**Lesson 10: What Will We Do for Rusty and Its Pollinator Friends?**

**Unit: Plants, Pollinators & People**

**Rusty Patched Bumble Bee: A Beacon of Hope**

**Grade 4:** Plant Structures and Functions

**Driving Question(s):**

How can we create a pollinator friendly garden?

Will all of the plants in our garden be attractive to the pollinators?

(**Nativars Research Question:** Should we include nativars in our research gardens?)

**Overview**

This is the culminating lesson of the curriculum. Students have hopefully learned a lot about the parts of a flower and their preferred pollinators! They've learned how flower parts are specialized to help specific pollinators get food as well as how the pollinators’ bodies have evolved to pick up pollen and deliver it to the pistils of flowers. They've learned that many native bees and other pollinators are threatened, endangered, or even thought to be extinct because of loss of habitat, among other things. This habitat loss is often caused by the needs of humans for more land to farm, build homes, and start industries. This final lesson allows student to consider ways they can give nature a helping hand. They will suggest their own research questions and showcase their understandings through a poster presentation.

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| **Grade:** Four | Time Recommendations: 1 – 2 class periods |
| **Central Focus**: Students will consider the main driving question, “Should we include cultivars in our native pollinator garden?” within the context of how to help the rusty patched bumble bee and other native pollinators. They have learned that plants and pollinators need each other. Now they will show how people are also needed. | **Student Objectives**:1. Determine how we humans might help plants and pollinators by coming up with a new research question and plan of action.
2. Make a claim about how a solution to help a pollinator meets the criteria to solve the problem by citing relevant evidence backed by research.
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| **Essential Question**: Will the information collected by the Nativars Research Project help to inform scientists as to what native plants (or nativars) should be planted to attract pollinators? How will research and the observations of community scientists help plants and pollinators thrive and survive? |  |

**NGSS Alignment**: See Unit Overview for list of NGSS standards being addressed in each of the lessons.

**Common Core Connections**: Check the list of common core standards listed at the bottom of the NGSS standard used for this unit. Choose the ones that highlight an ELA/Writing or Math objective you introduced during a particular lesson.

**Vocabulary**: Use this last lesson as a way to review all of the vocabulary terms used in the unit. Perhaps give students time to participate in one last Kagan ‘Quiz, Quiz, Trade’ vocabulary game.

**Materials**

* Poster paper or large sheets of paper
* Pencils, rulers, markers
* Student science journals
* Access to books on bees and other native pollinators
* Access to books on native plants and their cultivated species
* Links to internet resources on each of the above

**Advance Preparation and Teaching Tips**

Tailor the final products for this lesson to the grade level you are teaching.

* Allow students to work in groups for this project. Determine the groups ahead of time.
* Ask your librarian or technology support staff to bookmark potential internet sources ahead of time on the computers your students will be using.
* At the beginning of this lesson, tell students that the research and investigations they have been doing on plants and pollinators may help them think of a new research question that will help plants and pollinators thrive and survive way into the future.

**Pre-teaching/Background Knowledge/Misconceptions**

Review all of the information shared from the other lessons and see if there is a misconception that still needs to be addressed. Any wonderings may be used to trigger ideas for new research questions. The KWL that was done in lesson one can be read to see if there were any “What I know” statements that need to be revisited to see if students’ misconceptions have been changed.

**Engage** (Inquiry/Anticipatory Hook/Opening/Activate Prior Knowledge/Create Interest/Orient to Content)

1. Display the class KWL from lesson 1, go over the first two columns one more time, and then complete the third column – what I have learned. Allow students plenty of time to share. Sometimes doing a Think, Pair, Share, will encourage more individual participation. Tell students that some of their wonderings may be rewritten into new research questions during this last lesson.
2. Show the poster of the rusty patched bumble bee one more time, and ask students if they have new ideas about how they can help all our native bees, especially the ones on the endangered list. Have them use their science journals to jot down their ideas. Encourage them to leaf through their journals to see if there are any ideas coming to mind.

**Explore** (Conceptualizing Concepts/Student Activities/Instructional Strategies and Learning Tasks/Development of the Concept)

1. Show the video, ‘[Celebrating Bees’](https://www.youtube.com/watch?v=qgG0FwcOWy8). It is 2.31 minutes long. Ask the students what David Attenborough meant when he said, “The plan for our planet is remarkably simple: Reduce our impact by making sure everything we do, we can do forever!” (Accept all responses. Guide the discussion toward what some of the things are that we might do to have a lasting impact on our environment. That should include planting individual gardens filled with native plants that flower at different times of the growing season).
2. David also says, “We need to rewild the world.” What do students think he meant by that? Ask students to name some of the suggestions from the video. Feel free to replay that portion (.59-1.30 ) His suggestions include:
	* + Keeping patches of our own back yard and gardens unkept (natural)
		+ Putting away the bug sprays (pesticides) to create pesticide free zones
		+ Planting flowering species of plants
		+ These become stepping stones throughout our urban and suburban landscapes that allow our pollinators to always have nectar available to them.

**Explain** (Checking for Understanding/What the students are doing to construct meaning and what the teacher is doing to facilitate the process)

1. Now students will process everything they have learned to decide upon a new research question.
2. Tell students they will form a small group of community scientists that need to know what people can do to ensure that unlike Rusty, our other bees and pollinators will not become endangered or extinct in the near future. Tell them that when they are done they will have created a poster that highlights the new research question and has evidence drawn or placed on the poster to explain how they might solve their problem.
3. They should write this statement at the bottom of their research posters (with their suggested solution that states, “What We Can Do To Make Sure Our Bees Always Have a Home.”) This satisfies the first learner objective for this lesson that students, “Make a claim about how a solution to help a pollinator meets the criteria to solve the problem by citing relevant evidence backed by research.” Their claims should be written in this format: CLAIM… because…EVIDENCE.
4. Allow students to use the information they gathered and assembled when they made their own pollinator gardens as part of the evidence for their new research questions. They might want to place their garden plots on their posters. They should gather all their research, observations, wonderings, notes, etc., to help create their final product.

**Extend** (Applying New Knowledge/Guided Practice/Independent Practice)

1. Students will now arrange all of their drawings and research question on a poster.
2. Provide class time for students to complete their posters and practice how they will present their research to the rest of the class.

**Evaluate** (Closing/Exit Slip/Wrap Up/Tie Up the Lesson/Provide Cognitive Closure)

1. If students created poster highlighting their new research questions, then provide an opportunity for them to share their findings and their ideas for helping plants and pollinators by planning a Nativars Research Project Poster Symposium. Invite families or other grade levels to attend. Your students will share their newfound knowledge and get others excited to plant their own Pollinator gardens. Some will be interested in creating gardens totally composed of native plants. Some will be willing to convert parts of their green, grassy lawns into more natural habitats for our native bees. How exciting that more will do their part to help Rusty and its pollinator friends! How exciting that more people will participate in data collecting to help answer scientists’ research questions!! Congratulate your student community scientists for a job well done!!!
2. If your school does not organize a Nativars Research Project Poster Symposium, then give students the opportunity to present to another fourth grade classroom that didn’t have the opportunity to participate this year.
3. An alternative (or additional) assessment might be an exit slip that asks, “How will research and the observations of community scientists help plants and pollinators thrive and survive? Using the data analyses and observations you completed during this unit, how will the results of the Nativars Research Project help pollinators?” (Students should be able to articulate that by planting native plants or other plants that display a pollinator’s preferences, plants will have an increased chance of being pollinated, and, therefore, will thrive and survive. By studying if pollinators prefer native plants over their nativars or vice versa, scientists can then communicate those results to the general public so that people can be informed as to what kinds of plants will be more successful.)

**Assessments/Evidence of Student Learning**

**Informal Assessment**s: Ongoing formative assessing of student learning in order to inform teaching and learning practices should occur. Use a variety of science classroom formative assessment techniques, including ‘thumbs up, thumbs down’ and probing questions.

**Formal Assessments**: This is the last lesson in the unit, so a cumulative assessment (or assessment of learning) could be the research posters, the completion of their science journals, or the posttest given at the end of the unit (or a combination of two or more of the above).

**Student and Teacher Resources**

The video clip, ‘Celebrating Bees’ was accessed at: <https://www.youtube.com/watch?v=qgG0FwcOWy8>

Congratulations! You have completed the Plants, Pollinators, and People: Plant Parts and Functions Unit and now have the knowledge and understanding for creating and maintaining your own school native (and nativars) gardens! Use have also learned how to do the work of real scientists to solve real world problems. Carry on Community Scientists!