# Week 3

**TEKS Science Standards:** TEKS.b.2.A, TEKS.b.2.B, TEKS.b.2.C, TEKS.b.2.D, TEKS.b.2.E,TEKS.b.2.F, TEKS.b.3.A, TEKS.b.3.C, TEKS.b.3.D, TEKS.b.4.A, TEKS.b.4.B, TEKS.b.9.A, TEKS.b.9.B
**TEKS ELA Standards:** TEKS.b.1, TEKS.b.2.A, TEKS.b.3, TEKS.b.9, TEKS.b.10, TEKS.b.11.A, TEKS.b.12, TEKS.b.13.B, TEKS.b.13.B, TEKS.b.15, TEKS.b.15.A, TEKS.b.23.A, TEKS.b.24.A, TEKS.b.24.C

## Literature Links

"The Lorax" by Dr. Seuss
"America's Wetlands: Guide to Plants and Animals" by Marianne D. Wallace
"Aliens from Earth: When Animals and Plants Invade Other Ecosystems" by Mary Batten
"Life in a Desert" (series) by Dorothy Hinshaw Patent, William Munoz
"Owl Puke, the Book" by Jane Hammerslough
"Gregor Mendel, Genetics Pioneer" by Lynn Van Gorp

## Words to Know & Building Academic Vocabulary (BAV)

| | | |
|---|---|---|
| ecosystem | biome | food web |
| producer | CFC | food chain |
| consumer | (chlorofluorocarbon) | competition |
| decomposer | interact | interdependent |

**Page 1 Cover Story**
**Neighborhood Ecosystem**
**TEKS Science Standards:** TEKS.b.2.A, TEKS.b.2.B, TEKS.b.2.C, TEKS.b.2.D, TEKS.b.3.A, TEKS.b.4.A
**TEKS ELA Standards:** TEKS.b.1, TEKS.b.2.A, TEKS.b.10, TEKS.b.11.A,TEKS.b.12

**Lesson Suggestions:** A unit on ecosystems provides a classroom with wonderful opportunities to discuss wildlife and in a larger sense, geography in general. This issue of Science Studies Weekly can be the jumping-off point to a variety of studies, not only of wildlife, but also of habitats and communities of people. Though the issue emphasizes ecosystems inhabited by non-human communities, teachers can also discuss with students the role that humans play in any ecosystem of which they are a part. Discussion of the ways that students fit into their own ecosystems will bring life to your study of communities of organisms on Earth. An additional resource is the website, www.theteachersguide.com/Habitats.html, which has activities and lesson plans dealing with habitats and ecosystems. In the Science Notebook, have students record the data gathered during this week's lab activity. Be sure not only to list the organisms that you see but also to classify them as producers, consumers and decomposers. Also, remember not to limit your list to animal organisms. Remember that plants are organisms too! Any ecosystem you find, even a small one, should provide enough information to fill a large section of the Science Notebook.

**Teacher Questions, (Answers) and Cognitive Complexity Level/Relevance Level**

- In what ways is an ecosystem like the community on the front page illustration of this week's issue? (Everyone has a job; everything depends on everything else to do its job to keep the system working; if one part isn't functioning correctly, it messes up the whole system.) MODERATE/3

- Where do you think there is an ecosystem in nature? (Answers will vary, but may include: ponds, deserts, woodlands, etc.) HIGH/4

D**ifferentiated Instruction:** Create an imaginary biome with fictional plants and animals by drawing original organisms in a fictional setting. Look at a few Dr. Seuss books for examples. Add some rhyming text to drawings. Give your biome and creatures names. Post in the room.

- Add these standards if students completed the activity above: TEKS ELA Standards: TEKS.b.15, TEKS.b.23.A

**Pages 2 and 3 Lesson**
**Ecosystems – Action and Interaction**
**TEKS Science Standards:** TEKS.b.2.A, TEKS.b.2.B, TEKS.b.2.D, TEKS.b.3.A
**TEKS ELA Standards:** TEKS.b.1, TEKS.b.2.A, TEKS.b.3, TEKS.b.11.A, TEKS.b.12, TEKS.b.13.B, TEKS.b.24.A

**Lesson Suggestions:** These questioning techniques may be used at any time with any issue: Search, Analyze, Apply. Good questioning techniques employing higher level thinking are a vital part of a successful learning experience. Here are descriptions of these levels of questioning that might be useful to consider:

1. **SEARCH** questions. In response to search questions, students look for and find information in a text or lecture. Search questions are useful for turning a student's attention to the content at hand but should not often be left without further effective questioning. An example of a search question for this article might be: What does the text say is a producer's job?
2. **ANALYZE** questions. Information discovered in a search question is considered in context, juxtaposed against other facts, and dissected for insight. An example of an analyze question for this article might be: How are producers, consumers and decomposers different?
3. **APPLY** questions. Application to a student's own experience is the goal of almost any educative exercise, and as such, a line of questioning is often most effective when it terminates with a question that helps a student apply discovered and analyzed concepts. An example of an apply question for this article might be: What would happen if there were no competition in an ecosystem?

Using search, analyze, and apply questions will enrich any classroom discussion and will be especially useful when students wonder what significance a particular concept has in their lives.

**Teacher Questions, (Answers) and Cognitive Complexity Level/Relevance Level**

- Why do you think the article in this week's lesson uses the phrase "food web," instead of "food chain"? (A chain suggests a link between the parts, but happens in a line. A web is more complex with more interactions, like the woodland environment pictured with the article.) MODERATE/3
- How does competition between organisms help keep an ecosystem healthy? (Competition keeps the ecosystem healthy, so that one species doesn't overrun another, or one doesn't lack food.) LOW/2
- How are the three kinds of workers in an ecosystem different? (Producers create the food; consumers eat the producers; decomposers break down plants and animals to be used again as nutrients in the soil.) MODERATE/3

**Differentiated Instruction:** Have the class research one particular ecosystem and play a "web of life game." Begin by writing on separate index cards the names of some animals and plants found in that ecosystem. Then write down on index cards the abiotic factors like rain, sun, soil, and air. Give one card to each student and have them sit in a big circle. Take a long ball of string and, starting with the student with the "sun" index card, have each student pass the ball of string on to another student to whom they are connected in the ecosystem. For example: The sun connects to the tree, the tree connects to a bird,

the bird connects to a worm and the worm connects to the soil, which connects back to the tree. Pretty soon you will have a massive spider web showing the interconnected nature of an ecosystem. This game and a number of other activities related to ecosystems can be found at: teacher.scholastic.com/dirt/ecosys/tguide.htm.

- Add these standards if students completed the activity above: TEKS ELA Standards: TEKS.b.15, TEKS.b.23.A

**Page 2**
**Mario Molina**
**TEKS Science Standards:** TEKS.b.2.A, TEKS.b.2.D, TEKS.b.3.A
**TEKS ELA Standards:** TEKS.b.1, TEKS.b.2.A, TEKS.b.3, TEKS.b.12

**Lesson Suggestions**: Show a diagram of the ozone layer so that students can grasp this abstract concept. Put Molina's research into language a child can understand by visiting a website such as: http://www.epa.gov/sunwise/kids/kids_ozone.html to see diagrams of the ozone layer, safety suggestions and games. The site also shows how other organisms protect themselves from the sun's harmful rays.

**Teacher Questions, (Answers) and Cognitive Complexity Level/Relevance Level**

- How do you think Mario Molina discovered that CFCs were harming the ozone? (Answers will vary.) HIGH/4
- Why are there still aerosol cans of products today? (They use something besides CFCs.) MODERATE/3
- Why is it important for everyone in the world to stop using harmful substances like CFCs? (If only one or two countries stopped, the ozone would still be harmed. Everyone has to work together to stop harmful practices.) MODERATE-HIGH/3-4

**Differentiated Instruction:** Turn the process of ozone destruction into a digital pretend movie trailer. Using the free, built-in "iMovie" app on iPads or iPhones, choose a theme (fairy tale, adventure, science fiction, etc.) and add mini-videos and text to tell the story. Students can play the starring roles. This is a very simple app to use. It takes about 10 minutes to make, and then the application puts it all together into a 1-1/2 to 2 minute video trailer. Share with the class.

- Add these standards if students completed the activity above: TEKS ELA Standards: TEKS.b.9, TEKS.b.13.B, TEKS.b.15.A

**Page 3**
**Change Affects Everyone**
**TEKS Science Standards:** TEKS.b.2.A, TEKS.b.2.D, TEKS.b.3.A, TEKS.b.9.B
**TEKS ELA Standards:** TEKS.b.1, TEKS.b.12, TEKS.b.24.A

**Lesson Suggestions:** Invite students to imagine what the "ecosystem" of their classroom would be like without one important organism – you! Your students will probably be able to come up with many ways in which their environment would be affected without you—some that may surprise you. Remember that the students have a limited view of all the ways in which you impact the classroom. The discussion might be positively affected by your providing an amplified view of "a day in the life" of their teacher. The object here is to give students plenty of ammunition, in the form of gentle reminders, for their ideas about how your absence would affect their classroom environment.

**Teacher Questions, (Answers) and Cognitive Complexity Level/Relevance Level**

- Ecosystems are full of producers, consumers, and decomposers. Imagine and describe what would happen in a particular ecosystem if one of those entire groups were removed. (Answers will vary.

Sample: If I put too many predator fish in my tank, they will eat all the smaller fish and there will be not enough producers, just consumers. The consumers will run out of food quickly and then they will all die. The decomposers will also run out of organisms very quickly and the whole tank will be ruined.) HIGH/4

- Why is it possibly a bad idea to spray crops with poison to get rid of insects that eat them? (Sample answer: The poisons might kill most of the bugs, but allow the strongest bugs to survive. Then, only poison-resistant bugs would have offspring that are also poison-resistant and it could make the problem even worse than it was at the beginning of the process.) HIGH/4

**Differentiated Instruction:** Assign students to work in small groups. Have each group draw, on a large sheet of paper, a different ecosystem. (Deserts, streams, oceans, forests, jungles, and plains are just a few of the settings where ecosystems can exist.) Have them include as many organisms in their picture as they can, but leave something important out. Ask each group to pass its drawing to a neighboring group. The new group should describe the food web depicted in the drawing, pointing out which organisms in the drawing consume others, and doing some brief research to discover an important organism that is missing. Jot down sources on the back of the poster. Remind students to label drawings with names of organisms and draw arrows showing energy transfers.

Add these standards if students completed the activity above: TEKS ELA Standards: TEKS.b.23.A, TEKS.b.24.C

**Page 3**
**Taking Care of Ecosystems**
**TEKS Science Standards:** TEKS.b.2.A, TEKS.b.2.D, TEKS.b.3.A, TEKS.b.9.B
**TEKS ELA Standards:** TEKS.b.1, TEKS.b.2.A, TEKS.b.3, TEKS.b.11.A,TEKS.b.12, TEKS.b.24.A

**Lesson Suggestions:** Make a class "H-chart" for a discussion about the environment. Draw a large letter H on a big piece of paper. During the discussion, positive practices we have to take care of ecosystems are recorded above the H's middle bar. Negative practices are recorded below the H's middle bar. Possible improvements or next steps for the future are recorded to the right of the H. This becomes a graphic reminder of the state of our Earth regarding the environment.

**Teacher Questions, (Answers) and Cognitive Complexity Level/Relevance Level**

- What is one of the worst things people used to do that harmed ecosystems, but that is now illegal? (Answers will vary, such as: burn trash in backyards, drive smoky cars, throw trash in water sources.) HIGH/4
- What is one way we can personally take better care of ecosystems around us? (Answers will vary.) HIGH/4
- What do we really need to work on in order to take care of ecosystems today? (Various answers possible, for example: Stop cutting down trees in rainforests for grazing land.) HIGH/4

**Differentiated Instruction:** Art Connection: A collage is a piece of artwork made up of a variety of different pictures pasted together, sometimes overlapping. A piece of artwork can be drawn, cut out of a publication or a combination of both. Using magazines and newspapers (with permission), make a collage of two different ecosystems. (For example, a desert and rainforest or a coral reef and a forest, etc.) Label as many of the living things in each ecosystem as you can.

- Add these standards if students completed the activity above: TEKS ELA Standards: TEKS.b.23.A

**In the Lab**
**It's Not Just a Backyard – It's an Ecosystem**
**TEKS Science Standards:** TEKS.b.2.A, TEKS.b.2.B, TEKS.b.2.D, TEKS.b.3.A, TEKS.b.4.A, TEKS.b.9.B
**TEKS ELA Standards:** TEKS.b.1, TEKS.b.2.A, TEKS.b.12, TEKS.b.13.B, TEKS.b.15, TEKS.b.24.A

**Lesson Suggestions:** Use the Science Notebook template for this lab. Walk outdoors to the nearest natural area. Ask everyone to silently look around and observe living things with their senses. Ask students to think about how the organisms are interacting at this moment. Sit outdoors if possible and quietly discuss observations. Fill out a class Science Notebook investigation sheet as you go along in order to reinforce how to complete an investigation. After doing it so many times, some students will easily complete the template on their own yet there will always be others who will appreciate the review. Also, sometimes the lack of the first piece of equipment is enough to preclude participation in a home investigation, so have a "container drive" in class for a few days before doing this activity, to make sure everyone has the containers they need. Possible contributions could be shoeboxes, coffee cans, large plastic snack containers, etc. Collect a few items from the school to make the class model ecosystem, and preview the instructions for the lab before proceeding to clear up any questions. Return the living creatures you gathered to the outdoors within a few days. Be sure to encourage students to return living things they gather to their original environment after they've finished observing and sharing.

**Teacher Questions, (Answers) and Cognitive Complexity Level/Relevance Level**
- Where can you go to find the best specimens for your investigation? (Answers will vary.) HIGH/4
- How many different items do you need to make an ecosystem? (Just a few; even two or three things can be interdependent.) LOW/2

**Differentiated Instruction: F**urther explore world biomes and their ecosystems by playing the free game, "Food Fight" at www.brainpop.com. Students can play in pairs or teams. At the site, choose 'free stuff' then click 'game up,' 'science games' and "Food Fight."
- Add these standards if students completed the activity above: TEKS ELA Standards: TEKS.b.23.A

**Let's Investigate**
**TEKS Science Standards:** TEKS.b.2.A, TEKS.b.2.B, TEKS.b.2.C, TEKS.b.2.D, TEKS.b.3.A, TEKS.b.9.B
**TEKS ELA Standards:** TEKS.b.1, TEKS.b.2.A, TEKS.b.12, TEKS.b.15

**Lesson Suggestions:** Do a model investigation by dissecting owl pellets. Hold up a pellet and tell students it represents a whole ecosystem. Owl pellets, the regurgitated remains of what the owl can't digest, give immediate insight into a forest ecosystem and are fascinating to students, since skeletal remains of mice, other small rodents and birds are found inside. The skeletons can be re-assembled with a guide sheet that comes in an owl pellet kit. Be sure to use pellets from a science company rather than some that come directly from a forest, since science companies bake them at high temperatures to kill bacteria. Sources are www.pellet.com or www.amazon.com. Read "Owl Puke, the Book" by Jane Hammerslough or place it in a science center. This activity is a great opportunity to get out the microscopes and magnifying lenses, too, since many mysterious items will be found in the pellets. Now, when students design their own investigations, they may realize their subject doesn't need to be huge and complicated, just creative.

**Teacher Questions, (Answers) and Cognitive Complexity Level/Relevance Level**

- What did you find that you expected/didn't expect in your owl pellet? (Various possible answers, like: vole bones, a gopher skull, a feather, a piece of rock, etc.) HIGH/4
- What would you like to investigate this time? (Answers will vary.) HIGH/4

**Differentiated Instruction:** Social Studies Connection: Find out what your state bird, flower and tree are. Create an ecosystem flyer with drawings and factual information that focus on your state bird, flower and tree. What type of ecosystem do they need to survive? Why do you think they survive well in your state? Create a multimedia presentation of your findings.

- Add these standards if students completed the activity above: TEKS ELA Standards: TEKS.b.9, TEKS.b.13.B, TEKS.b.15.A, TEKS.b.23.A, TEKS.b.24.C

**Writing and Technology**

**Let's Write:** Write an essay on why it is important to take care of your ecosystem. Be sure to cite sources from this week's magazine and use correct spelling and puncuation.

- **Digital Developments:** The teacher may use this as a student product assessment and/or replacement for weekly assessment. MODERATE to HIGH/3 and 4

**Web 2.0 Publishing Technology Suggestion(s):** Create a "Glog" (digital poster) of an ecosystem or biome at: http://edu.glogster.com. Upload images, imbed video, add transparent layers, zoom effects, graphics and text. Students can also add effects to the Glog to show changes over time, under extreme conditions, or due to human interaction.

**Web Surfers**

- http://pbskids.org/eekoworld/index.html?load=eekohouse
- kbears.com/geography.html: fun web environment with world and biome information
- http://www.epa.gov/students/games.html: tons of interactive activities about the environment