

A 2,000 year old seed found by archaeologists at Herod the Great's Palace in Israel was successfully germinated in 2005.

Glossary Words

Seed Bank
Seed Vault
Seed Saving

Related Activities

(Link to Activities in the 4-H Directory of Materials)



Apply. . .

- What did you learn by participating in this process that will help you in the future?
- Why would a plant disease like the new strain of wheat rust disease require more cooperation between countries than a disease affecting only part of one nation?
- What would you do differently if you conducted this activity again?

References

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Save Those Seeds!

Scenario: You and your friends are living in an impoverished developing nation. Civil war is looming, but the existing government is receptive to some help from the outside. Your country is not technologically advanced, but the literacy rate is high. Agriculture is the most important industry; your nation not only feeds itself, but generates most of its income by exporting food surpluses. The four farming regions are spread out, each distant from the other. No seed bank currently exists, but the government has promised funding. You need to make a plan to protect the agricultural diversity of your nation and it needs to be done fast, before civil war makes travel difficult and dangerous.

You have been given a budget of one million dibils (your country's currency) to collect and store crop seeds to safeguard the genetic diversity of your country's food crops. *Goal:* Given the relative costs of the following options, collect and protect as much of your country's crop genetic diversity as quickly, safely and cheaply as possible.

Options:

1. Training seed collectors is a must. Regardless of any options you must train collectors to retrieve the seeds from the farming regions. Costs: -200,000 dibils: Takes 2 months to train collectors.
2. Good roads exist in only half the farming regions. You can build roads to access the diverse crop seeds in the other half in 8 months. Costs: -200,000 dibils: Takes 8 months.
3. Air travel to collect crop seeds and their genetic diversity is costly and only possible *in three of the four farming regions*. Costs: -600,000 dibils: Takes 2 months.
4. Build an in-country seed bank. Costs: -200,000 dibils: Takes 6 months.
5. Fly the *entire* seed collection, representing all of the country's diversity to Svalbard Global Seed Vault. Costs: -700,000 dibils: Takes 2 days.
6. Foreign aid. 500,000 dibils is available in international aid from the United Nations for your cause, but it takes 6 months to get the funding, and training to file the paperwork costs 300,000 dibils. Costs: (net) + 200,000 dibils: Takes 6 months.



Save Those Seeds!

Action Plan Template

Using the options listed on the previous page, complete this plan of action form as a group.

Steps	Time	Cost
TOTAL		