Student Material

# A Butterfly Garden

Have you ever seen butterflies in person or on video? Have you ever been to a butterfly garden? Butterflies are beautiful to look at, adding wonderful color to our world. They are also helpful to the plants and animals around them, and they help pollinate plants that produce food for us. Butterflies, however, demand some very special host plants in order to live during the different stages of their life cycle, and those plants are on the decline. With increasing habitat loss, butterflies are finding fewer and fewer places with the plants they need to thrive. This is resulting in the quasi-extinction of butterflies. The good news is: You can help!

Explore butterflies and the various plants that will attract butterflies native to our area. Design a butterfly garden that someone in the community could plant and that we could plant at the school to attract butterflies and help them thrive. Spread the word and educate others about the threat to the butterfly population.

## **A Butterfly Garden** *Rubric*

| ***Design Process Journal*** *(each group member submits a journal to support the garden plan)* | | | | |
|---|---|---|---|---|
| | **Novice** | **Apprentice** | **Practitioner** | **Expert** |
| **Formulate** | states the problem to be solved and why it is important to solve it | describes the problem to be solved, why it is important to solve it, and known causes | describes:<br>❑ the problem<br>❑ known causes<br>❑ how other living beings are affected<br>❑ what will happen if we do not solve it | all of *Practitioner* plus: includes facts and statistics to show how the problem has worsened over time |
| **Explore** | includes relevant information from reading one non-fiction book on butterflies | includes:<br>❑ at least two questions to be answered through reading<br>❑ relevant information from reading at least two nonfiction books and at least one fiction book on butterflies | includes:<br>❑ at least five questions to be answered through reading<br>❑ relevant information from reading at least three nonfiction books on butterflies<br>❑ relevant information from reading at least two fiction books on butterflies<br>❑ information on and sketch of the life cycle of butterflies<br>❑ list of plants that attract butterflies, noting which grow in the local climate | all of *Practitioner* plus: includes a table to use while reading to write down<br>❑ questions that come to mind to answer and then<br>❑ the answers, once found |
| **Ideate** | includes at least one idea to use in designing the garden | includes a list of at least three different ideas to use in designing the garden | includes:<br>❑ at least three different ideas to use in designing the garden with why the idea will be good for attracting butterflies<br>❑ at least three different ways to convince people to build a butterfly garden | all of *Practitioner* plus: includes sketches of ideas for gardens |

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| **Sift** | a table (designed by the group) with each group member's ideas and the group's thoughts on which could work | includes:<br>❑ a table (designed by the group) with each group member's ideas and the group's thoughts on which could work<br>❑ notes from group discussion on favorite idea for each of the two categories | includes:<br>❑ a table (designed by the group) with each group member's ideas and<br>❑ how feasible each is<br>❑ what could go wrong<br>❑ notes from group discussion on favorite idea for each of the two categories with pros and cons for each<br>❑ signature of all group members indicating the decision was reached through consensus | all of *Practitioner* plus: includes a list of at least two experts who might be able to offer an opinion on the garden plan |
| **Simulate** | includes sketch drawing of garden with all plants labeled | includes:<br>❑ sketch drawing of garden with all plants labeled<br>❑ plants listed with average height for each | includes:<br>❑ sketch drawing of garden with all plants labeled<br>❑ plants listed with average height and sun requirement for each<br>❑ notes on why each plant was chosen along with evidence supporting it | all of *Practitioner* plus: timeline for plant growth from seed to when butterflies will be drawn to the garden |
| **Advocate** | includes list of people with whom to share the garden plan | includes description of chosen audience type and list of people (of this audience type) with whom to share the garden plan | includes:<br>❑ description of chosen audience type to receive the garden plan<br>❑ list of at least three people with whom to share the garden plan<br>❑ at least one organization that might fund or build a butterfly garden | all of *Practitioner* plus: records short video file with thoughts from the designers to send as well |

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| **Evidence of Revisiting Steps** | includes notes indicating a return to a previous step | ❑ labels notes for each step in the design process<br>❑ includes arrows in the notes to indicate the need to return to a former step and why | ❑ labels notes for each step in the design process<br>❑ includes arrows in the notes to indicate the design process path with arrows to show return to a former step with explanation as to why | all of *Practitioner* plus: includes reflection on how the process went and what could have been done differently at any of the steps to make it go more smoothly |

| ***Garden Plan*** *(the group submits one plan signed by all group members to acknowledge this is their best work):* | | | | |
|---|---|---|---|---|
| | **Novice** | **Apprentice** | **Practitioner** | **Expert** |
| **Introduction** | explanation of why someone should build a butterfly garden | one to two paragraphs that build a case for building a butterfly garden, using facts and statistics | ❑ one to two paragraphs that build a case for building a butterfly garden, using facts and statistics<br>❑ organizational structure with supporting reasons | all of *Practitioner* plus: message is clearly tailored for the intended audience through various techniques |
| **Butterfly Life Cycle** | includes stages of the butterfly cycle | includes stages that clearly show the butterfly at each stage and arrows from one stage to the next | includes all stages of the life cycle with:<br>❑ accurate image of butterfly in each stage<br>❑ arrows from one stage to the next<br>❑ accurate and neat labels<br>❑ approximate length of time for each stage | all of *Practitioner* plus: includes life cycle of one of the plants with a paragraph about similarities and differences |
| **Garden Size** | scale drawing (using grid) of garden layout | ❑ scale drawing (using grid) of garden layout<br>❑ accurate dimensions for all sides | ❑ scale drawing (using grid) of garden layout<br>❑ accurate dimensions for all sides<br>❑ accurately calculated perimeter<br>❑ accurately calculated area | all of *Practitioner* plus: includes garden that is an irregular polygon |

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|---|---|---|---|---|
| **Garden Plants** | list of garden plants to purchase and plant | ❑ list of a variety of garden plants to purchase and plant that complement one another<br>❑ plants included on drawing, labeled neatly | ❑ list of a variety of garden plants to purchase and plant that complement one another<br>❑ plants included on drawing, labeled neatly<br>❑ written description of plants and where in the garden to plant each, along with planting directions (i.e., depth of planting, distance from other plants, etc.) | all of *Practitioner* plus: includes elements other than plants |
| **Garden Cost** | budget with approximate unit pricing for each plant, soil, fencing, and any other garden needs | accurate calculations for all materials and plants needed | ❑ budget with approximate unit pricing for each plant, soil, fencing, and any other garden needs<br>❑ accurate calculations for all materials and plants needed<br>❑ accurate subtotal, state tax, and total | all of *Practitioner* plus: includes actual pricing and store or online site from which to purchase all that is needed to get started |
| **Addressing the Audience** | statement addressing the specific audience for whom the garden plan is intended | some evidence of wording, images, brochure decoration, etc., to address the specific audience for whom the garden plan is intended | evidence of wording, images, brochure decoration, etc., throughout to address the specific audience for whom the garden plan is intended | all of *Practitioner* plus specific statements aimed at connecting the intended audience's interests and lives to the garden design |

Teacher Material

## **A Butterfly Garden** *Scaffold for Learning*

**Benchmark Video and Discussions**

- **Launch the unit with the butterfly decline challenge**
- **Design Process**
- **Reaching a consensus in collaborative work**

**Instructional Activities: Learning**

**Instructional Activities: Additional**

| **Instructional Texts/Websites** | **Instructional Videos** | **How-to Sheets** | **Practice** |
|---|---|---|---|
| • Determine main idea from an informational text (I, P)<br>• Identify supporting details (I)<br>• Find the perimeter of a plane shape (I, P)<br>• Find the area of a plane shape<br>• State an opinion (IV)<br>• Understand the Design Process (IV)<br>• Use context clues<br>• Use a digital platform for garden plan (SG)<br>• Create spreadsheet for budget (SG) | • Determine main idea from an informational text (I, P)<br>• Identify supporting details (I)<br>• Find the perimeter of a plane shape (I, P)<br>• Find the area of a plane shape<br>• State an opinion (IV)<br>• Understand the Design Process (IV)<br>• Use context clues<br>• Use a digital platform for garden plan (SG)<br>• Create spreadsheet for budget (SG) | • Determine main idea from an informational text<br>• Identify supporting details<br>• Find the perimeter of a plane shape<br>• Find the area of a plane shape<br>• State an opinion<br>• Garden plan | • **Research plants and local climate (SG)**<br>• **Access virtual books and texts (P)**<br>• **Perimeter/area (P)**<br>• **Determine main idea/central (I, P)**<br>• **Identify supporting details (I, P)**<br>• **Recognizing opinion (I, P, SG)**<br>• **Butterfly life cycle (P, SG)** |
| | | | **Application**<br>• **Garden plan (P)**<br>• **Spreadsheet/Budget (I, P)**<br>• **Research for task (SG)**<br>• **Synthesizing information into a cited piece of research (I, P)**<br>• **Citing evidence (I, P)** |
| **Interactive Websites** | **Learning Centers** | **Small-Group Mini-Lessons** | **Assessment** |
| • Life Cycle of a Butterfly (I, P)<br>• Find the Area (I, HW)<br>• Cite Text Evidence (I, P)<br>• Subject-Verb Agreement<br>• Freerice.com — math/la (I, HW)<br>• Flocabulary (I, P)<br>• ixl (I) | • Understand the Design Process (P, SG)<br>• Differentiate perimeter and area (I, P)<br>• Use context clues (I, P)<br>• Find the perimeter of a plane shape (I, P)<br>• Find the area of a plane shape<br>• Understand subject-verb agreement (I, P) | • Determine main idea from an informational text<br>• Identify supporting details<br>• Find the perimeter/area<br>• State an opinion<br>• The Design Process<br>• Use context clues<br>• Use word processing for garden plan<br>• Create spreadsheet for budget | • **Understand subject-verb agreement (P)**<br>• **Butterfly (insect) life cycle (P)**<br>• **Parts of a butterfly (P, SG)**<br>• **Peer discuss plan (P, SG)**<br>• **Use rubric to peer assess task (P)** |
| | | | **Reflection**<br>• **In journal, ask, "What part of this task was easy/challenging? Why? (I)**<br>• **How can you help butterflies? (I, P)**<br>• **How does it feel to make a difference?** |

**Key**: Individual **(I)**, Pairs **(P)**, Small Groups **(SG)**, Activities suitable for homework **(HW),** Insights Video **(IV)**

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Teacher Material

**A Butterfly Garden** *Content Facilitation Grid (Week 1 Sample)*

| | ***Science*** | | ***English Language Arts*** | | | | | | | ***Math*** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Student Name | Identifies the stages of the butterfly life cycle | Identifies the body parts of a butterfly | Identifies main idea | Identifies supporting details | Identifies important steps in a process as described in an | Cites text evidence | Uses context clues to determine meaning of unknown words | States opinion | Uses correct subject-verb agreement in writing | Calculates the perimeter of a basic shape | Calculates the area of a basic shape | Fluently adds whole numbers and decimals | Fluently subtracts whole numbers and decimals |
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# **A Butterfly Garden** *Sample Activity List*

Student Material

| *Type* | *Title/Description* **(I=Individual, P=Paired, SG=Small Group)** | *Time* |
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| **Butterfly Life Cycle** | | |
| **Choose 3 to complete** *Learning* | Read the book *I Am a Butterfly*. (I/P) | 20 min |
| | Read the book *The Life Cycle of a Butterfly* with a partner. | 10 min |
| | Watch the video "The Life Cycle of a Butterfly" once, then again to take notes. (I) | 20 min |
| | Explore and read the website www.thebutterflysite.com. (I) | 15 min |
| | Explore the "Butterfly Learning Center." (P) | 20 min |
| **Choose 1** *Practice* | Play the online game "Butterfly Life Cycle." (I) | 10 min |
| | Play the board game "Butterfly Life Cycle." (P, G) | 15 min |
| **Required** *Application* | Find two additional resources on the butterfly life cycle as references. Create a drawing of the butterfly life cycle. Cite your resources on the back of your drawing. (I/P) | 30 min |
| **Optional** *Learning* | Read the book *The Life Cycle of Butterflies* for a more in-depth look. (I) | 20 min |
| **Choose 1** *Assessment* | Meet with a peer and explain the butterfly life cycle. (P) | 15 min |
| | Draw and label the butterfly life cycle. (I) | |
| **Butterfly Habitats** | | |
| **Choose 1** *Assessment* | Read the book *Raising Butterflies to Set Them Free* and write down your ideas for your butterfly garden. (I, P) | 20 min |
| | Sign up for the *small-group mini-lesson* with your teacher for a small-group read of the book *Raising Butterflies to Set Them Free* and write down your ideas for your butterfly garden. | |
| **Optional** *Application* | Read the book *Gardening for Birds, Butterflies, and Bees* to learn about more than just butterflies for your garden. (I, P) | 20 min |
| **Required** *Reflection* | In your journal or on Flipgrid, reflect on the following: What do butterflies need to have to survive? What can you add to the habitat to make sure they will thrive? What else can you do to assist in butterfly survival? | 15 min |
| **Butterfly Habitat Kit** | | |
| **Choose 1 to receive permit** *Application* | Meet as a group to complete the "Butterfly Habitat Construction Permit Application" and have all group members sign it. (SG) | 15 min |
| | Have all group members individually complete the "I Know My Butterflies" online survey. (I) | 10 min |
| **Required** *Application* | **(**Must have permit) Unpack your butterfly habitat kit and follow the directions to set it up and start observing your caterpillars. (SG) | 20 min |

# **A Butterfly Garden** *Content Facilitation Questions*

Teacher Material

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| **COMPREHENSION**<br><br>*Ask questions that ensure students understand content and skills needed to solve the problem.* | • What is the design process?<br>• What are the four stages of the life cycle of an insect?<br>• What is the formula for area?<br>• What is the formula for perimeter?<br>• What is a subject?<br>• What is a verb?<br>• What is a main idea?<br>• What is a context clue? |
| **APPLICATION**<br><br>*Ask questions that ensure the ability of students to apply learning to new situations.* | • Why should you support your claim with reasons?<br>• What are the stages of a ladybug's life cycle?<br>• How can you use your knowledge about life cycles and apply it to other living things?<br>• How can you use your knowledge about perimeter of rectangles and apply it to other polygons? |
| **CONNECTION**<br><br>*Ask questions that ensure the ability of students to apply learning to their lives.* | • How do you benefit from having butterflies in our environment?<br>• How is the design process applied in other content areas or problems?<br>• How are butterflies helpful to our environment? |
| **SYNTHESIS**<br><br>*Ask questions that encourage students to create new information from existing data.* | • How does local climate change the types of plants needed for a successful butterfly garden?<br>• What solutions/suggestions do you have that might solve this problem in other locations?<br>• How might the butterfly garden support other living creatures? |
| **METACOGNITION**<br><br>*Ask questions that prompt students to think about their own thinking process.* | • What do you find is the most challenging in either giving or receiving feedback?<br>• How can you apply what you have learned to other situations?<br>• How was the design process reflected throughout your work?<br>• What do you find difficult about area and perimeter, and what strategies can help you and others? |

Student Material

# **A Butterfly Garden** *Transfer Task*

You learned a lot about the impact butterflies have on our environment and convincing others to take action. You will select an animal from the list of endangered species below, gather information from texts (online or print), and convince a reader why the animal you selected is important.

- Rhinoceros
- Bald Eagle
- Blue Whale
- Sea Lion

In your writing, be sure to include:

- The animal you chose
- At least two reasons why the animal is important for the environment
- The stage of life when the animal is most vulnerable
- At least one way humans can help the animal

Remember to use:

- Correct capital letters and punctuation
- Correct spellings of words in your texts
- Subject-verb agreement

# **A Butterfly Garden** *Teacher Notes*

Teacher Material

| **Unit Overview** |
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| In this task, students will design a butterfly garden that someone in the community could plant and that they could plant at the school to attract butterflies and help them thrive. Students will spread the word and educate others about the threat to the butterfly population. |
| **Standards Addressed** |
| *Common Core Math Standards:*<br>3.NBT, 3. NF<br>4.G.A.3, MP.2, MP.4<br><br>*Common Core Literacy Standards:*<br>W. 3.1-8, RI. 3.1, RI. 3.1-5, SL. 3.1, SL. 3.2, SL. 3.4<br>W. 4.1, W. 4.2, W. 4.4, W. 4.5, W. 4.6 , W. 4.7, W. 4.8, W. 4.9<br>RL .4.1, RI.4.1 SL.4.1, SL.4.5<br><br>*Next Generation Science Standards:*<br>3-LS1-1, 3-LS4-4, 4-LS1-1, 4-LS1-2, 3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3 |

| **Enduring Understandings** | **Essential Questions** |
|---|---|
| • Reading expands our knowledge of the world and beyond.<br>• People rely on various resources and media to obtain information.<br>• The design process is used to solve problems that yet have solutions.<br>• Perimeter is a measurement that allows us to describe a space and design changes.<br>• Living things are made of parts that meet their needs. | • Why should we ask a variety of questions?<br>• Why do we use an engineering design process?<br>• How can perimeter help you in daily life?<br>• How do you know a result is reasonable?<br>• What do living things need to survive? |
| **Math Practice Standards** | **Next Generation Cross-Cutting Concepts** |
| • Make sense of problems and persevere in solving them.<br>• Construct viable arguments and critique the reasoning of others.<br>• Attend to precision. | • Cause and Effect<br>• Systems and Systems Models<br>• Structure and Function<br>• Stability and Change |

| 21st Century Skills Addressed |
| --- |
| *Core Content and Interdisciplinary Themes*<br>• Subject-Area Mastery<br>*Learning and Innovation*<br>• Critical Thinking and Problem Solving<br>• Creativity and Innovation<br>• Communication and Collaboration<br>*Information and Media Literacy*<br>• Information Literacy<br>• Information and Communication Technology<br>*Life and Career*<br>• Flexibility and adaptability<br>• Productivity and Accountability<br>• Leadership and Responsibility<br>• Initiative and Self-Direction |