Minnesota Flowers for Pollinators

Purpose

7th grade students will learn about local floriculture including flower species, plant reproduction, and pollination.

Students will work in groups to research and design sustainable pollinator gardens using annual, perennial, and/or wild flowers indigenous to Minnesota. Each group will create an informational website or record a multimedia presentation describing the need, purpose, features, functions, cost, and future benefits of their garden design. Students will share their completed project in class and with at least one authentic audience.

The overarching goal is that students will gain a better understanding of the local flora and fauna that surround them at home, school, and in the community. Students will grasp the urgency of the pollinator problem at local, national, and global levels as it relates to agriculture and future food supply. Finally, students will be empowered to get involved in spreading the word and planting new pollinator gardens in their community.

Academic Content Standards

MN K-12 Academic Standards and Benchmarks

Science

7.4.2.1.3 Explain how the number of populations an ecosystem can support depends on the biotic resources available as well as abiotic factors such as amount of light and water, temperature range, and soil composition.

7.4.2.2.2 Describe the roles and relationships among producers, consumers, and decomposers in changing energy from one form to another in a food web within an ecosystem.

Social Studies

7.2.1.1.1 Apply reasoned decision-making techniques in making choices; explain why different households or groups faced with the same alternatives might make different choices.
7.3.1.1.1 Create and use various kinds of maps, including overlaying thematic maps, of places in the United States; incorporate the “TODALSS” map basics, as well as points, lines and colored areas to display spatial information.

Common Core Connections

Reading
CCSS.ELA-Literacy.RL.7.1
Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

Writing
CCSS.ELA-Literacy.W.7.6
Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources.

National Agricultural Literacy Outcomes

Agriculture and the Environment

Materials

Needed Daily:

- Hyperdoc - accessible at: https://minnesota.agclassroom.org/educator/sclb.cfm
  The teacher can make a copy and then share it with his/her students. The hyperdoc can be posted to Schoology or Google Classroom so each individual student has his/her own copy.
- Headphones or earbuds
- Mobile device for classroom use (iPad, Chromebook, laptop – preferably at least 2:1 ratio)

Day 1:
- Slides 2-5 on Hyperdoc

Day 2:
- Minnesota Flower Rating Handout - 1 copy per student
- Slides 6-9 on Hyperdoc accessible

Day 3:
- Minnesota Pollinator Garden Project Rubric - 1 copy per student
- Slides 10-11 on Hyperdoc

Day 4 and 5:
- Slides 12-15 on Hyperdoc
- Pollinator Garden Project Group Notes worksheet for each group

Day 6
- Slides 16-17 on Hyperdoc

- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 7
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 8-9
- Slides 19-20 on Hyperdoc

Day 10
- Slide 21 on Hyperdoc
- SMART board for presentation projection

Day 11
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 12
- Pollinator Garden Project Group Notes worksheet for each group

Day 13
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 14
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 15
- Pollinator Garden Project Group Notes worksheet for each group

Day 16
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 17
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 18
- Pollinator Garden Project Group Notes worksheet for each group

Day 19
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 20
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 21
- Pollinator Garden Project Group Notes worksheet for each group

Day 22
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 23
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 24
- Pollinator Garden Project Group Notes worksheet for each group

Day 25
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 26
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 27
- Pollinator Garden Project Group Notes worksheet for each group

Day 28
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 29
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 30
- Pollinator Garden Project Group Notes worksheet for each group

Day 31
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 32
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 33
- Pollinator Garden Project Group Notes worksheet for each group

Day 34
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 35
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 36
- Pollinator Garden Project Group Notes worksheet for each group

Day 37
- Material Cost List and Installation Procedures worksheet for each group
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- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 38
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 39
- Pollinator Garden Project Group Notes worksheet for each group

Day 40
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 41
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 42
- Pollinator Garden Project Group Notes worksheet for each group

Day 43
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 44
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 45
- Pollinator Garden Project Group Notes worksheet for each group

Day 46
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 47
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 48
- Pollinator Garden Project Group Notes worksheet for each group

Day 49
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 50
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 51
- Pollinator Garden Project Group Notes worksheet for each group

Day 52
- Material Cost List and Installation Procedures worksheet for each group
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- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 53
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 54
- Pollinator Garden Project Group Notes worksheet for each group

Day 55
- Material Cost List and Installation Procedures worksheet for each group
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- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 56
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 57
- Pollinator Garden Project Group Notes worksheet for each group

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- Material Cost List and Installation Procedures worksheet for each group
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- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 59
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 60
- Pollinator Garden Project Group Notes worksheet for each group

Day 61
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 62
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 63
- Pollinator Garden Project Group Notes worksheet for each group

Day 64
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 65
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 66
- Pollinator Garden Project Group Notes worksheet for each group

Day 67
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 68
- Smartphone, camera, or video recording device for field trip (At least one per group)

Day 69
- Pollinator Garden Project Group Notes worksheet for each group

Day 70
- Material Cost List and Installation Procedures worksheet for each group
- Colored pencils
- Paper (8.5 x 11 and 11 x 14)
- Pencil

Day 71
- Smartphone, camera, or video recording device for field trip (At least one per group)
Describe benefits and challenges of using conservation practices for natural resources (e.g., soil, water, and forests), in agricultural systems which impact water, air, and soil quality. (T1.6-8 b)

- Recognize the factors of an agricultural system which determine its sustainability. (T1.6-8 h)

**Plants and Animals for Food, Fiber & Energy**

- Explain the role of ethics in the production and management of food, fiber (fabric or clothing), and energy sources. (T2.6-8 b)
- Identify farm practices for plant protection (e.g., using a pesticide, integrated pest management, cultural practices) and the harvest of safe products for consumers. (T2.6-8 c)

**Background—Agricultural Connections**

Various species of flowers throughout Minnesota are pollinated by bees, butterflies, hummingbirds, and other animals. The natural ecosystems of wildflowers throughout Minnesota are shrinking, as are many pollinator populations across local, national, and global communities. Around one third of the world’s crops depend on insect pollinators to bear fruit, seed, or nut; this includes a wide variety of fruits, vegetables, and trees. As the local and global population grows, food supply will need to increase to match it. Drastic changes are needed by individuals, farmers, and governments to help pollinators re-grow and expand their colonies in order to pollinate this increasing food supply.
Interest Approach - Engagement

1. Instruct students to complete the three polls on slide two of the Hyperdoc.

2. Discuss with students: How would you feel if you could never eat certain foods again? How can we prevent this from happening?

3. Have students watch the two videos (Pollinators Dying and Planting a Pollinator-friendly Garden) on slide three of the Hyperdoc. Students may write down main ideas and questions as they watch. You can facilitate a class discussion that focuses on their reactions.

Procedures:

The Hyperdoc (accessible at https://minnesota.agclassroom.org/educator/sclb.cfm) provides the lesson flow. The Hyperdoc walks students through the tasks included in this procedure. Teachers can add “stop here today” slides if they would like.

Ask

Activity 1: Engagement activity (above) – What are pollinators and pollinizers? Slides 2-3 on Hyperdoc

Activity 2: Pollinators & plant reproduction – How does pollination work? Watch the Brainpop video and take the quiz included on Slide 4 of the Hyperdoc.

Activity 3: Minnesota ecosystems – Where do various pollinators live? Pollinator food web activity - Slide 5 on Hyperdoc

Activity 4: Minnesota flowers map jigsaw – Which flowers thrive in each Minnesota biome? Why? Slides 6 and 7 on Hyperdoc

Activity 5: Flowers as pollinators – Which Minnesota flowers help pollinators? Pollinizer rating activity Slides 8 and 9 on Hyperdoc

• Provide a copy of the Minnesota Flower Rating Handout to each student so they can record their opinions on this handout

Collect

Activity 6: Minnesota pollinator garden project launch - Slides 10 and 11 on Hyperdoc

• Provide a copy of the Minnesota Pollinator Garden Project Rubric to each student. Review as a class and brainstorm options.
Activity 7: Two Group research days (books, databases, videos, and articles) – slides 12-15 on Hyperdoc

- Utilize the digital file, Pollinator Garden Project Group Notes, found on slide 12 of the Hyperdoc as a guide for student groups. Assist students as they complete this digitally.

Activity 8: One garden design day, material selection, cost/upkeep analysis, and planting timeline/steps Slides 16 and 17 on Hyperdoc

- Utilize the digital files, Material Cost List and Installation Procedures, on slide 16 of the Hyperdoc for students to record details of their project.

Activity 9: Field trip to University of Minnesota Landscape Arboretum with smartphones - take photos/videos of flowers, pollinators, and gardens. Slide 18 on Hyperdoc. If this field trip is not possible, any garden area with a variety of pollinator friendly plants is acceptable.

Activity 10: Collaborative group presentation creation days (Google Sites, Adobe Spark, or Google Slides screencast) Slides 19 and 20 on Hyperdoc

Activity 11: Share presentations with authentic audiences. Complete group and self-evaluation Google form on Slide 21 on Hyperdoc

Enriching Activities

Links to these items are accessible at https://minnesota.agclassroom.org/educator/sclb.cfm

- Death of bees explained
- 4 Easy ways you can save bees
- Bee Beard
- Marla Spivak TED Talk – why bees are disappearing
- Minnesota Pollinators
- Minnesota Floriculture Quizlet flashcards
- U of MN Bee Lab website
Minnesota, Wisconsin, and Michigan together have more than 500 species of native bees. Native bees and other insects are important pollinators.
**GOOGLE SEARCH KEYWORDS:** Flower name, pollinator, price, season  (Watch for “legit” sources!)

<table>
<thead>
<tr>
<th>Flower Name</th>
<th>List Pollinators</th>
<th>Type*</th>
<th>Appeal**</th>
<th>Difficulty**</th>
<th>Worth time/$$ to plant? Why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azalea</td>
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<td>Begonia</td>
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<td>Chrysanthemum</td>
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<td>Columbine</td>
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<td>Coreopsis</td>
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<td>Daisy</td>
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<td>Dahlia</td>
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<td>Delphinium</td>
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<td>Dianthus</td>
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<td>Geranium</td>
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<td>Gladiolus</td>
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<td>Impatiens</td>
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<td>Iris</td>
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<td>Lily / Daylily</td>
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<td>Marigold</td>
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<td>Orchid</td>
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<td>Peony</td>
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<td>Petunia</td>
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<td>Phlox</td>
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<td>Rose</td>
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<td>Salvia</td>
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<td>Snapdragon</td>
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<tr>
<td>Violet</td>
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</tbody>
</table>

*Type = annual, perennial, wild, bedded, herbaceous, etc. **Rate 1-5 (1=low, 5=high)
# Minnesota Pollinator Garden Project Rubric

**Circle Location:** Lakeshore Farm Roadside Downtown School Orchard Home Apiary Park (Other?)

**Circle Biome:** Tallgrass Aspen Parkland Coniferous Forest Deciduous Forest Prairie Grassland

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Teacher Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota Flowers</td>
<td>2 or less chosen, not described</td>
<td>At least 3 chosen &amp; some descriptions</td>
<td>At least 4 chosen &amp; some descriptions</td>
<td>At least 5 chosen &amp; features described</td>
<td></td>
</tr>
<tr>
<td>Pollinators</td>
<td>Lacking pollinator and description</td>
<td>Names a pollinator but no description</td>
<td>Describe how 1 pollinator benefits</td>
<td>Describes how 2+ pollinators benefit</td>
<td></td>
</tr>
<tr>
<td>Garden Design</td>
<td>Incomplete or unlabeled; not suited to location</td>
<td>Complete design but lacking details, labels, descriptions</td>
<td>Some detail / labels; may lack originality or descriptions</td>
<td>Detailed &amp; labeled; unique environment features described</td>
<td>x2! Out of 8 pts</td>
</tr>
<tr>
<td>Itemized Cost List</td>
<td>Incomplete or incorrect item list</td>
<td>Most items priced &amp; totaled, few justified</td>
<td>Most items justified, priced and totalled</td>
<td>All materials justified, itemized &amp; totalled</td>
<td></td>
</tr>
<tr>
<td>Installation Procedures</td>
<td>Illogical, incorrect or incomplete list</td>
<td>Some procedures listed, possible gaps</td>
<td>Mostly complete list, logical for location</td>
<td>Logical, complete list for location, timelines given</td>
<td></td>
</tr>
<tr>
<td>Visual Presentation</td>
<td>&lt;2 mins, incomplete or disorganized</td>
<td>2-3 mins, need not identified, no sources</td>
<td>2-3 mins, details need, how met, missing sources</td>
<td>3+ mins, details need &amp; how met, cites sources</td>
<td>x2! Out of 8 pts</td>
</tr>
<tr>
<td>Authentic Audience</td>
<td>No audience listed, incomplete script</td>
<td>Audience not specific; script needs editing</td>
<td>Audience not specific; Business etiquette used</td>
<td>Specific, relevant contact business etiquette used</td>
<td></td>
</tr>
<tr>
<td>Vocabulary</td>
<td>&lt;5 vocab words</td>
<td>5-9 vocab words used</td>
<td>10-14 vocab words used</td>
<td>15+ vocab words used</td>
<td></td>
</tr>
<tr>
<td>Group Work</td>
<td>5+ redirects needed</td>
<td>3+ redirects needed</td>
<td>Mostly on task, equal work</td>
<td>On task, equal work</td>
<td></td>
</tr>
</tbody>
</table>

**Group Score:** / 44

**Self Evaluation:**
- I put forth solid effort: _____ / 2
- I communicated well: _____ / 2
- I was a team player: _____ / 2

**Final Grade:** / 50