Lessons in a Backpack

United Nations Educational, Scientific and Cultural Organization

LONG POINT BIOSPHERE REGION

Winter Sowing

Restorations in the classroom

Description of Lesson

Embark on a fascinating journey into sustainable gardening with our Winter Sowing Lesson Plan. Designed for grade 4 students, this hands-on experience introduces the innovative method of winter sowing, where recycled plastic containers become miniature greenhouses. From understanding the basics of seed germination to fostering responsible resource use, students engage in a series of activities that align with the 2030 Agenda for Sustainable Development's Goal 15. Get ready for an educational adventure that combines environmental stewardship with the joy of watching seeds bloom in the winter cold!

Connect with the Long Point Biosphere

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SUSTAINABLE DEVELOPMENT GOALS

LONG POINT BIOSPHERE REGION

A1. STEM Investigation and Communication Skills

A1.1 use a scientific research process and associated skills to conduct investigations

A1.2 use a scientific experimentation process and associated skills to conduct investigations

A1.3 use an engineering design process and associated skills to design, build, and test devices, models, structures, and/or systems

A1.4 follow established health and safety procedures during science and technology investigations, including wearing appropriate protective equipment and clothing and safely using tools, instruments, and materials

A1.5 communicate their findings, using science and technology vocabulary and formats that are appropriate for specific audiences and purposes

A3. Applications, Connections, and Contributions

A3.1 describe practical applications of science and technology concepts in various occupations, including skilled trades, and how these applications address real-world problems

A3.2 investigate how science and technology can be used with other subject areas to address real-world problems

A3.3 analyse contributions to science and technology from various communities

Welcome

The 2030 Agenda has a special goal, number 15, all about taking care of the land and nature. It wants us to keep our forests safe, stop deserts from growing, and make sure we don't harm our environment. This goal is like a big promise from many countries to protect all the different plants and animals and keep our Earth healthy.

People from different countries talked about this at a meeting called Rio+20. They said that nature is super important because it helps us with things like clean water and good food. They also talked about a plan called the Strategic Plan for Biodiversity 2011-2020, which is like a guide to help us take care of nature.

In 2002, at another meeting called the World Summit on Sustainable Development, they made a plan to try and stop animals and plants from disappearing. They wanted to make sure that by 2010, we would see less harm happening to nature around the world.

A long time ago, in 1992, countries met in Rio de Janeiro and made a special plan called Agenda 21. This plan talked about how important it is to take care of all living things on Earth. They even made a special rulebook called the Convention on Biological Diversity to help everyone follow these important rules.

If you want to know more about this, you can ask your teacher or check out some books and documents on this topic. Taking care of nature is something we all need to do together!

Lesson Plan Background

Winter sowing is an engaging and sustainable gardening method that utilizes recycled plastic containers as miniature greenhouses. This lesson plan aims to introduce grade 4 students to this eco-friendly practice. By planting winter-hardy seeds outdoors in winter, students learn about seed germination, propagation, and the importance of biodiversity. The hands-on activities, from collecting and washing plastic containers to transplanting seedlings, foster an understanding of responsible resource use and environmental stewardship. The lesson aligns with the 2030 Agenda for Sustainable Development, focusing on Goal 15: "Protect, restore, and promote sustainable use of terrestrial ecosystems.

"Residing in a UNESCO World Biosphere is a unique experience, emphasizing the harmonious coexistence of human life and nature. These designated areas are chosen for their ecological diversity, turning them into living laboratories for biodiversity conservation. Residents become stewards of the environment, fostering a lifestyle that respects and sustains the surrounding ecosystems. The significance lies in the balance achieved between conservation and human activity, promoting sustainable practices, education, and global recognition of the region's ecological importance.

Explore and Learn

Instructional video: **7 Steps to Winter Sowing Using Pop/Soda Bottles, Juice Bottles and Vinegar Bottles**

Collect and Wash Plastic Containers (Home):

- Discuss the importance of recycling and how it contributes to environmental sustainability. Explain the concept of reducing waste by reusing materials.
- Encourage students to collect various plastic containers, emphasizing the significance of selecting those suitable for recycling. Discuss the various types of plastics and their recycling codes.
- In a hands-on activity, have students wash and clean the collected plastic containers. Emphasize the proper disposal of any non-recyclable components.

Cut Drain Holes and Recycle Lids

- Explain the need for drainage in the containers. Explore the role of drainage in preventing waterlogging and promoting healthy plant growth.
- Guide students in cutting 5 or 6 drain holes in the bottom of the containers.

Slice Gallon Jug Responsibly:

- Introduce the concept of responsible resource use while slicing gallon jugs. Emphasize the idea of minimizing waste and utilizing materials efficiently.
- Instruct students to carefully cut the gallon jug in half, leaving the handle attached. Discuss the benefits of reusing plastic containers for educational and practical purposes.

Prepare Craft Stick Seed Labels

- Discuss the importance of labelling for organization and tracking purposes. Emphasize the role of proper labelling in scientific experiments and gardening practices.
- Engage students in a creative activity by having them prepare craft stick seed labels for placement inside the jug. Encourage them to use recycled or sustainable materials for labelling.

Mix Water and Potting Mix Responsibly

- iscuss the components of potting mix and the importance of responsible resource management. Emphasize the need for proper hydration and nutrient content in the soil.
- Guide students in mixing water and potting mix thoroughly in a bucket. Encourage them to explore sustainable practices in gardening, such as composting and using eco-friendly soil amendments.

Explore and Learn cont...

Plant Seeds with Care

- Discuss the significance of the following proper seed planting depth for native species. Explore the science behind seed germination and the factors that influence successful growth.
- In a hands-on activity, have students plant seeds in the containers, ensuring they adhere to the recommended planting depth (1/8-1/4" Max.). Emphasize the connection between responsible gardening practices and successful plant development.

Seal Container with Eco-Friendly Materials

- Show students how to seal the containers with duct tape, highlighting the importance of using minimal resources and choosing eco-friendly options when available. Discuss the impact of these choices on the environment.

Set Jugs in a Sunny Location

- Discuss the importance of sunlight in the growth of plants and the role of a sunny location in the winter sowing process. Emphasize the natural elements contributing to successful gardening.
- Guide students in placing the sealed jugs in a sunny location, allowing rain and snow to enter through the cap hole. Connect this step to the broader concept of working harmoniously with nature in gardening practices.

Open on Warm Days in Springtime

- Explain the role of temperature in seed germination and plant growth. Discuss the seasonal changes and the impact of warmer weather on the winter-sown seeds.
- Have students to open the containers on warm days in springtime, fostering an understanding of the natural cycles that influence plant development.

Transplant Seedlings with Care

- Discuss the significance of transplanting seedlings when true leaves appear and the importance of providing adequate space for root growth.
- Engage students in a discussion about responsible gardening practices, emphasizing the need for proper care and attention to plants as they continue to grow. Connect this step to the broader context of biodiversity and environmental stewardship.

Dig Deeper

Explore additional resources and videos on winter sowing and seed starting to enhance understanding and appreciation for sustainable gardening practices. Encourage students to critically evaluate the information and consider how they can apply these concepts in their own lives.

Native Species List

Here is a list of native species taken from the Norfolk Seed Strategies overview:

Blue Lupine (Lupinus perennis)
Butterfly Milkweed (Asclepias tuberosa)
Round Leaved Shadbush (Amelanchier sanguinea)
Witch Hazel (Hammamelis virginiana)
Venus' Looking Glass (Triodansperfoliata)
Whorled Milkweed (Asclepias verticillata)
Rock Elm (Ulmus thomasii)
Intermediate Pinweed (Lecheaintermedia)
Sand Violet (Viola sagittata)
Early Saxifrage (Micranthes virginica)
Prairie Chord Grass (Spartina pectinata)
River Bulrush (Bulbenoscoens fluviatalis)
Blue Eyed Grass (Sisyrinchiummontanum)
Wild Crab Apple (Malus coronaria)
Carolina Wood Vetch (Viccia caroliniana)
Leatherwood (Dirca palustris)
Wood Phlox (Phlox divaricata)
Hills's Oak (Quercus ellipoidalis)
Wood Betony (Pedicularis canadensis)
Dwarf Blazing Star (Liatirs cylindracea)
Running Tick Trefoil (Desmodium rotundofolium)
Hairy Bushclover (Lespedeza hirta)
Panicled Tick Trefoil (Desmodium paniculatum)
Kalm's St. John's Wort (Hypericum kalmii)
Shining Sumac (Rhus copallina)
Poke Milkweed (Asclepias exaltata)
Early Buttercup (Ranunculus fasicularis)
Green Milkweed (Asclepias virid)

Evaluation

Encourage students to reflect on the environmental impact of their actions throughout the lesson. Discuss the importance of responsible resource use, recycling, and sustainable gardening practices. Evaluate the success of the lesson in fostering a sense of environmental responsibility and understanding of sustainable practices.

Spring: STEM Lesson Plan: Garden Survey of Native Species

Objective: To introduce students to the concept of biodiversity and the importance of native plant species in local ecosystems through a hands-on garden survey activity.

Materials Needed:
1. Clipboards
2. Pencils
3. Field guides or plant identification apps (optional)
4. Garden or outdoor space with various plant species, including native and non-native plants

Duration: 1-2 class periods (adjust as needed)

Procedure:

1. Introduction to Biodiversity (15 minutes):
- Start by discussing the concept of biodiversity with the students. Explain that biodiversity refers to the variety of life on Earth, including all living organisms, ecosystems, and the genetic variations within species.
- Discuss why biodiversity is essential for healthy ecosystems and how different plant species contribute to it.

2. Native vs. Non-Native Plants (15 minutes):
- Explain to the students the difference between native and non-native plant species. Native plants are those that naturally occur in a specific region, while non-native plants are introduced from other regions.
- Discuss the potential impact of non-native plants on local ecosystems, including competition with native species.

3. Preparing for the Garden Survey (10 minutes):
- Divide the students into small groups and give each group a clipboard and pencil.
- Briefly explain the purpose of the garden survey: to identify and record native and non-native plant species in your school's garden or outdoor space.

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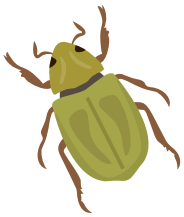
Plant species worksheet

Species Name	How Many	Native	Insects
Common milkweed	3	yes	Monarch caterpillar

4. Conducting the Garden Survey (30-45 minutes):

- Take the students to the garden or outdoor space.
- Instruct each group to observe and identify plant species, focusing on whether each plant is native or non-native, and whether there are insects present on the plants.
- Encourage students to use field guides or plant identification apps if available and safe to do so. Alternatively, provide them with a list of common native plants found in your region.(provide on page 8)
- Have each group record the following information for each plant they encounter on the worksheet on the next page:
- Plant name (if known) and how many
- Whether it is native or non-native
- Insects



5. Group Discussion and Data Sharing (15 minutes):

- Bring the students back together and have each group share their findings.
- Create a master list on the board or a poster, categorizing plants as native or non-native based on the students' observations.

6. Reflection and Discussion (15 minutes):

- Lead a class discussion about the importance of native plant species in local ecosystems here in the Long Point Biosphere Region.
- Discuss the potential consequences of having too many non-native plants in a garden or natural area.
- Encourage students to share their thoughts on how they can contribute to promoting native plant conservation.

7. Follow-up Activities (Optional):

- Depending on available time and resources, consider follow-up activities such as creating informational posters about native plants, designing a native plant garden, or inviting a local botanist or naturalist to talk to the class about native plant conservation.

Evaluation

Evaluate students based on their participation in the garden survey, their ability to distinguish between native and non-native plants and their engagement in class discussions.

Conclusion

This garden survey activity not only introduces students to the concepts of biodiversity and the importance of native plants but also provides them with a hands-on experience in their school's outdoor space. It encourages them to become more aware of their local environment and its significance in supporting native wildlife and ecosystems.

Learning Extension: Native Species Garden Layout Design

Objective: To apply principles of landscape architecture and geometry to design a native species garden layout that will bloom during spring, summer, and fall, providing support for pollinators and birds.

Materials Needed (for the extension):
1. Graph paper
2. Geometry set (ruler, compass, protractor)
3. Field guides or plant identification resources
4. Access to the garden or outdoor space

Duration: 2-3 additional class periods (adjust as needed)

Extension Procedure:

1. **Introduction to Landscape Design and Geometry (15 minutes):**
   - Begin by introducing students to the basics of landscape architecture and geometry in garden design. Explain that they will create a garden layout that supports native plant species and biodiversity.

2. **Identifying Native Plants (20 minutes):**
   - Return to the garden with the students and ask them to identify native plant species that are suitable for planting during spring, summer, and fall. They can use field guides or resources to help with plant selection.

3. **Garden Layout Design (30 minutes):**
   - Distribute graph paper and geometry sets to each student or group.
   - Explain that they should design a garden layout that incorporates native plant species with consideration for their bloom times to support pollinators and birds throughout the seasons.
   - Encourage students to use geometric shapes and measurements to plan the garden layout, ensuring it is both aesthetically pleasing and functional.

4. **Research and Plant Selection (30 minutes):**
   - Instruct students to research the specific native plant species they plan to include in their garden layout. They should gather information on each plant's size, preferred soil and light conditions, and flowering times.

cont'd... Learning Extension: Native Species Garden Layout Design

5. **Design Presentation (1 class period):**
   - Allow each student or group to present their garden layout design to the class. They should explain their plant choices, the geometric principles they applied, and how their garden design supports pollinators and birds year-round.

6. **Class Discussion and Evaluation (15 minutes):**
   - Lead a class discussion about the various garden designs and their effectiveness in supporting native wildlife.
   - Discuss how geometry and landscape architecture principles can be used to create functional and beautiful gardens.

7. **Reflection (15 minutes):**
   - Encourage students to reflect on the design process, what they learned about native plant species, and how their garden layout can contribute to biodiversity and environmental conservation.

Assessment

Assess students based on the creativity and functionality of their garden layout designs, the research they conducted on native plants, their presentation skills, and their participation in class discussions and reflections.

Conclusion

This learning extension challenges students to integrate principles of landscape design and geometry into the creation of a native species garden that supports pollinators and birds throughout the seasons. It emphasizes the importance of biodiversity and ecological considerations in garden planning, fostering a deeper appreciation for the natural world and the role of design in conservation.

Sustainable Development Goals

LONG POINT BIOSPHERE REGION

NatureHood
A NATURE CANADA INITIATIVE

Bonus Material for Home

Here are two additional options your class could get involved in:

In the Zone provides the tools needed for anyone to gradually transform outdoor spaces into healthy habitats for native wildlife.

Receive advice from wildlife and gardening experts on how to cultivate habitat for warblers, frogs, owls, butterflies, bees and more: The Butterflyway