



Lesson Focus Question: What can we do to help the RPB?

Lesson Overview: In this lesson students formulate and evaluate solutions to the RPB s. They are introduced to the community solution and service project their class will participate in and identify how it will benefit the RPB using the ecosystem model. They also design and evaluate an individual solution that they can enact in order to help the RPB. Both the community and individual solutions are shared with a parent or guardian and added to the student blog.

Materials

- Slide Deck
- Driving Question Board
- Summary Chart
- 1 copy of the Student materials for every student
- Blog Post Guidelines

Time Estimate: 2 class periods

Before the lesson begins

- Decide on a community solution
- Determine the constraints for your community solution

Three Dimensional Learning

Science and Engineering Practices		
<u>Element</u>	<u>How it is used</u>	<u>Where it is used</u>
Constructing Explanations and Designing Solutions	This 6-8 element is being developed in this lesson. Students are not expected to	Students are introduced to the concept of using criteria and constraints to evaluate

<i>Apply scientific ideas or principles to design, construct, and/or test a design of an object, tool, process or system.</i>	be proficient in their understanding and use of this element at this point in the unit.	solutions to the RPB problem. They determine the criteria for success and constraints for solutions, then design a community and individual solution to help the RPB.
Developing and Using Models <i>Develop and/or use models to describe and/or predict phenomena.</i>	This 3-5 element is used in this lesson. The element was developed in previous lessons in the unit.	Students use their RPB ecosystem model to determine how solutions will positively impact the RPB population.

Disciplinary Core Ideas		
<u>Element</u>	<u>How it is used and prior knowledge</u>	<u>Where it is used</u>
LS2.C: Interdependent Relationships in Ecosystems <i>Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors (MS-LS2-1) .</i>	This 6-8 element is being used in this lesson. It was developed in previous lessons.	Students use their understanding of how the RPB depends on the living and nonliving factors in its environment to design solutions to the problem of the RPB population and range declining.
ESS3.C: Human Impacts on Earth's Systems	This 6-8 element is being further developed in this lesson.	Students develop solutions to change the Earth's environments to have a positive impact on the living things in the RPB ecosystem.

<i>Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things (MS-ESS3-4).</i>		
ETS1.A: Defining and Delimiting an Engineering Problem <i>The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that is likely to limit possible solutions. (MS-ETS1-1) (secondary to MS-PS3-3)</i>	This 6-8 element is being developed in this lesson. Students are not expected to be proficient in their understanding and use of this element at this point in the unit.	Students learn that designing effective solutions takes considering the criteria and constraints of a possible solution. Students collaboratively list criteria for a community solution together and provide reasoning for the criteria from their models. Students independently list criteria and constraints for individual solutions and provide reasoning from their models.

Crosscutting Concepts: Systems and System Models, Cause and Effect		
<u>Element</u>	<u>How it is used</u>	<u>Where it is used</u>

<i>Cause and effect relationships may be used to predict phenomena in natural or designed systems.</i>	The 6-8 element is used in this lesson. It was developed in previous lessons.	Students use mechanisms to explain how their proposed solutions will affect the RPB.
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Objective: Design and evaluate solutions that will benefit the RPB population in your local community.

What do we know? What can we do the help the RPB?	Class revisits the Summary Chart to review what they figured out previously. • Follow the Summary Chart Protocol for the beginning of class. • Introduce students to the lesson question • Add the lesson question to Summary Charts
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What can we do to help the RPB? Explain how your ideas would help the RPB.	Students formulate solutions • Have students use their student sheet to individually brainstorm possible solutions to help maintain or revive the RPB population • After students have brainstormed as many solutions as they could think of, have them share their possible solutions with a partner. Have partners share how they think the solutions would help the RPB. • Have partners share the most promising ideas with the class. Record solutions as they are shared. • As partners share their solution ideas with the class point out that some of the solutions are actions that can be taken as individuals or families, and some can be carried out by the class in the community.
	Class is introduced to the community solution. • If your community solution for your site is not on the student generated list, describe it and add it to the list. • Describe the proposed community solution to the class in a way that still allows students to evaluate the solution. For example: "One opportunity we may have is...I wonder if that would be a useful solution to this problem?"

How do we decide if a solution is good? Criteria: A description of the desired features of a solution Constraints: Limits of a solution based on available materials and resources	Class is introduced to the ideas of using criteria and constraints to evaluate solutions. • Tell students that when we design solutions to problems, it is important to carefully evaluate them to help predict if the solution will be successful. • Introduce students to the concept of Criteria and Constraints using the definitions from the Slide Deck
	Students generate success criteria for the proposed community solutions • Using scratch paper have students brainstorm possible criteria for success for your community solution, then share that list with a partner. Guide students to use their RPB ecosystem models as reasoning for their proposed criteria. • Have partners share their criteria and reasoning, compile a class list of criteria for a successful solution. Discuss the merits of the criteria to determine if it should remain on the list of final criteria. Focus on reasoning during this discussion. • Discuss as a class how to best complete the “Criteria” and “Reasoning from Model” columns of the student sheet.
	Discuss constraints for community solutions

	• This discussion will be site specific depending on which solution you would like to pursue and the specific constraints due to your classroom situation. • Have students add the constraints to their Student Sheet ○ Use the constraints you formulated in preparing for the lesson.
How will our solution help the RPB population?	Students describe community solution in detail • Using the student sheet, have students describe the community solution incorporating the criteria and constraints that were decided upon. They should explain how it will help the RPB. This will eventually be added to their blog posts.
	Class discusses next steps for community solutions • Make clear to students what the next steps will be in the community solutions so they understand that this solution will come to fruition.

How will your solution help the RPB population?	Students develop criteria and constraints for individual solutions. • Explain to students that they can also impact the RPB population with their individual actions and choices. • Have students go back to the list of brainstormed solutions and select an individual solution they can take. • Have them use their student sheet to identify the criteria and constraints for that individual solution. • Have students use their student sheet to describe their individual solution.
	Blog Posts • Tell students that they will add descriptions of their planned community and individual solutions to their blog post. • Just as before, they need to have their parents read their blog entry before posting.