

Fourth Grade STEAM Unit Plan-Spring 2018

Project scenario: Approximately $\frac{1}{3}$ of the national honey bee population has disappeared over the last 5 years. This is especially significant to the lowcountry of South Carolina due to recent events involving the deaths of millions of honey bees. In August 2016, Dorchester County inadvertently killed millions of local honey bees when they sprayed for mosquitos without warning beekeepers first.

Driving question: How can we raise awareness of the importance of pollinators through the creation and sharing of a pollinator garden?

Unit Objectives: Raise awareness of the honey bee population in SC

1. Highlight the importance of the honey bee in the pollination of foods we eat; approximately 1 out of every 3 bites of what we eat is due to pollinators like honey bees.
2. Explain those things that are detrimental to honey bees, so that those things can be avoided or replaced.
3. Compare and contrast the presence and absence of honey bees in the local environment.
4. Identify what we can do to help ensure the survival and success of the honey bee.

Content Standards*:

*Only include standards that you will assess.

Science:

4.L.5A.2 Analyze and interpret data from observations and measurements to compare the stages of development of different seed plants.

4.L.5A.3 Develop and use models to compare the stages of growth and development in various animals.

Digital Literacy:

Digital Breakout Scenario: The EPA might allow 165,000,000 acres of land in the US to be sprayed with pesticides. We know how harmful this will be to our bee population, and we just found out that the Bee City Owner is on vacation. Our group will follow the clues in our Breakout box to find the beekeeper so that he can protect his bees!

Engineering Practices:

4.S.1A.1 Ask questions that can be (1) answered using scientific investigations or (2) used to refine models, explanations, or designs.

4.S.1A.2 Develop, use, and refine models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.

4.S.1A.4 Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation or graphing) to (1) reveal patterns and construct meaning or (2) support explanations, claims, or designs.

4.S.1A.5 Use mathematical and computational thinking to (1) express quantitative observations using appropriate English or metric units, (2) collect and analyze data, or (3) understand patterns, trends and relationships between variables.

Design:

Anchor Standard 3: I can select and create possible solutions to the design challenge.

Anchor Standard 4: I can create an original prototype.

Anchor Standard 5: I can present my final design solution.

Anchor Standard 8: I can relate design ideas to other arts, disciplines, content areas, and careers.

PE: PE infusion-Bee Dance for communication and importance of communication in survival.

ELA:

4-RI.5.1: Ask and answer inferential questions to analyze meaning beyond the text; refer to details and examples within a text to support inferences and conclusions.

4-RI.7.1: Compare and contrast how events, topics, concepts, and ideas are depicted in primary and secondary sources.

4-W.2.1: Write informative/explanatory texts that: a. introduce a topic clearly; b. use information from multiple print and multimedia sources; c. group related information in paragraphs and sections;

Math:

4.MDA.2 Solve real world problems involving distance/length, intervals of time within 12 hours, liquid volume, mass, and money using the four operations.

4.MDA.3 Apply the area and perimeter formulas for rectangles.

Brief description of students' activities/Timeline:

1. Highlight the importance of the honey bee in the pollination of foods we eat; approximately 1 out of every 3 bites of what we eat is due to pollinators like honey bees.

- Research those foods and other items that are directly impacted by honey bees. Pollination is included as beginning step of life cycle of plants--will expand on throughout life cycle of plants lessons. (Assessed with Lima Bean Lab observation and pollination direct instruction-December 18, 2018).
- Mrs. Carlton will have students research in science stations weeks of January 15. Students will complete reflections of photos demonstrating world with bees and world without bees (this will serve as an informal classwork assessment). Comparison of life cycles of honey bees, frogs, butterflies, etc. will demonstrate differences and similarities in animal life cycles. (Utilized Bee Life Cycle Time Lapse Video January 30, 2018. (Will be assessed on Honey Bee Research Project) Questioning: Are all seed life cycles started by pollination? (Will be assessed through Flowering vs. Non-Flowering

Venn Diagram Compare/Contrast) Do all animals have same life cycles? How does the honey bee life cycle differ from butterflies and frogs? (Will be assessed on Honey Bee Research Project)

- In addition, Mrs. Carlton will work with students on choosing homes for bees. Sugar shacks, watering pads, wooden houses, etc.
- Research to determine best plants to attract honey bees-can include in organisms unit lesson plans as we talk about adaptations and traits of plants to attract animals. Mrs. Carlton will discuss and encourage choice through science activities. Plants will be identified and 10-12 chosen by students by Friday, January 19, 2018.
**(Based on student input: Lavender, Thistle, Sweet Clover, Mint, Dandelions, Black Eyed Susans, Geraniums, Cilantro, Sunflowers and Zinnia).
- Lego WeDo 2.0 Bee Pollinator Project--Lego WeDo 2.0 Pollinators and Plants in Makerspace (What is Pollination? What role do bees play in pollination? What adaptations do flowers have to attract bees? What senses do bees use to survive and pollinate? (Assessed with completion of Lego WeDo 2.0 building & coding and Honey Bee Adaptation/Senses Illustration Project-on January 24 and February 1, 2018).

2. Explain those things that are detrimental to honey bees, so that those things can be avoided or replaced.

- Ms. Allen will complete with expert speaker and research paper. The students will begin gathering information for their problem and solution research paper. The problem is "Honey Bees are dying". In the research paper the students will explain why Honey Bees are dying and provide solutions. The students will find primary and secondary sources and use these sources to develop their research paper. In ELA the students will view the video Who's Killing the Honey Bees. They will also use articles as secondary sources. January 18

https://www.washingtonpost.com/national/health-science/cdc-urges-aerial-spraying-amid-jump-in-puerto-rico-zika-cases/2016/07/06/70c8c33c-43d7-11e6-88d0-6adee48be8bc_story.html?tid=a_mcntx&utm_term=.e0fcbb5ba813

https://www.washingtonpost.com/news/morning-mix/wp/2016/09/01/like-its-been-nuked-millions-of-bees-dead-after-south-carolina-sprays-for-zika-mosquitoes/?utm_term=.6343a2bf57fd

The Journal Scene Summerville, SC

https://www.journalscene.com/news/lawsuit-filed-over-honeybee-deaths/article_8c2ca7f4-e3d-11e6-aa06-df8f999c14b1.html

https://www.journalscene.com/archives/bees-die-after-spraying/article_d0533188-7cd8-500e-a27d-45f0d14922e0.html

3. Compare and contrast the presence and absence of honey bees in the local environment.

- Students will complete reflections of photos demonstrating world with bees and world without bees (this will serve as an informal classwork assessment).
- Ms. Allen will utilize the Whole Foods video: [A Market Without Bees](#) as a secondary source for the research paper.

4. Identify what we can do to help ensure the survival and success of the honey bee.

- The students will begin gathering information for their problem and solution research paper. The problem is "Honey Bees are dying". In the research paper the students will explain why Honey Bees are dying and provide solutions. The students will find primary and secondary sources and use these sources to develop their research paper. January 18
- In ELA the students will view the video Who's Killing the Honey Bees. They will also use articles as secondary sources. January 22-25
- Students will create their research paper on why bees are dying. February 5
- Create homes for pollinators: Ms. Hobbs will brainstorm with each group how to construct a pollinator hotel. Students will plan their home based on research about materials that attract certain pollinators, and size of the structure that will hold 9 homes. Students will also research the cost of materials needed. (February 1)
- Create a pollinator friendly garden blueprint: Ms. Hobbs will complete the garden blueprint with each group. (area/perimeter, measurement assessed)
- Makerspace: Student groups will construct their homes. (February 9)
- Students will plant the first round of plants in the garden - ones suitable for planting/surviving in February and make watering pads and sugar shacks to add to the garden (February 12-16)
- Digital Breakout (February 19-23) - Scenario: The EPA might allow 165,000,000 acres of land in the US to be sprayed with pesticides. We know how harmful this will be to our bee population, and we just found out that the Bee City Owner is on vacation. Our group will follow the clues in our Breakout box to find the beekeeper so that he can protect his bees!

Resources needed:

1. Chromebook research/table to identify those things that negatively impact honey bees.
2. Plants and materials for garden. Building materials for honey bee homes.

Equipment needed:

1. Makerspace Equipment-drills, saws, scissors, etc. for wooden honey bee homes.

Experts (Provide an explanation of how the experts will be integrated into the unit and the role that they will play. For example, will they provide background knowledge or judge the final product?)

1. Bee Cause Speaker

Technology Integration:

1. Chromebook research
2. Lego WeDo 2.0 Bee Pollinator Project
3. Break out

Opportunities for Peer Feedback:

1. Review peer's honey bee reflections and discuss (Carlton)
2. Peer editing of research paper (Allen)
3. Peer review of honey bee garden blueprints (Hobbs)
4. Construction process with houses

Authentic Assessments:

We will hold a "garden tour" for our Pollinator Garden. We will invite the PSE students to tour our garden, with the 4th graders serving as guides and answering questions. Our goal is to raise awareness of the importance of these pollinators.

