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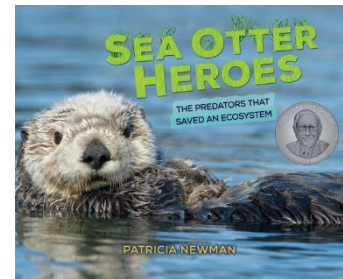
The Ubiquitous Endangered Species Unit

Connect students to endangered species and a new concept called trophic cascades with several activities that integrate STEM and language arts.

Objective: Using sea otters as an example, students will understand the important role endangered species play within their ecosystems.

Materials:

- ✓ Copy of *Sea Otter Heroes: The Predators That Saved an Ecosystem*
- ✓ Research notebook to record all thoughts and writings for this unit – all of the work for the endangered species unit will be performed in this notebook. The goal is to show students that science links to many school subjects and different aspects of their lives.



Pre-reading activity

- ✓ Ask students to write the following prediction (or hypothesis) into their notebooks: Why are sea otters the predators that saved an ecosystem?
- ✓ Ask students to draw a sea otter in their notebooks, without looking at a photo or any other visual reference.
- ✓ Ask students to list in their notebooks as many adjectives as they can think of to describe sea otters.

Reading *Sea Otter Heroes*

✓ Preparation:

- Ask students to duplicate the chart (right) in their notebooks on an entire spread (left page and right page).
- The chart should be as large as possible. Perhaps put the first two columns on the left page and the last three columns on the right page.

For student notebooks

| What I think I Know | Confirmation (I was right!) | Misconceptions | New information | Wonderings |
|---------------------|-----------------------------|----------------|-----------------|------------|
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- Ask students to use small sticky notes to write down a few things they think they know about sea otters saving an ecosystem.
- ✓ Read the book a chapter at a time (there are only five chapters).
 - Ask students if the text is narrative, expository, or a little of both.
 - Examine text structures such as chapter titles, captions, maps, charts, and graphs. Discuss why the author used these structures.
- ✓ At the end of each chapter, ask students to update the chart in their notebook.
 - The “What I Think I Know” sticky notes should be moved to the Confirmation column if students were correct, or the Misconceptions column if students were incorrect.
 - Students should create new sticky notes for the New Information column.
 - Students can also add sticky notes with questions in the Wonderings column. If their questions are answered in the text, they can move these sticky note questions (with the answers) to New Information. If the questions are unanswered by the text, students leave their questions in Wonderings.
- ✓ Ask students to predict what will happen in each chapter before you read it.

Writing exercise

- ✓ Email me at newmanbooks@live.com for a copy of my *Sea Otter Heroes* proposal—the document I wrote to sell the book idea before the book was written. The proposal is a persuasive document meant to convince an acquisitions committee at a publishing house that they need this book.
- ✓ After reading *Sea Otter Heroes*, students will reverse engineer the proposal as a persuasive piece of writing. Proposals have three main sections:
 - Overview – or a summary of what the book is about
 - Chapter outline – the basics of each chapter
 - Who will read this book – the group of people you think will read this book
- ✓ Perhaps you could stage a mock acquisitions committee in your class with a group of students to see whose proposals are “acquired for publication.”



What is a trophic cascade?

- ✓ Trophic cascades are advanced ecological concepts. After reading *Sea Otter Heroes*, see if students can explain the trophic cascade in Elkhorn Slough.
- ✓ Ask students to draw the trophic cascade in their notebooks.
- ✓ Ask them to respond to the following question:
 - Why is the sea otter trophic cascade important? (The hope is students understand how seagrass benefits humans.)

Making a mesocosm

- ✓ On page 47 of *Sea Otter Heroes*, you will find an experiment called Making a Mesocosm (a habitat in a bucket).
- ✓ Students will create their own backyard mesocosm and find out how a spider it.
- ✓ Students should list the materials they use and the procedure they follow in their notebooks.
- ✓ All results and analysis of results should also be recorded in the notebook.
- ✓ Ask students to write a conclusion in their notebooks at the end of the experiment.

Further reading



- ✓ Another example of a trophic cascade involving an endangered species: *When the Wolves Returned* by Dorothy Hinshaw Patent

- ✓ Ask students to research what other endangered animals are as important to their ecosystems as sea otters are to seagrass. Provide a reading list of endangered species literature to choose from. Some ideas include:
 - *Hoot* by Carl Hiaasen
 - *Endangered* by Eliot Schrefer (or one of the other books in the quartet)
 - *Don't Let Them Disappear* by Chelsea Clinton
 - *Mission Tiger Rescue* by Daniel Raven-Ellison and Kitson Jazyuka
 - *Zoo Scientists to the Rescue* by Patricia Newman
 - *The Great Bear Rescue* by Sandra Markle
 - *Eavesdropping on Elephants* by Patricia Newman
- ✓ Encourage students to read at least two of the above books about endangered species – either fiction or nonfiction.
 - Ask them to write book reviews of each book in their notebook.

Endangered species project

- ✓ Using either *Sea Otter Heroes* or one of the books above, ask students to create an endangered species project. The project can be one of the following, and it could also persuade people to join in the fight to save the animal(s) in the project.
 - an oral presentation
 - a PowerPoint presentation
 - a video
 - an infographic
 - consider involving coding with a simple Scratch programming device