**NGSS Lesson Planning Template**

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| **Grade:** Fourth | **Topic:** Structure, Function, and Information Processing | **Lesson Time: Two 30-45 minute lessons to be completed when plants are flowering.** |
| **Brief Lesson Description: *Introduction/Foundational Lesson***Students will be observing the relationship between plants and insects and the role that each plays. |
| **Materials:**  science notebooks, construction paper, plain white construction paper, pencils, scissors, glue |
|  **Performance Expectation(s):** **4-LS1-1**Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.*What plant and animals structures support survival, behavior, and reproduction?* *What is the relationship between pollinators and the flowers they visit?* *How have these flowers adapted to benefit from these pollinators?* |
|  **Specific Learning Outcomes:*** I can observe and identify the interactions between plants and insects.
* I can design a flower to attract pollinators.
* I can evaluate my design and decide how to adapt it to make it more attractive to pollinators.
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| **Narrative / Background Information** |
| **Prior Student Knowledge:** All organisms have external parts that they use to perform daily functions. |
| **Science & Engineering Practices:**[**Engaging in Argument from Evidence**](http://www.nap.edu/openbook.php?record_id=13165&page=71)[Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).](http://www.nap.edu/openbook.php?record_id=13165&page=71)* [Construct an argument with evidence, data, and/or a model.](http://www.nap.edu/openbook.php?record_id=13165&page=71)
 | **Disciplinary Core Ideas:**[**LS1.A: Structure and Function**](http://www.nap.edu/openbook.php?record_id=13165&page=143)* [Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.](http://www.nap.edu/openbook.php?record_id=13165&page=143)
 | **Crosscutting Concepts:**[**Systems and System Models**](http://www.nap.edu/openbook.php?record_id=13165&page=91)* [A system can be described in terms of its components and their interactions.](http://www.nap.edu/openbook.php?record_id=13165&page=91)
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| **Possible Preconceptions/Misconceptions**Plants and animals are not dependent upon one another. |
| **LESSON PLAN – 5-E Model** |
| **ENGAGE: Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions*** Activate Prior Knowledge:
* Ask students if they can name any pollinators? What do these pollinators do?
* What types of flowers have they seen these pollinators visit in the garden?
* What do pollinators gain from visiting these flowers? How do flowers benefit?
* How do plants reproduce?
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| **EXPLORE: Lesson Description – Materials Needed / Probing or Clarifying Questions*** Students will use science notebooks to record their observations of what insects visit what flowers.
* Students will spend 5-10 minutes making their observations.
* Each student should choose a small area of the garden to observe. Each should limit his or her observations to an area of about one square yard. To make this assignment more manageable, a student should only observe one insect at a time.
* To get the best data, a student should sit quietly in one place. Demonstrate putting a notebook on your lap and quietly writing observations without making any sudden movements that may scare off the insects.
* Students’ notes should include what type of plant or flower the insect landed on, describing its size, color, shape and name, if possible.
* Return to the classroom to discuss their observations. The students will then predict what flower characteristics attract insects.
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| **EXPLAIN: Concepts Explained and Vocabulary Defined*** This video explains pollination and the role of pollinators. Show this video to students. Then, use the paragraphs below to help guide discussion
* Plant Life Cycles: How Plants Grow and Reproduce -Pollination -Segment 2 -(Discovery Education) <http://app.discoveryeducation.com/player/view/assetGuid/8A04F6F2-10DE-4A46-A46B-48DA77F2834D>
* Plants are unable to move from place to place, so they must use other means to distribute their pollen to other flowers. While some flowers are pollinated by wind or water, many others are assisted by honey bees, bumblebees, solitary bees, wasps, beetles, flies, mosquitoes, butterflies, moths, hummingbirds and even mammals such as bats. They utilize the help of these pollinators to help spread their pollen, facilitating production of fruit and seeds. The pollinator collects the nectar and pollen for food for itself and other members of its colony. While collecting pollen and nectar, it also transfers pollen from flower-to-flower.
* To attract pollinators at just the right time, many flowers have developed adaptations such as specialized colors, size, shape or fragrance. Some flower faces offer a set of instructions as to how to enter the blossom and procure the nectar or pollen. A bright and showy surface or alluring scent catches the pollinator’s attention from a distance. The shape of the flower may also be specially modified to match the pollinator's tongue or body shape.

**Closing if done for the day:*** Bring students back together to review the concepts learned today (Pollination, pollinators, stamen, pistil)
* Tell students to keep their eyes open for pollinators and for attractive plants that might attract pollinators.
* If time, have students use their science notebooks to sketch flowers that they believe will attract pollinators. The students will design their own flowers, choosing size, color, design, etc.
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| **ELABORATE: Applications and Extensions*****Day 1 Continued/Day 2*** * Using the materials listed below the students will make a few flowers that they believe will attract pollinators. They will choose colors and designs that they believe will attract pollinators. These will be glued to white backgrounds.
* Once these are complete they will be taken outside and erected to simulate a garden (attach to the outside of garden boxes). The students will then repeat their earlier observations noting what insects were attracted to their “flowers.”

**Closing:*** Discuss their findings.
* Ask each student to describe their original flower model. Why did they choose each characteristic? How might they consider adapting their flower in order to attract more pollinators?
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| **EVALUATE:** **Formative Monitoring (Questioning / Discussion):*** In science notebooks
* What conclusions can you make about the relationship between flowers and pollinators? What characteristics do plants have that help them attract pollinators in order to reproduce?
* Share out/discussion

**Summative Assessment (Quiz / Project / Report):*** **N/A**
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| **Elaborate Further / Reflect:****Additional Resources:**[**http://gen.uga.edu/documents/pollination/Pollination\_BackgroundInfo.pdf**](http://gen.uga.edu/documents/pollination/Pollination_BackgroundInfo.pdf) |