



# Crystal Ball for Critters (Learning Experience #1) Student Procedures



**Lesson Essential Question :** What can a bioindicator species, such as the hellbender, tell us about changes in its habitat resulting from climate change?

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## Procedures

1. In this learning experience you are going to get to know a rare and unusual animal, a salamander named the hellbender. Before you watch an introductory video, set up your science journal with the following headings, leaving room to make your observations: Name of species, physical description, habitat description, importance of species, and other observations.
2. Watch the video of the “West Virginia Wildlife” segment that introduces TV viewers to hellbenders. You may need to watch the video more than once in order to complete your first description of the hellbender and its habitat.
3. Write a reflection in your journal about your first impression of a hellbender. It is called a *bioindicator species* by some scientists. What do you think that term means?
4. Your teacher will assign you to a project team consisting of three or four members. Each team member should have a task: researcher (may have two of these), recorder, and communicator.
5. Your teacher will post the essential questions for this scenario and Learning Experience #1. Copy them into your science journal. Discuss the questions with your team, decide on preliminary answers, and record the answers in your science journal, leaving space for more complete answers at the end of the scenario. Keep these questions in mind as you complete Learning Experience #1.



6. Your team will play the role of wildlife biologists employed by the West Virginia Division of Natural Resources. Your team's challenge is to locate as much information about the hellbender as possible. Each team will recommend whether or not hellbenders should be considered a **bioindicator species** for clean waterways. Teams will also consider the future prospects of hellbenders in a world of climate change. At the end of the scenario, your team will present its findings about the hellbender.
7. Begin your research by completing *Happy Hellbender: Habitat Requirements* (Student Sheet #1). Refer to the notes you made when you watched the video then find more information by referring to print materials and the web sites that your teacher has listed for you. Cite your sources of information on the student sheet.
8. Share your group's answers in a class discussion. Add to your team's notes if you hear something new from one of the other groups.
9. You will learn about the importance of water temperature for the hellbender and other cutaneous breathers as you complete a lab experience and the accompanying data sheet, *Hellbender: Hot or Cold Tub* (Student Sheet #2). Be prepared to share the results from your experiment with the other groups in order to reach a class conclusion. Your group will be expected to share your answers to the final questions on Student Sheet #2.
10. Now that you have become acquainted with the hellbender and its habitat in West Virginia, write an answer to the following question in your science journal.
  - *How will the hellbender species fare as climate change produces warmer average water temperatures? Explain your answer.*
11. Complete *What's Next for Hellbenders* (Student Sheet #3). Be prepared to share your answers in a class discussion. Include a question that you would like to ask if you had the chance to interview a hellbender.