

# Ecology, Habitats and Food Chains

**Grade Level or Special Area:** 3<sup>rd</sup> Grade

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**Length of Unit:** Nine lessons, approximately 45 minutes each and one Culminating Activity

## I. ABSTRACT

This exploration of ecology, habitats and food chains allows students to read, learn and create their own habitats. Multiple experiments and activities make this unit entertaining and informative for students.

## II. OVERVIEW

### A. Concept Objectives

1. Students will develop an awareness of the importance of protecting the environment.
2. Students will understand the interactions of organisms within an ecosystem and how fragile the balance of nature is.

### B. Content from the *Core Knowledge Sequence*

1. Third Grade Science (p. 83)
  - a. Ecology
    - i. Habitats, interdependence of organisms and their environment
    - ii. The concept of a “balance of nature” (constantly changing, not a static condition)
    - iii. The food chain: producers, consumers, decomposers
    - iv. Ecosystems: how they can be affected by changes in environment (for example, rainfall, food supply, etc.), and by man-made changes
    - v. Man-made threats to the environment
      - a) Air pollution: emissions, smog
      - b) Water pollution: industrial waste, run-off from farming
    - vi. Measures we can take to protect the environment (for example, conservation, recycling)

### C. Skill Objectives

1. Students will identify the essential interdependency of animals and plants upon each other by exploring food chains.
2. Students will identify producers, consumers and decomposer part in the food chain and its necessity for the balance of nature.
3. Students will identify various habitats and what makes them different.
4. Students will identify producers, consumers, decomposers, herbivores, carnivores and omnivores.
5. Students will compare and contrast experimental data gathered and journal their observations.
6. Students will identify the cause of air pollution through reading and experimentation and begin to learn how to help keep the air clean.
7. Students will identify water and land pollution and begin to identify ways to protect the earth and water from pollution.
8. Students will identify ways to recycle and conserve in their homes and schools.
9. Students will identify Ecology vocabulary words and match them with their definition via a crossword puzzle.

10. Students will identify Ecology lessons learned via the Ecology final assessment.

### III. BACKGROUND KNOWLEDGE

- A. For Teachers
  1. Book – Batten, Mary, *Aliens from Earth*
  2. Book – Hirsch Jr., E.D., *What Your 3<sup>rd</sup> Grader Needs to Know*
  3. Book – Pollock, Steve, *Ecology*
- B. For Students
  1. First Grade Science: Living Things and Their Environments (p. 37)
    - a. Habitats
    - b. Environment Change and Habitat Destruction

### IV. RESOURCES

- A. Book – *Weird Friends Unlikely Allies in the Animal Kingdom*, Jose Aruego and Ariane Dewey (Lesson One)
- B. Pictures of the Forest, Desert, Urban, Wetlands and Coral Reefs habitats as shown on the National Geographic website at <http://www.nationalgeographic.com/photography/galleries> (Lesson Three)

### V. LESSONS

#### Lesson One: **Weird Friends (45 minutes)**

##### *Daily Objectives*

1. Concept Objective(s)
    - a. Students will understand the interactions of organisms within an ecosystem and how fragile the balance of nature is.
  2. Lesson Content
    - a. Habitats, interdependence of organisms and their environment
  3. Skill Objective(s)
    - a. Students will identify the essential interdependency of animals and plants upon each other by exploring food chains.
- B. *Materials*
1. Class set of the Ecology pre-assessment (Appendix A)
  2. Pencil for each student
  3. Science folder – one per student
  4. Book *Weird Friends Unlikely Allies in the Animal Kingdom* by Jose Aruego and Ariane Dewey
  5. Class set of Ecology vocabulary sheet (Appendix C)
- C. *Key Vocabulary*
1. A *food chain* is a series of plants and animals that are linked together because they feed on each other.
- D. *Procedures/Activities*
1. Explain to the class, “You will be taking a pre-assessment on Ecology and Habitats and it is okay if you don’t know the answers. This pre-test is to determine what you may already know and what you still want to learn about.”
  2. Hand out the Ecology pre-assessment (Appendix A) to the class and allow time for them to silently complete it. Allow approximately 10-15 minutes for completion.
  3. Collect them once students are finished. (Grade them after class using the Ecology pre-assessment answer key (Appendix B) to ensure the teaching direction of the lesson is correct.)

4. Read the list of Ecology vocabulary words that the class will be learning throughout the unit found in Appendix C.
5. Explain that as the class encounters each vocabulary word, they will be writing down the definition in the blank area provided next to the word. If your class does not know what a definition is, please instruct them that it is the meaning of a word.
6. Hand out the Ecology vocabulary sheet (Appendix C) to the class.
7. Read the book *Weird Friends Unlikely Allies in the Animal Kingdom* to the class aloud. The book discusses the dependency of diverse animals upon each other, which ultimately aid to their survival in their world.
8. Discuss with the class the weird friendships described in the book. Ask students, "Which friendship was most interesting to you?" Wait for student participation and call on a student to share.
9. Turn to the page of the friendship the student shared and discuss the interdependency of the animals. How the animals help each other. If time allows, do this with several different animal partnerships described in the book.
10. Ask students, "Okay, we understand why it is so important for the animals to be together in the wild right? But what if I was a fisherman and I decided to hunt the sperm whales until no more existed. What do you think would happen to the Red Phalaropes? (Reference this page in the book or use any partnership described in the book and remove one of the animals from the scenario for the sake of discussion.) Wait for student responses, which may include that the Red Phalaropes will starve or they will find different food to eat. Informally assess student participation throughout the discussion
11. Ask students, "What happens if the Red Phalaropes starve because they don't have the parasites from the sperm whale to eat?" Wait for student responses, which may include a basic reference to the animal that eats the Red Phalaropes starving as well because it doesn't have any food. Guide students in this direction during discussion.
12. Ask students, "Let's say the sperm whales are all hunted so there are no more and then the Red Phalaropes starve because there are no more parasites to eat from the sperm whales so they all die and there are no more and the animal that hunts and eats them starves...what is happening here? Does anyone know what we call the cycle of all these animals eating another down the line?" Wait for student responses including the correct being this is a food chain. If students are not familiar with this term, share it with them after discussion.
13. Tell students, "A food chain is a series of plants and animals that are linked together because they feed on each other." Write this definition on the board.
14. Have students write this definition on their Ecology vocabulary sheet allowing a few minutes for completion. Informally assess student accuracy and participation.
15. Explain to students, "We are going to explore more food chains in this unit. We are also going to explore some of the habitats these animals live in as well as how we can protect these habitats, including the one we live in."
16. Have students put their Ecology vocabulary (Appendix C) sheet in their science folder.

E. *Assessment/Evaluation*

1. An informally assessment will occur while the teacher is leading the book discussion and observing the student responses.
2. The students' Ecology pre-assessment will be a formal assessment to lead the instruction of this unit.

## **Lesson Two: The Balance of Nature (45 minutes)**

### A. *Daily Objectives*

1. Concept Objective(s)
  - a. Students will understand the interactions of organisms within an ecosystem and how fragile the balance of nature is.
2. Lesson Content
  - a. The concept of a “balance of nature” (constantly changing, not a static condition)
  - b. The food chain: producers, consumers, decomposers
  - c. Ecosystems: how they can be affected by changes in environment (for example, rainfall, food supply, etc.), and by man-made changes
3. Skill Objective(s)
  - a. Students will identify producers, consumers and decomposer part in the food chain and its necessity for the balance of nature.

### B. *Materials*

1. Pencil for each student
2. Class set of Ecology vocabulary sheet (Appendix C)
3. Science folder for each student
4. Class set of Ecology packet (Appendix D)
5. Two sided balance scale
6. Small, equally sized model houses, trees, people figures, animals, whale, bird etc. to use on the scale

### C. *Key Vocabulary*

1. A plant that makes its own food is a *producer*.
2. A *consumer* is an animal that eats the food.
3. A *decomposer* eats dead plants and animals.

### D. *Procedures/Activities*

1. Display the scale in the front of the class. Ask students, “Remember our story about the weird friends? Remember the Sperm Whale and the Red Phalaropes? What happened when the Sperm Whale was hunted and there were no more left?” Wait for responses including the correct being that the Red Phalaropes starved because they didn’t have the parasites to eat off the Sperm Whales anymore.
2. Show students the scale and say, “This scale represents the world we live in. Right now, it is empty and it is balanced, isn’t it? Let’s put the Sperm Whale on one side and the Red Phalaropes on the other side. The scale or the world we live in is still balanced, right? But what if the Sperm Whale goes away?” Take the Sperm Whale off the scale. “What happens then?” Wait for student responses including the correct being that the scale or the world we live in is no longer balanced. Informally assess student participation and comprehension throughout the activity.
3. Clear off the scale.
4. Put trees on both sides of the scale.
5. Ask students, “Before your house was built, it was all trees and fields like what I’ve put on our scale. What if I bulldoze some of the trees down and put houses there?” Take one side of the scales trees away and replace with houses. Wait for student responses including the correct being that the balance didn’t change – we can have houses and trees together.
6. Ask students, “What happens if those houses sell so well that everybody wants to live in your neighborhood so they bulldoze down the rest of the trees and put more houses?” Remove the trees from the other side of the scale and replace

with houses. Wait for student responses including the correct being that the scale is still balanced so it is okay.

7. Now tell students, “Yes, the world we live in is still balanced, but, the trees were apple and orange trees and that’s what the people in the neighborhood ate. Now they are starving. Is the world we live in still balanced?” Wait for student responses including the correct being that we are not balanced and we need the plants that make the food to live.
8. Commend students for the high-level thinking and have them turn to page 2 of the Ecology packet (Appendix D).
9. Read this page aloud or have a competent student read it aloud to the class.
10. Ask students, “Are there any Ecology vocabulary words on this page we need to define?” Wait for student responses including the correct being yes, producer, consumer and decomposer.
11. Ask students, “What is the definition for producer?” Wait for student responses including the correct being that it is a plant that makes its own food.
12. Write the definition on the board and allow students a few minutes to write them on their Ecology vocabulary sheet.
13. Ask students, “What is the definition for consumer?” Wait for student responses including the correct being that it is an animal that eats the food.
14. Write the definition on the board and allow students a few minutes to write them on their Ecology vocabulary sheet.
15. Ask students, “What is the definition for decomposer?” Wait for student responses including the correct being that it eats dead plants and animals.
16. Write the definition on the board and allow students a few minutes to write them on the Ecology vocabulary sheet.
17. Have students turn to page 3 of the Ecology packet (Appendix D).
18. Read this page aloud to the class and discuss the food chain pictured on the page. Remember to continue to informally assess student participation and accuracy during this lesson.
19. Discuss the food chain pictured on this page with the class. Be sure they point out that there are no decomposers shown, only producers and consumers.
20. Tell students, “You are going to write three sentences about this food chain on the lines provided and don’t forget to use the words producers and consumers. Then you get to draw a food chain described in the boxes below. Use your best artwork and label your pictures.” Allow students 15-20 minutes to complete this activity. If time and resources permit, you may allow students to color their food chain drawings.
21. Assess students’ accurate completion of this task by walking throughout the room, reviewing and assisting students’ work. If need be, collect the packets and check their work, being sure to return them in time for the next lesson.
22. Have students put their Ecology vocabulary sheet (Appendix C) and their Ecology packet (Appendix D) in their science folder

E. *Assessment/Evaluation*

1. An informal assessment will occur while the teacher is leading the class discussion on the food chains and observing the student responses.
2. A formal assessment will occur during the students’ assignment of completing the sentences and drawings of the food chains correctly.

### **Lesson Three: Exploring Habitats (45 minutes)**

#### **A. Daily Objectives**

1. Concept Objective(s)
  - a. Students will understand the interactions of organisms within an ecosystem and how fragile the balance of nature is.
2. Lesson Content
  - a. Habitats, interdependence of organisms and their environment
  - b. The food chain: producers, consumers, decomposers
  - c. Ecosystems: how they can be affected by changes in environment (for example, rainfall, food supply, etc.) and by man-made changes.
3. Skill Objective(s)
  - a. Students will identify various habitats and what makes them different.

#### **B. Materials**

1. Class set of the Ecology packet (Appendix D)
2. Class set of the Ecology vocabulary sheet (Appendix C)
3. Pencil for each student
4. Science folder for each student
5. Picture of each habitat to show students: Forest, Desert, Urban, Wetlands, Coral Reefs (accessible through school or public library or National Geographic Website at <http://www.nationalgeographic.com/photography/galleries>)

#### **C. Key Vocabulary**

1. A *habitat* is the area where a plant or animal naturally grows and lives.

#### **D. Procedures/Activities**

1. Have students retrieve their Ecology vocabulary sheet (Appendix C) and their Ecology packet (Appendix D) and turn to page 4.
2. Read page 4 aloud or have a competent student read it aloud.
3. Once page 4 has been read, ask students, “Is there an Ecology vocabulary word we need to define on this page?” Wait for student responses including the correct being yes – habitat.
4. Write the definition for habitat on the board and allow students a few minutes to write it on their Ecology vocabulary sheets.
5. Now, show students pictures of this habitat, being sure to point out any producers, consumers or decomposers that might be shown.
6. The bottom of page 4 asks some questions – read these aloud to the class. “Is this the habitat you live in? Have you ever visited this habitat?” Wait for student responses. Discuss this as long as time permits. Informally assess throughout the discussion for student participation and comprehension.
7. Ask students, “From the information we just read about the forest, who can tell me the name of a producer?” Wait for student responses which may include any of the plants/trees mentioned in the reading i.e. maples, poplars, beeches, oaks, pines, hemlocks, cedars.
8. Ask students, “Why are these plants and trees producers?” Wait for student responses including the correct being that they make their own food.
9. Ask students, “From the information we just read about the forest, who can tell me the name of a consumer?” Wait for student responses, which may include any of the animals mentioned in the reading, i.e. insects, birds, mammals, reptiles, amphibians, deer, squirrels, hawks, woodchucks, raccoons etc.
10. Ask students, “Why are these animals consumers?” Wait for student responses including the correct being that they are animals that eat the food – they cannot make food on their own like a plant or tree can.

11. Have students turn to page 5 of the Ecology packet (Appendix D) and read it aloud or have a competent student read it aloud.
12. Show students pictures of this habitat being sure to point out any producers, consumers or decomposers that might be shown.
13. Once the page has been read, ask the students, “Is this the habitat you live in? Have you ever visited this habitat?” Wait for student responses. Discuss this as long as time permits. Again, remember to informally assess throughout the discussion for student participation and comprehension.
14. Ask students, “What are some differences between the forest habitat and the desert habitat?” Wait for student responses including the water production levels, the plant and animal density etc.
15. Ask students, “Do the animals still live in the desert even though there is very little water?” Wait for students’ responses including the correct being yes.
16. Ask students, “What do some of the animals do to live in the dry desert that is different from animals in the forest? How do these animals adapt to the different environment?” Wait for student responses including burrowing homes in the cactus, not going out during the heat of the day, drinking little water etc.
17. Have students turn to page 6 of the Ecology packet (Appendix D) and read aloud or have a competent student read aloud.
18. Show students pictures of this habitat being sure to point out any producers, consumers or decomposers that might be shown.
19. Ask students, “Is this the habitat you live in? Do you know anyone who lives in this habitat?” Wait for students’ responses and discuss the different levels of urban habitats (population/density etc) for as long as time permits.
20. Have students turn to page 7 of the Ecology packet (Appendix D) and read aloud or have a competent student read aloud.
21. Show students pictures of this habitat being sure to point out any producers, consumers or decomposers that might be shown.
22. Ask students, “Is this the habitat you live in? Have you ever visited this habitat?” Wait for student responses and discuss this as long as time permits.
23. Have students turn to page 8 of the Ecology packet (Appendix D) and read aloud or have a competent student read aloud.
24. Show students pictures of this habitat being sure to point out any producers, consumers or decomposers that might be shown.
25. Ask students, “Is this the habitat you live in? Have you ever visited this habitat?” Wait for student responses and discuss this as long as time permits.
26. Ask students, “How do you think it affects the Coral Reef habitat when people break part of the coral off?” Wait for responses, which may include that humans are ruining it; it removes living space for all the other animals so the food chain may be affected if too many of the animals are displaced. Informally assess for student understanding of man’s effects on the coral reef ecosystem and relate man’s interference in other ecosystems (i.e. the wetlands etc.) if further discussion is needed for student comprehension.
27. Explain to students, “You will get to do an exciting project. You will get to create a shoebox habitat of one of the habitats we read about today. Therefore, tonight, I want you to think about which habitat you may want to do and tomorrow you will get the instructions on how to make it.
28. Have students return their Ecology packet (Appendix D) and their Ecology vocabulary sheet (Appendix C) to their science folder.

- E. *Assessment/Evaluation*
1. An informal assessment will occur while the teacher is leading the habitat discussion and observing student participation and responses.
  2. A formal assessment will occur during students writing of the definition.

**Lesson Four: Follow the Food Chain (45 minutes)**

A. *Daily Objectives*

1. Concept Objective(s)
  - a. Students will understand the interactions of organisms within an ecosystem and how fragile the balance of nature is.
2. Lesson Content
  - a. The food chain: producers, consumers, decomposers
3. Skill Objective(s)
  - a. Students will identify producers, consumers, decomposers, herbivores, carnivores and omnivores.

B. *Materials*

1. Class set of the Ecology packet (Appendix D)
2. Pencil for each student
3. Science folder for each student
4. Shoebox Habitat assignment sheet (Appendix E)
5. Class set of the Ecology vocabulary sheet (Appendix C)

C. *Key Vocabulary*

1. An *herbivore* eats only plants.
2. A *carnivore* eats only meat.
3. An *omnivore* eats both meats and plants.

D. *Procedures/Activities*

1. Begin by reminding the class of the habitat shoebox project they will all get to create. This is the Culminating Activity for this unit and is outlined in that area of this unit plan. Please follow the instructions under Culminating Activity to assign and grade this project. It is a labor/time intensive project so it should be assigned at least one week (including two weekends) before it is due. This is just a reminder to assign it – please refer to the Culminating Activity section for the rest of the project’s description.
2. Have students turn to page 9 of the Ecology packet (Appendix D) and discuss the diagram. Ask students, “Why is the plant a producer?” Wait for the correct response being that it makes its own food.
3. Ask students, “Why are the bug, frog and fox all consumers?” Wait for the correct response being that they are animals that eat the food – they do not make their own food.
4. Ask students, “Why is the mushroom or fungi a decomposer?” Wait for the correct response being that they eat dead plants and animals.
5. Read the rest of the page aloud or have a competent student read it aloud.
6. Ask students, “Are there any words we need to define on this page?” Wait for student responses including the correct being yes, herbivore, carnivore and omnivore. Write the definition for these words on the board and allow the students a few minutes to write them on their Ecology vocabulary sheets.
7. Ask students, “Name a few herbivores.” Wait for student responses including grasshoppers, ladybugs, panda bears, etc. Write these on the board under the heading herbivore.
8. Ask students, “Name a few carnivores.” Wait for student responses including frogs, lions, tigers, etc. Write these on the board under the heading carnivores.

9. Ask students, "Name a few omnivores." Wait for student responses including foxes, humans, ants, etc. Write these on the board under the heading omnivores.
  10. Now, allow students a few minutes to answer the questions at the bottom of the page.
  11. Assess students' accurate completion of this task by walking throughout the room reviewing student's work. If need be, collect the packets and check their work being sure to return them in time for the next lesson.
- E. *Assessment/Evaluation*
1. Informal assessment will occur during the teacher-led class discussion of the food chain diagram.
  2. Formal assessment will occur during student completion of the questions regarding producers, consumers, decomposers, herbivores, carnivores and omnivores.

**Lesson Five: Decomposers (45 minutes)**

- A. *Daily Objectives*
1. Concept Objective(s)
    - a. Students will understand the interactions of organisms within an ecosystem and how fragile the balance of nature is.
  2. Lesson Content
    - a. The food chain: producers, consumers, decomposers
  3. Skill Objective(s)
    - a. Students will compare and contrast experimental data gathered and journal their observations.
- B. *Materials*
1. Class set of the Ecology packet (Appendix D)
  2. Pencil for each student
  3. Per each student group:
    - a. two Ziploc baggies
    - b. two slices of banana
    - c. one yeast packet
    - d. masking tape
    - e. pen
- C. *Key Vocabulary*
- No new vocabulary words for this lesson
- D. *Procedures/Activities*
1. Before beginning the lesson, remind students of their final habitat shoebox project due date.
  2. Have supplies for the experiment ready and have students turn to page 10 of their Ecology packet (Appendix D).
  3. Read this page aloud or have a competent student read it aloud to the class.
  4. Ask students, "Remind me what a decomposer does again." Wait for student responses including the correct being that it eats dead plants and animals.
  5. After the experiment has been read aloud, you can divide students into groups or do the experiment with the entire class as you see fit.
  6. Follow the procedures on the experiment in order with the class, allowing students to do the work.
  7. First, write the words "yeast" and "no yeast" on the tape and put one label on each baggie.
  8. Second, put a slice of banana into each baggie.

9. Third, add a pinch of yeast to the baggie that has the “yeast” label and seal both baggies – KEEP THE BAGGIE SEALED!
  10. Finally, explain to the class, “We will be observing this experiment over the next five days to see what, if anything, changes in the bags. Turn to page 11 of your Ecology packet so we can begin taking our observations down.”
  11. Read page 11 aloud to the class. Explain, “We will observe the experiment for five days beginning today and on the fifth day we will answer the following questions so you’ll need to be looking at the baggies closely and writing the observations down that will most help you at the end of the week.”
  12. Read the questions on page 11 aloud.
  13. Ask students, “What are some predictions to the answers of these questions?” Wait for student responses and facilitate class discussion for as long as time will allow.
  14. Show the two baggies to the students and ask, “What do the baggies look like? What is going on with the banana in both baggies?” Wait for student responses and initiate class discussion. The baggies look identical with the exception of yeast being in one baggie and not the other.
  15. Tell students, “Write down what you see as similar or different between the two baggies on your data and observations sheet (page 11) under Day 1 Observations. Allow students a few minutes to complete this. Also, allow students multiple opportunities to look closely at the baggies – but no touching!
  16. Display the baggies in the room in a location where students can see them regularly throughout the day.
  17. Have students return their Ecology packet (Appendix D) to their science folder.
- E. *Assessment/Evaluation*
1. An informal assessment will occur during the teacher-led class discussion regarding the experiment, predications and observations.
  2. A formal assessment occurs during students’ daily data and observation gathering of the experiment.

**Lesson Six: Air Pollution (45 minutes)**

A. *Daily Objectives*

1. Concept Objective(s)
  - a. Students will develop an awareness of the importance of protecting the environment.
2. Lesson Content
  - a. Man-made threats to the environment
    - i. Air pollution: emissions, smog
3. Skill Objective(s)
  - a. Students will identify the cause of air pollution through reading and experimentation and begin to learn how to help keep the air clean.

B. *Materials*

1. Class set of Ecology packet (Appendix D)
2. Class set of Ecology vocabulary sheet (Appendix C)
3. Pencil for each student
4. Science folder for each student
5. Petroleum jelly (Vaseline)
6. Three plastic sheets (clear)
7. Per each student group:
  - a. one wood block (2” x 2” x 6”)
  - b. masking tape

- c. one plastic sheet (2" x 2" x 6")
- C. *Key Vocabulary*
1. Air that is dirty or not pure is called *air pollution*.
  2. *Smog* is fog mixed with smoke.
  3. *Emissions* are what come out of your car's exhaust.
- D. *Procedures/Activities*
1. Have students retrieve their Ecology vocabulary sheet (Appendix C) and their Ecology packet (Appendix D) and turn to page 11.
  2. Remind students, "We have our decomposer experiment going on and we need to write down our observations of it today." Allow students a few minutes to look at the two Ziploc baggies holding the banana slices from Lesson Five.
  3. Tell students, "Under Day 2 observations, write down what you see happening. What color are the bananas? Has anything changed about their shape or size?" Allow students a few minutes to write down their observations.
  4. Remind students, "We will write down our observations for five full days so we'll look at it again tomorrow."
  5. Have students turn to page 12 of their Ecology packet (Appendix D).
  6. Read this page aloud or have a competent student read it aloud to the class.
  7. Ask the class, "Are there any words we need to write the definitions down for?" Wait for student responses including the correct being yes, air pollution, emissions and smog.
  8. Write the definitions for these words on the board and allow students a few minutes to write them on their Ecology definition sheets. Assess student participation and accuracy. Assist students if necessary.
  9. Ask students, "What other kinds of things pollute our air?" Wait for student responses, which may include smoke, pollution from vehicles and factories, acid rain, pollution from farms tobacco smoke etc. Informally assess student participation and comprehension.
  10. Ask students, "How clean do you think the air we breathe is?" Wait for student responses.
  11. Have students turn to page 13 of their Ecology packet (Appendix D).
  12. Tell students, "We are going to find out how clean the air we breathe is." Read the experiment aloud to the class. This can be done in small groups or with the class as a whole depending on student abilities and time available.
  13. Prepare the experiment via the directions on page 13 of the Ecology packet and put the Vaseline-smearred plastic wrap blocks outside where they can be retrieved tomorrow and observed. It is a cleaner experience if the teacher smears the Vaseline on the plastic sheets instead of the children, but this is up to the teachers' discretion. Also, make a point of showing the students how clean the newly applied Vaseline is on the plastic wrap so they have a frame of reference when they look at it again tomorrow.
  14. Have students return their Ecology packet (Appendix D) and their Ecology vocabulary sheet (Appendix C) to their science folder.
- E. *Assessment/Evaluation*
1. An informal assessment will occur during the teacher-led class discussion regarding air pollution.
  2. A formal assessment will occur during students' assignment of writing their Ecology vocabulary words and in constructing their air pollution experiment.

## **Lesson Seven: Water and Land Pollution (45 minutes)**

### **A. Daily Objectives**

1. Concept Objective(s)
  - a. Students will develop an awareness of the importance of protecting the environment.
2. Lesson Content
  - a. Man-made threats to the environment
    - i. Water pollution: industrial waste, run-off from farming
3. Skill Objective(s)
  - a. Students will identify water and land pollution and begin to identify ways to protect the earth and water from pollution.

### **B. Materials**

1. Class set of Ecology packet (Appendix D)
2. Class set of Ecology vocabulary sheet (Appendix C)
3. Pencil for each student
4. Science folder for each student

### **C. Key Vocabulary**

1. Water that is dirty or not pure is called *water pollution*.
2. Land that is polluted and dirty is called *land pollution*.

### **D. Procedures/Activities**

1. Have students retrieve their Ecology vocabulary sheet (Appendix C) and their Ecology packet (Appendix D) and turn to page 11.
2. Remind students, “We have our decomposer experiment going on and we need to write down our observations of it today.” Allow students a few minutes to look at the two Ziploc baggies holding the banana slices from Lesson Five.
3. Tell students, “Under Day 3 observations, write down what you see happening. What color are the bananas? Has anything changed about their shape or size?” Allow students a few minutes to write down their observations.
4. Remind students, “We will write down our observations for five full days so we’ll look at it again tomorrow.”
5. Next, retrieve the air pollution experiment and have students take a close look at the Vaseline on the plastic wrap. They should see bits and pieces of dirt and crud.
6. Have students turn to page 13 of their Ecology packet (Appendix D) and write their observations on the lines on the bottom of the page.
7. Remind students that, “This crud and dirt is in the air we breathe and that doesn’t include the smog and smoke in the air that we can’t see stick to the Vaseline.”
8. Have students turn to page 14 of their Ecology packet (Appendix D).
9. Read the section on water pollution aloud or have a competent student read it aloud to the class.
10. Ask students, “Is there a word we need to define in this section?” Wait for student responses including the correct being yes, water pollution.
11. Write the definition on the board and allow students a few minutes to write the definition on their Ecology vocabulary sheet (Appendix C). Formally assess student participation and accuracy.
12. Discuss the questions at the end with the class, “What are some ways we can help keep our water clean?” Wait for student responses, which may include, not dumping trash in the water, picking up trash out of the water, telling someone if we see businesses or industries dumping trash in the water etc. Informally assess student participation and comprehension throughout this lesson’s discussion.

13. Read the section on page 14 of the Ecology packet (Appendix D) regarding land pollution to the class aloud or have a competent student read it aloud to the class.
  14. Ask students, “Is there a word we need to define in this section?” Wait for student responses including the correct being yes, land pollution.
  15. Write the definition on the board and allow students a few minutes to write the definition on their Ecology vocabulary sheet (Appendix C). Formally assess student participation and accuracy.
  16. Discuss the questions at the end of this section with the class, “What are some ways we can help keep our land clean?” Wait for student responses, which may include, not throwing our trash on the ground, pick up trash from the ground, etc.
  17. Have students return their Ecology packet (Appendix D) and their Ecology vocabulary sheet (Appendix C) to their science folder.
- E. *Assessment/Evaluation*
1. An informal assessment will occur during teacher-led class discussion on the prevention of water and land pollution.
  2. A formal assessment will occur during the students’ assignment of writing definitions on their Ecology vocabulary sheet.

**Lesson Eight: Recycle Me! (45 minutes)**

- A. *Daily Objectives*
1. Concept Objective(s)
    - a. Students will develop an awareness of the importance of protecting the environment.
  2. Lesson Content
    - a. Measures we can take to protect the environment (for example, conservation, recycling)
  3. Skill Objective(s)
    - a. Students will identify ways to recycle and conserve in their homes and schools.
- B. *Materials*
1. Class set Ecology packet (Appendix D)
  2. Class set Ecology vocabulary (Appendix C)
  3. Pencil for each student
  4. Science folder for each student
- C. *Key Vocabulary*
1. *Conserving* means using something carefully and not wasting it.
  2. To treat materials that have been thrown away, in order to use them again is called *recycling*.
- D. *Procedures/Activities*
1. Remind students of their assigned shoebox habitat and its due date. Be sure to answer any questions students may have about its completion.
  2. Have students retrieve their Ecology vocabulary sheet (Appendix C) and their Ecology packet (Appendix D) and turn to page 11.
  3. Remind students, “We have our decomposer experiment going on and we need to write down our observations of it today.” Allow students a few minutes to look at the two Ziploc baggies holding the banana slices from lesson five.
  4. Tell students, “Under Day 4 observations, write down what you see happening. What color are the bananas? Has anything changed about their shape or size?” Allow students a few minutes to write down their observations.

5. Remind students, “We will write down our observations for five full days so we’ll look at it again tomorrow.” Note: the baggie with the yeast will gray and deteriorate quicker than the no yeast baggie.
  6. Now have students turn to page 15 of their Ecology packet (Appendix D).
  7. Read aloud or have a competent student read this page aloud to the class.
  8. Ask students, “Are there any Ecology vocabulary words to define on this page?” Wait for student response including the correct being yes, conservation and recycling.
  9. Write these definitions on the board and allow students a few minutes to write them on their Ecology vocabulary sheets. Assess student participation.
  10. Discuss with the students, “What are some ways you recycle at home? What are some ways we recycle at the school? What are some things we could be doing to recycle?” Wait for student responses. This discussion is meant to stir a call to action within the students to recycle and conserve at home and at school. Remind them to pick up trash at their school when they see it and throw it away and make sure the teacher models this throughout the day. Informally assess student participation and comprehension. The length of this discussion is dependent on time available.
  11. Have students turn to page 16 of their Ecology packet (Appendix D).
  12. Tell students, “You have all come up with some wonderful ways to recycle and conserve and I want to hear ideas from each of you. On page 16 you get to write a paragraph about three things you can do to help protect and clean up the environment. The paragraph must use complete sentences, proper spelling and grammar and be three things you are going to try to do yourself.”
  13. Allow students approximately 15-20 minutes to complete this paragraph.
  14. Have students return their Ecology packet (Appendix D) to their science folder.
  15. Let students know, “You will be taking a final vocabulary test for the Ecology unit so you’ll want to study your vocabulary sheets.” The teacher may want to collect the vocabulary sheets and grade them for completion and accuracy and then announce this test allowing students to take the vocabulary sheet home to study or the teacher may allow time in class for studying depending on available class time.
  16. Use the Recycling Writing Rubric (Appendix E) to grade the students writing.
- E. *Assessment/Evaluation*
1. An informal assessment will occur during the teacher-led class discussion on recycling and conservation opportunities.
  2. A formal assessment will occur during the grading of the Recycling writing assignment on page 16 of the Ecology packet (Appendix D) via the grading rubric (Appendix G).

### **Lesson Nine: Words, Words and More Words**

#### A. *Daily Objectives*

1. Concept Objective(s)
  - a. Students will understand the interactions of organisms within an ecosystem and how fragile the balance of nature is.
2. Lesson Content
  - a. The food chain: producers, consumers, decomposers
  - b. Measures we can take to protect the environment (for example, conservation, recycling)
  - c. Man-made threats to the environment
    - i. Air pollution: emissions, smog

- ii. Water pollution: industrial waste, run-off from farming
- 3. Skill Objective(s)
  - a. Students will identify Ecology vocabulary words and match them with their definition via a crossword puzzle which will serve as a study guide for the final assessment.
- B. *Materials*
  - 1. Class set Ecology packet (Appendix D)
  - 2. Class set Ecology Vocabulary study guide (Appendix H)
  - 3. Pencil for each student
  - 4. Science folder for each student
- C. *Key Vocabulary*  
No new vocabulary words for this lesson
- D. *Procedures/Activities*
  - 1. Remind students of their assigned shoebox habitat and its due date. Be sure to answer any questions students may have about its completion.
  - 2. Have students retrieve their Ecology packet (Appendix D) and turn to page 11.
  - 3. Remind students, “We have our decomposer experiment going on and we need to write down our observations of it today.” Allow students a few minutes to look at the two Ziploc baggies holding the banana slices from lesson five.
  - 4. Tell students, “Under Day 5 observations, write down what you see happening. What color are the bananas? Has anything changed about their shape or size?” Allow students a few minutes to write down their observations.
  - 5. Note: the baggie with the yeast will gray and deteriorate quicker than the no yeast baggie.
  - 6. Have students return their Ecology packet (Appendix D) to their science folder.
  - 7. Remind students, “We are taking our Ecology vocabulary study guide, are there any questions before we begin?” Wait for possible student questions. It is up to the teachers’ discretion, time and student needs if a vocabulary review should be done prior to the delivery of the test.
  - 8. Explain to students, “You will be working individually on this study guide. Don’t forget to write your name at the top.”
  - 9. Pass out the crossword puzzle study guide.
  - 10. Allow students 20-30 minutes to complete it.
  - 11. Collect the vocabulary study guide and grade according to the Ecology vocabulary crossword puzzle answer key (Appendix I).
- E. *Assessment/Evaluation*
  - 1. An informal assessment will occur during students’ observation of the banana/yeast experiment.
  - 2. A formal assessment will occur during students’ final vocabulary crossword study guide.

**Lesson Ten: Final Assessment**

- A. *Daily Objectives*
  - 1. Concept Objective(s)
    - a. Students will understand the interactions of organisms within an ecosystem and how fragile the balance of nature is.
  - 2. Lesson Content
    - a. The food chain: producers, consumers, decomposers
    - b. Measures we can take to protect the environment (for example, conservation, recycling)
    - c. Man-made threats to the environment

- i. Air pollution: emissions, smog
    - ii. Water pollution: industrial waste, run-off from farming
  - 3. Skill Objective(s)
    - a. Students will identify Ecology lessons learned via the Ecology final assessment.
- B. *Materials*
  - 1. Class set Ecology Final Assessment (Appendix L)
  - 2. Ecology Final Assessment Answer Key (Appendix M)
  - 3. Pencil for each student
- C. *Key Vocabulary*  
No new vocabulary words for this lesson
- D. *Procedures/Activities*
  - 1. Remind students of their assigned shoebox habitat and its due date. Be sure to answer any questions students may have about its completion.
  - 2. Remind students, “We are taking our Ecology final assessment (Appendix L), are there any questions before we begin?” Wait for possible student questions. It is up to the teachers’ discretion, time and student needs if a vocabulary review should be done prior to the delivery of the test.
  - 3. Explain to students, “You will be working individually on this final assessment. Don’t forget to write your name at the top.”
  - 4. Pass out the final assessment.
  - 5. Allow students 20-30 minutes to complete it.
  - 6. Collect the final assessment and grade according to the Ecology final assessment answer key (Appendix M).
- E. *Assessment/Evaluation*
  - 1. A formal assessment will occur during students’ ecology final assessment.

## VI. CULMINATING ACTIVITY

- A. Overview: The Culminating Activity consists of the creation of a shoebox habitat by each student. The student picks the habitat they would like to create from the instruction sheet (Appendix E) and assembles it at home without parental assistance. The student also answers five questions based on the habitat they have chosen. Teachers, please stress the need for students to use supplies they currently have. It is not necessary for students to purchase materials for this project. Also, because this project will take at least a week (including two weekends) for the student to complete, be sure to assign it early in the unit and remind students of its due date often.
- B. Before passing out the instructions for the shoebox habitat, read them aloud to the class. The students tend to pay attention better if they are not reading the paper on their own while you are trying to explain the project.
- C. Ask students, “Are there any questions?” Respond to student questions.
- D. Pass out the shoebox habitat assignment sheet and questionnaire (Appendix E).
- E. Have students write their name at the top of both the assignment sheet and the questionnaire.
- F. Have students fill in the due date on the line at the bottom of the page.
- G. It is up to the teacher if they will allow a box of the same size as a shoebox to be used if a shoebox is not available. We just don’t want huge projects being turned in.
- H. On the date the project is due, have students put their project and their questionnaire on their desk approximately 20 minutes before a recess period.
- I. Allow students to rotate throughout the room looking at each other’s projects, reminding them not to touch with their hands, but look with their eyes.

- J. The teacher will also mingle throughout the classroom with a class set of the shoebox habitat grading sheet.
- K. At this time, the teacher can begin grading the students work and continue during the recess period once students have left the classroom.
- L. The teacher can return the habitats and questionnaire to the students and give them their grading sheet once it has been recorded.
- M. This is a great opportunity for other grades or classrooms to come in and see the fine work your class has created if the opportunity to invite them in permits itself.

## VII. HANDOUTS/WORKSHEETS

- A. Appendix A: Ecology Pre-assessment (Lesson One)
- B. Appendix B: Ecology Pre-assessment Answer Key (Lesson One)
- C. Appendix C: Ecology Vocabulary Sheet (Lesson One – Four, Six - Eight)
- D. Appendix D: Ecology Packet (Lesson Two – Nine)
- E. Appendix E: Shoebox Habitat Assignment (Lesson Four, Culminating Activity)
- F. Appendix F: Shoebox Habitat Grading Sheet Lesson (Culminating Activity)
- G. Appendix G: Clean Up Environment Writing Rubric (Lesson Nine)
- H. Appendix H: Ecology Vocabulary Crossword Puzzle (Lesson Nine)
- I. Appendix I: Ecology Vocabulary Crossword Puzzle Answer Key (Lesson Nine)
- J. Appendix J: Ecology Word Search – Optional Activity (Optional)
- K. Appendix K: Ecology Word Search – Optional Activity / Answer Key (Optional)
- L. Appendix L: Ecology Final Assessment
- M. Appendix M: Ecology Final Assessment Answer Key

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# FOOD CHAINS-HABITATS-ECOLOGY PRE-ASSESSMENT

NAME \_\_\_\_\_

1. What is a habitat?

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2. What four things are needed to have a balance of nature?

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

3. Describe an urban habitat.

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4. Describe a wetland habitat.

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5. Describe a coral reef habitat.

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Appendix A, page 2

Match these words with the definitions below. You will use each word once.  
Spelling counts.

PRODUCER      CONSUMER      DECOMPOSER  
CARNIVORE      OMNIVORE      HERBIVORE

A(n) \_\_\_\_\_ is a plant and makes its own food.

A(n) \_\_\_\_\_ is not a plant and can't make its own food.

A(n) \_\_\_\_\_ eats dead plants and animals.

A(n) \_\_\_\_\_ eats only meat.

A(n) \_\_\_\_\_ eats only plants.

A(n) \_\_\_\_\_ eats both plants and animals.

6. What is water pollution?

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7. What is air pollution?

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8. What are three things you can do to help prevent pollution?

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

9. What is a food chain?

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**Appendix A, page 3**

10. Use the space below to draw a picture (using arrows) of a food chain and label it.

## FOOD CHAINS-HABITATS-ECOLOGY PRE-ASSESSMENT ANSWER KEY

- 1. What is a habitat?**  
A habitat is where a plant or animal lives.
- 2. What four things are needed to have a balance of nature?**
  1. Food
  2. Water
  3. Space
  4. Shelter
- 3. Describe an urban habitat.**  
An urban habitat is in a city amongst trees, houses, and buildings.
- 4. Describe a wetland habitat.**  
A wetland habitat is a grassy place covered with water.
- 5. Describe a coral reef habitat.**  
A coral reef habitat is a habitat with clean water, fish, and coral.

**Match these words with the definitions below. You will use each one once. Spelling counts.**

PRODUCER      CONSUMER      DECOMPOSER  
CARNIVORE      OMNIVORE      HERBIVORE

A PRODUCER is a plant that makes its own food.

A CONSUMER is not a plant and cannot make its own food.

A DECOMPOSER eats dead plants and animals.

A CARNIVORE eats only meat.

An HERBIVORE eats only plants.

An OMNIVORE eats both meats and plants.

**Appendix B, page 2**

6. **What is water pollution?**  
Water pollution is when harmful liquids, solids, or gases get into the water. This is harmful to plants and animals that use the water.
7. **What is air pollution?**  
Harmful gases being put into the air causes air pollution. This air is dangerous to plants and animals.
8. **What are three things you can do to help prevent pollution?**
  1. Put trash where it belongs
  2. Recycle
  3. Ride a bike or walk instead of using a car
  4. Turn off the lights when we don't need them
  5. Don't leave the water running
  6. Etc.
9. **What is a food chain?**  
A food chain is a series of plants and animals that are linked together because they feed on each other.
10. **Use the space below to draw a picture (using arrows) of a food chain and label it.**

Answers may vary but should include a producer and consumer and no less than three steps in the food chain.

Appendix C  
**ECOLOGY VOCABULARY SHEET**

Food chain: \_\_\_\_\_

Producer: \_\_\_\_\_

Consumer: \_\_\_\_\_

Decomposer: \_\_\_\_\_

Habitat: \_\_\_\_\_

Herbivore: \_\_\_\_\_

Carnivore: \_\_\_\_\_

Omnivore: \_\_\_\_\_

Air pollution: \_\_\_\_\_

Smog: \_\_\_\_\_

Emissions: \_\_\_\_\_

Land pollution: \_\_\_\_\_

Water pollution: \_\_\_\_\_

Conservation: \_\_\_\_\_

Recycle: \_\_\_\_\_

# Habitats Ecology and Food Chains

Name \_\_\_\_\_

## THE BALANCE OF NATURE

In order to stay healthy, nature has to stay in balance. Nature would be unhealthy if only one kind of creature lived in it. For example, if suddenly there were only animals in the world and not plants, the plant-eating animals would start to die because they would have nothing to eat. Soon those animals that would normally eat the plant-eating animals would have nothing to eat and they would die, too. There would quickly be no living creatures at all. For nature to stay healthy, no one part can be allowed to disappear and make nature lose its balance.

But nature is always changing. So how does it keep in balance? The balance in nature depends on three groups of creatures that form a circular chain that goes around and around. One group is called producers, another is called consumers, and the third is called decomposers. The producers are plants that make their own food. The consumers are animals that eat it. When the plants and animals die, the decomposers are bacteria and fungi that turn the dead matter into material that will be used by the producers and the cycle begins again. The food chain cycles over and over and over again and keeps nature in balance.

Here's how it works. Plants are producers. They capture energy from sunlight and use it, as well as chemicals from the air and soil to make food.

Animals do not produce their own food from light and chemicals. They have to eat either plants or other animals that have already eaten plants. The energy and chemicals from the plants pass on to the animals. Because animals eat or consume living things, we call them consumers.

Finally, when plants and animals die, they provide food for another group, bacteria and fungi. Bacteria and fungi are called decomposers because they decompose (or break up) the dead animal or plant and turn it back into the chemicals that the plant uses in the

The facts contained on this page come from *What Your 3<sup>rd</sup> Grader Needs to Know* by E.D. Hirsch.

Appendix D, page 3

first place. When the chemicals go back into the soil and the air, the plants start the cycle again! This cycle just keeps going and going.

In a food chain, one thing provides food for another. The arrows show how something becomes food for something else.

Study this example of a food chain.



Write three sentences that tell the steps in this food chain and include the word producer and consumer.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_

Now draw a food chain as described below:

The carrot grows in the ground.	The carrot becomes food for the rabbit.	The rabbit becomes food for the snake.	The snake becomes food for the hawk.
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The facts contained on this page come from *What Your 3<sup>rd</sup> Grader Needs to Know* by E.D. Hirsch.

## Exploring Habitats

A habitat is the area where a plant or an animal naturally grows and lives. What habitat do you live in? Read about the following habitats and decide.

### A Forest Habitat

A forest habitat is a large area of land where many plants and trees grow. There are different kinds of forests throughout the world and each has its own special characteristics. Climate, soil, and water determine the kinds of plants and animals that can live in a forest.

In the forest, there are several layers of plants. Trees are the tallest. The world's forests consist mostly of broadleaf and needle leaf trees. Maples, poplars, beeches and oaks are some types of broadleaf trees. Their leaves are broad and flat and most shed their leaves in the fall and grow new leaves each spring. Needle leaf trees, like pines, hemlocks and cedars have needlelike or scale like leaves, and most remain green all year round. The spreading branches of these tall trees form a canopy. The small trees, such as dogwoods and hollies grow between their trunks forming the understory. Below that is the shrub layer where sassafras or a sumac shrub might grow. The herb layer is next, where ferns, grasses, wildflowers, and other soft-stemmed plants grow. Mosses, leaves and twigs cover the forest floor.

A forest provides food and shelter for many kinds of spiders, insects, birds, mammals, reptiles, and amphibians. Some animals can be seen during the day and others only at night. During the day, deer nibble on the leaves and branches of the shrub layer. Squirrels run along the branches of the understory and canopy trees. Hawks glide and fly through the air, diving quickly down to the forest floor to capture animals. Woodchucks eat grasses in the herb layer and snakes slither among the litter of the forest floor in search of frogs, or salamanders. At night, owls soar from the canopy trees in search of food. Mice run along the forest floor looking for tiny seeds, fruits and insects to eat. Raccoons emerge from their nests in hollows of trees, and frogs hop from their nests among the thick vegetation to search for food.

Is this the habitat you live in? Have you ever visited this habitat?

The facts contained on this page come from *Ecology* by Steve Pollock and *Science Horizons* by Mallinson, Froschauer, Harris, Lewis and Valentino.

## A Desert Habitat

Deserts occupy one-seventh of the earth's surface and all of them have one thing in common: They are all dry. All deserts have a lack of water. During the day, air temperatures in a desert may soar above 100 degrees (F). Because there are no clouds to trap the heat near the ground, the nighttime can be very cold.

Plants have to survive in the desert without much water. A cactus, for instance, will store water after a heavy rain. Just as plants have adapted in a special way to survive in the desert, so have the animals. A woodpecker makes its home in the waterproof hole in a cactus. Its feathers protect it against the heat of the desert. Most birds feed during the cooler early-morning or early-evening hours and go where there is shade during the hotter part of the day. Some smaller desert animals, such as rodents, rarely drink. They get all the water they need from the seeds and stems they eat. Other animals, such as snakes and lizards, get their water from the animals upon which they prey.

Deserts are very different from other habitats and have some of the most beautiful landscapes in the world. The dessert may look dry and dead but for those who look closely, the desert is alive with amazing creatures and plant life.

Is this the habitat you live in? Have you ever visited this habitat?

The facts contained on this page come from *Deserts* by Seymour Simon and *Ecology* by Steve Pollock.

## An Urban Habitat

Many people think cities are just places where people live and work, but plants and animals live in cities, too. Cities are urban habitats. They are built in areas where wildlife used to be. When people moved in, much of the wildlife moved out, but even in a city, some living things find everything they need to live.

An urban habitat is home to many animals. Birds like pigeons and starlings nest on the tall buildings. Mice and rats build their nests in or near these buildings. Squirrels, rabbits, and opossums make their homes in the wide, open spaces of the city parts. Even shy animals like foxes and raccoons search for food in the neighborhood garbage cans at night. The most popular city animals are the ones that live in the peoples' homes - cats, dogs and other animal pets.

About one-third of an urban area is covered with trees, shrubs, grass and other kinds of natural plant life. Trees can be planted along streets, in parks and in yards. Some cities hire arborists, or tree specialists, to plan what types of trees will be planted in the city and where they will be planted because of the limited space. Trees and plants provide homes and food for animals, so the more plant life a city has, the more animals that are able to live there.

Is this the habitat you live in? Do you know anyone who lives in this habitat?



The facts contained on this page come from *Science Horizons* by Mallinson, Froschauer, Harris, Lewis and Valentino.

## A Wetland Habitat

A wetland is a place where the water controls the environment and the plant and animal life. They are a place where the ground is wet or covered with water for most of the year. For many years, people did not realize the importance of the wetlands. They were drained and used for farmland or made into cities. But the wetlands are valuable. They help prevent floods by storing large amounts of water and they provide plants and animals with places to live. Today people understand that the wetlands are important and must be protected. There are laws to protect the wetlands from being destroyed.

The wetlands are rich in animal life. Since these areas are covered with water, many fish and amphibians (frogs, toads, salamanders, etc.) live in them. At least 200 kinds of fish depend on the wetlands for survival, as well as about 150 kinds of birds. Muskrats, otters, raccoons, bobcats, black bears, and deer are all found in the wetlands as well. At least one-third of America's threatened or endangered animals live in wetland areas.

Plants are very important to the wetlands. They help stabilize the soil, produce oxygen, and provide homes and food for the animals. Cattails, sedges, rushes, arrowhead and mangroves are common wetland plants that stand in the water. Water lilies seem to float on top of ponds, but they are really rooted in the mud at the bottom. Algae (very simple green plants) form a green carpet over the top of the water. Marsh marigolds, irises and other flowers grow along the edges of the water.

Unfortunately, in some areas, almost 50 percent of the trees have been destroyed. In the United States, they were cut to give people easy access to the ocean. Once the wetlands are lost, it is expensive to replace them, so we need to be careful and protect them.

Is this the habitat you live in? Have you ever visited this habitat?

The facts contained on this page come from *Wetlands* by Emilie U. Lepthien and Joan Kalbacken.

## The Coral Reef Habitat

Coral reefs are like rainbow-colored cities living in the warm, clear oceans around the world.

For hundreds of years, people thought that coral was a type of plant. Amazingly, coral reefs are actually formed by tiny animals called coral polyps. Each little coral animal looks like a flower growing from a stony pot. Hundreds, sometimes thousands, of small coral animals lock together in fantastic shapes that look like branches, horns of a deer or huge mounds that look like giant brains. Most coral polyps stay within their protective skeletons during the day. At night, fingerlike tentacles emerge from the skeleton and pull tiny animals into the coral's mouth. When the coral polyps die, their skeletons remain in place. New polyps make their homes on the rocky foundations of the skeletons. In this way, the reef grows larger and larger.

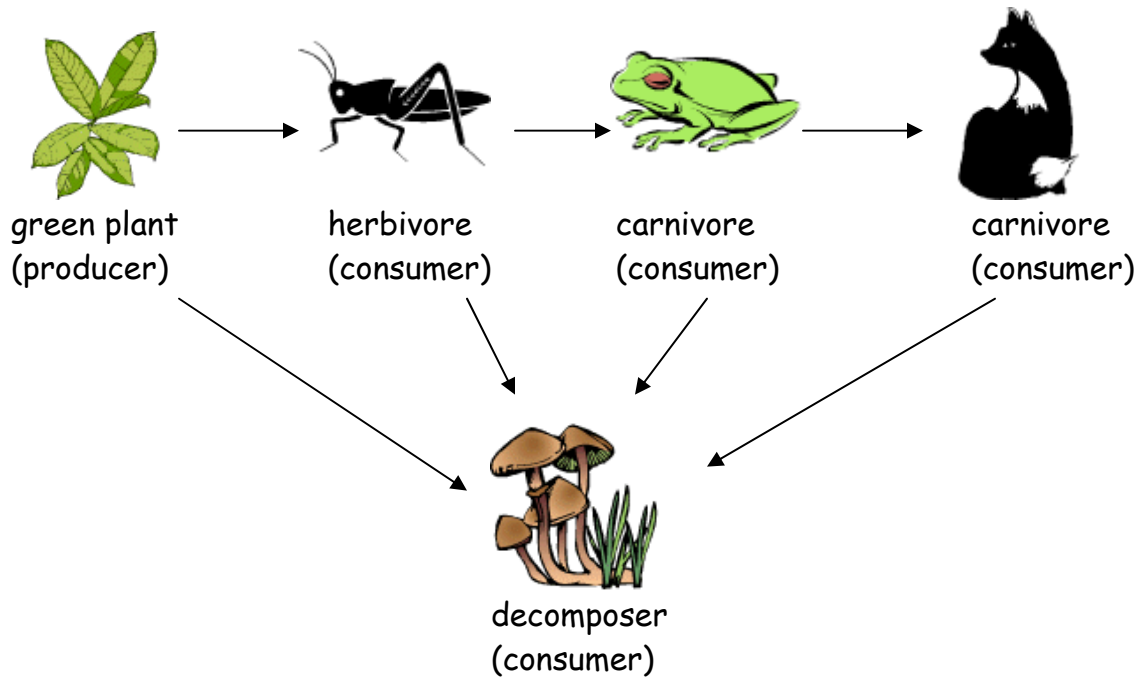
Every bit of space on a coral reef is taken up by millions of living things. Sponges, clams, snails, octopuses and squids can all be seen living on or around the coral reefs. Animals of amazing colors and shapes like the sea star, hermit crab, parrotfish and angelfish live here, too. Big, toothy barracudas, sleek sharks, large snappers and moray animals feed on their prey by the coral reefs.

Many people come to the coral reefs to snorkel or scuba dive and explore the beauty of the reef. Unfortunately, some people damage the reefs by handling the coral. It may take hundreds of years for a reef to restore itself after a careless person damages it.

Is this the habitat you live in? Have you ever visited this habitat?

The facts contained on this page come from *Coral Reefs* by Sylvia A. Earle.

## Follow the Food Chain



All living things need energy from food. Green plants are the only living things that can make their own food. For that reason, they are called producers. Animals are consumers because they eat plants or other animals to get their energy. Decomposers are consumers that break down dead plants and animals. They return materials stored in dead plants and animals to the soil, water, and air. Then green plants use these materials to make food.

A food chain always begins with a producer. The first consumer in a food chain is an herbivore (an animal that eats only plants). The next consumer is a carnivore (an animal that eats only other animals). A carnivore may be eaten by a larger carnivore. A food chain sometimes includes a consumer that is an omnivore (an animal that eats both plants and animals).

The facts contained on this page come from *Ecology* by Steve Pollock.

Answer each riddle below with one of the underlined words. Use each word once.

1. I am a fungus. I bread down dead plants and animals. What am I? \_\_\_\_\_
2. I am a tree. I make my own food. What am I? \_\_\_\_\_
3. I am a living thing that cannot make food. What am I? \_\_\_\_\_
4. I am a bear. I eat berries and fish. What am I? \_\_\_\_\_
5. I am a moose. I eat grass, leaves, and twigs. What am I? \_\_\_\_\_
6. I am a wolf. I eat mice and rabbits. What am I? \_\_\_\_\_

## Decomposers

### Background Information

Decomposers are a group of organisms (bacteria and fungi) that do us a huge favor. They get rid of all of the organic (natural) garbage that humans, animals and plants produce. They eat, digest, munch and generally reuse all of the dead plants and animals that are on the Earth. Once that stuff is all ground up, they put it all back into the air and soil so that we can use the nutrients and raw chemicals again. Decomposers are the last step in the food chain. If we didn't have these critters, we'd be up to our eyeballs in dead leaves and animal bones.

### The Question

The Yeast (bacteria) and the Banana (plant) get into a fight. Who wins?

### Materials

Kids (per group)  
Two Ziploc baggies  
Two banana slices  
One Yeast packet  
Masking tape  
Pen

### Procedure

1. Write the words "yeast" and "no yeast" on the tape and put one label on each baggie.
2. Put a slice of banana into each baggie.
3. Add a pinch of yeast to the baggie that has the "yeast" label and seal both baggies. (CAUTION! Keep the baggie sealed!)
4. Observe the baggies for five days and record your observations on your lab data sheet. When you are all done with the activity, do not open the baggie. It is hard to guess what you might be growing inside there, but chances are that it is not good for your health!

The experiment contained on this page comes from *Teacher Edition 3<sup>rd</sup> Grade* by Academy of Charter Schools.

# Decomposers Experiment

## Data and observations

Day	Observations
1	
2	
3	
4	
5	

## Questions

1. What was the difference between the two baggies?

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2. What was causing this change?

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3. Who won? \_\_\_\_\_

4. What do decomposers do?

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The experiment contained on this page comes from *Teacher Edition 3<sup>rd</sup> Grade* by Academy of Charter Schools.

## Air Pollution

Air is one of nature's greatest treasures. It forms a layer less than twenty miles deep that circles the earth. Animals and plants need this layer of air to live. Without air, all living things would die. When the air is dirty or not pure it becomes polluted. Have you ever smelled the exhaust that comes out of a car or truck or school bus? Have you ever seen thick smoke pouring out of a chimney on a house or out of a factory smokestack?

All this exhaust and smoke contains unhealthy chemicals that pollute the air. Polluted air contains a lot of human-made material, including dust and chemicals that are bad for plants and animals to breathe. Besides being unhealthy for plants and animals, air pollution upsets the balance of nature.

Can you think of some other causes of air pollution? Major sources are factories and cars. Big cities have a serious problem because there are so many people driving cars, trucks, and buses. The emissions from these vehicles contain unhealthy chemicals (emissions are what cars and other vehicles put in the air as a result of burning fuel in their engines). On some days, these emissions can turn the air dark and cloudy. This dark, cloudy air is called smog. Smog can be annoying, and it can even be dangerous. If people breathe in too much smog, they can get lung disease.

We can all do our share to reduce air pollution. We can, when possible, ride a bike or walk instead of using a car. We can turn off the lights when we don't need them. Lights use electricity, and electricity is often made by burning fuels. Since burning fuels causes air pollution, we can cause less to be burned by switching off the lights.

How else can we protect our air and keep it clean?

The facts contained on this page come from *Air Pollution* by Mary Ellen Snodgrass and *What Your 3<sup>rd</sup> Grader Needs to Know* by E.D. Hirsch Jr.

# Air Pollution Experiment

## Background Information

Much of the air pollution that we see in the sky is called particulate matter. It is chunks of crud floating in the air. Just how much crud there is is a little surprising.

## The Question

How dirty is the air that you breathe?

## Materials

Kids (per group)

One wood block (2" x 2" x 6")

Masking tape

One plastic sheet (2" x 2" x 6")

Teacher

Petroleum jelly (Vaseline)

Three plastic sheets (clear)

## Procedure

1. Examine your plastic sheet and make a mental note of how clean it is.
2. Smear the sheet of plastic with a thin layer of Vaseline.
3. Roll a piece of tape into a loop with the sticky side out. Put the loop of tape on the bottom of the plastic sheet and then stick the tape and plastic sheet to the wooden block.
4. Put the block outside for a 24-hour period to collect the junk in the air.
5. Bring the plastic sheet inside and observe what you see. Record your results

## Data and Observations

Describe what your sheet looked like after 24 hours.

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The experiment contained on this page comes from *Teacher Edition 3<sup>rd</sup> Grade* by Academy of Charter Schools.

## Water Pollution

The health of the Earth depends on a supply of clean water. Without water, people could not live and animals and plants would also die. Three-fourths of the earth's surface is made up of water. The earth needs water to exist. People and other living things depend on the water. It helps trees and green plants to make food. Water gives fish, frogs, toads, and many types of plants an environment in which to live. Without water, the world would be filled with rocks, deserts, mountains, and little else.

The greatest threat to the Earth's water supply is people. Major causes of water pollution are factories. Today, energy comes from a variety of sources - gas, oil, coal, electricity, steam and solar energy and many of these sources of energy pollute the water. Some large factories, paper mills, and oil refineries dump their waste into streams and rivers. Businesses and cities often haul their garbage and other solid wastes out to sea and dump them. However, the sea is filled with living animals and plants and this causes problems for their homes and food sources.

Individual people endanger themselves by polluting the water around them. They dump garbage and waste into every ocean, river, and stream on the planet. The chemicals and trash we put into the water suffocates fish and causes their eggs to be smothered. It is also harmful for people and other creatures to drink the polluted water. What are some ways we can help keep our water clean?

## Land Pollution

The earth is our home and to maintain life, it must have healthy soil. Unfortunately, much of the Earth's land is not healthy. Waste and chemicals from many sources create hazards for human and plant life. One serious source of pollution is deliberate dumping. Many factories and businesses make dangerous chemical wastes, which they dump into the earth. Laws are made to prevent this, but it still happens. City dumps are a cause of much pollution as well. Also, the waste that is dumped into the oceans washes up on the shores and pollutes beaches.

A serious form of land pollution is caused by overcrowding in cities. When too many people live close together, they create more body wastes, garbage and trash than can be safely disposed of. People cause another problem by constantly demanding more things. The more we buy, the more garbage it creates. What are some ways we can help keep our land clean?

The facts contained on this page come from *Land Pollution* and *Water Pollution* by Mary Ellen Snodgrass.

## Conserving and Recycling

Conserving means using something carefully and not wasting it. Conserving is more than just making sure you don't leave the bathroom faucet dripping. It means understanding that we have to be careful about how we use all of the resources that nature offers us.

For a long time in this country, not much thought was given to conserving natural resources. People acted as though they would never run out of anything in nature; there would always be more than enough oil and trees and clean water and good land. But now we've started to understand that we can run out of natural resources unless we use them carefully.

Are you doing anything at your home or school to conserve natural resources? Perhaps your school is saving energy by using a little less heat in the winter. Find out if your school or town has a recycling program. When you recycle something, instead of throwing it away it can be used again. If you drink juice or soda from aluminum can, you could throw the can away, which would be a waste, or you could recycle it. The aluminum will be cleaned, combined with other recycled cans, and re-formed into the new cans. Does your school have a special container to collect aluminum cans so they can be taken to a recycling center?

Lots of stuff can be recycled: aluminum cans, glass bottles, newspapers, grocery bags, cardboard, and even some kinds of plastic. Recycling conserves natural resources. It helps keep the balance of nature by making sure we don't use up too much of what nature has to offer.

Recycling can even help reduce air and water pollution. If you recycle glass and aluminum containers, then factories won't have to burn as much fuel to make new containers. If a factory burns less fuel, then it will put fewer unhealthy chemicals in the air and water.

Through waste and carelessness, people have upset the balance of nature. But through conserving and recycling and thinking about how humans fit into the balance of nature, people are helping to restore it. Let's hope we succeed.

The facts contained on this page come from *What Your 3<sup>rd</sup> Grader Needs to Know* by E.D. Hirsch Jr.



## 3<sup>rd</sup> Grade

# Shoebox Habitat

We have been studying different types of habitats. In this project, you will create one of the habitats in a shoebox. Below is a list of items that must be included and a list of optional materials that you may use to make your "shoebox habitat."

You may choose to make one of the following habitats:

Forest

Urban

Wetlands

Desert

Coral Reef

### Required Materials:

Shoebox

Name on the lid of the box

Type of habitat you made on the lid of the box

Soil (dirt for forest, sand for desert, etc.)

Animals that live in the habitat

Plants that live in the habitat

### Optional Materials:

Paper            markers

Crayons        pencils

Sand            plastic baggies

Dirt            waxed paper

Rocks          tinfoil

Clay            toothpicks

Water          grass

Have FUN with this project! Be creative when deciding how you will make your "shoebox habitat." You may use any of the above materials and more! This project is due \_\_\_\_\_.



**Appendix F**

## Shoebox Habitat Rubric

Student Name: \_\_\_\_\_

<b>CATEGORY</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>Habitat</b>	Chose only one of the five habitats learned about in the unit.	Chose more than one habitat learned about in the unit.	Did not choose one of the habitats learned about in the unit.
<b>Animals</b>	Animals indigenous to this habitat were chosen and placed in the habitat.	Animals indigenous to another habitat were chosen and placed in the habitat.	No animals were placed in the habitat.
<b>Plants</b>	Plants indigenous to this habitat were chosen and placed in the habitat.	Plants indigenous to another habitat were chosen and placed in the habitat.	No plants were placed in the habitat.
<b>Questions</b>	Student answered questions 1-5.	Student answered 3 of the 5 questions.	Student answered 1-2 of the questions.
<b>Effort and Creativity</b>	Student showed exceptional effort and creativity in the completion of their habitat.	Student showed some effort and/or creativity in the completion of their habitat.	Student showed little or no effort and/or creativity in the completion of their habitat.

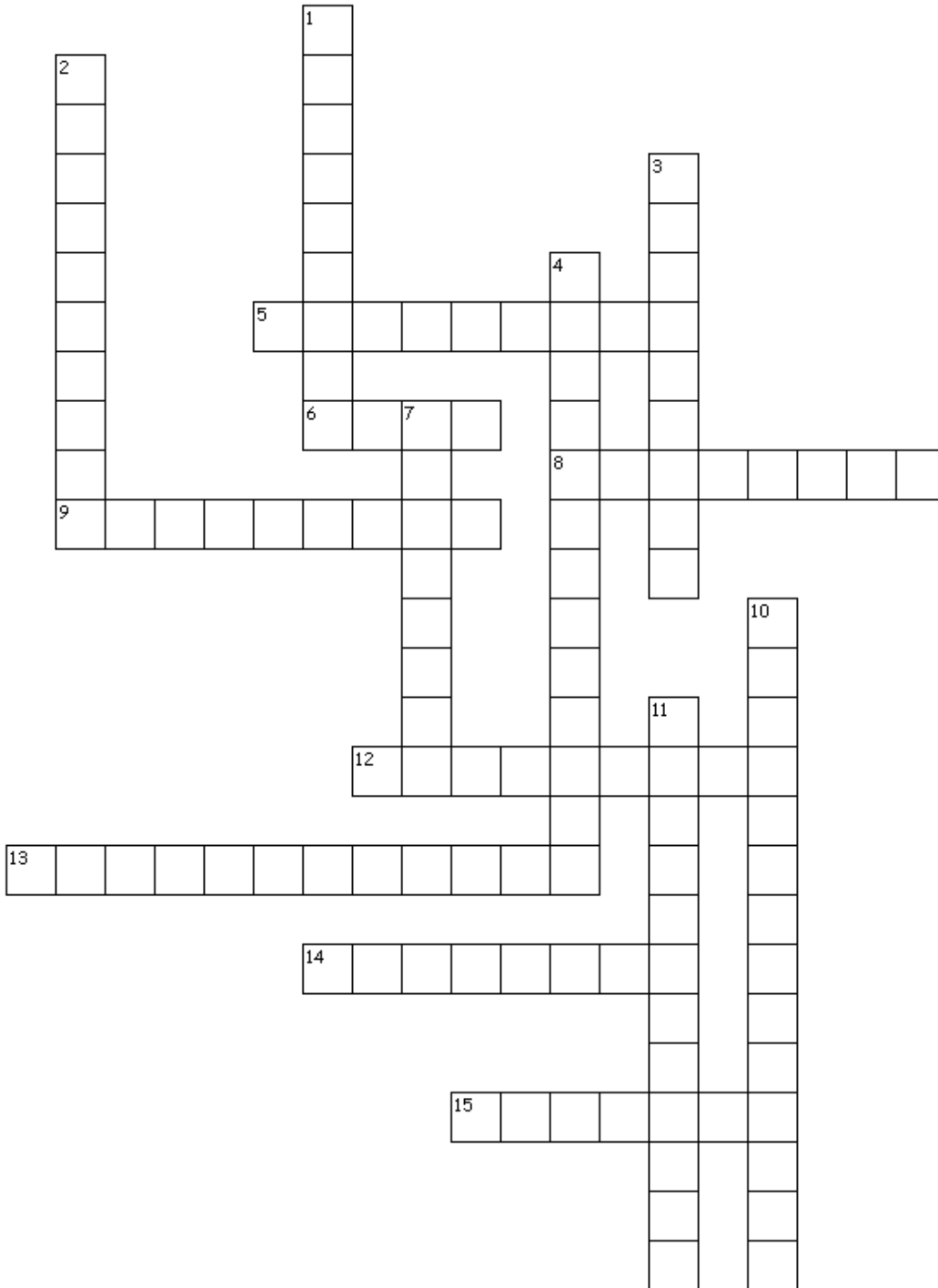
Appendix G

## Clean up the Environment Writing Rubric

Student Name: \_\_\_\_\_

CATEGORY	4	3	2	1
<b>Topic Sentence</b>	Excellent topic sentence, which accurately describes the paragraph topic.	Good topic sentence, which describes the paragraph topic.	The topic sentence somewhat reflects the paragraph topic.	The topic sentence does not reflect the paragraph topic.
<b>Focus on Topic (Content)</b>	There is one clear, well-focused topic. Main idea stands out and is supported by three items of detailed information.	Main idea is clear but the supporting information is general.	Main idea is somewhat clear but there is a need for more supporting information.	The main idea is not clear. There is a seemingly random collection of information.
<b>Grammar and Spelling (Conventions)</b>	Writer makes no errors in grammar or spelling that distract the reader from the content.	Writer makes one-two errors in grammar or spelling that distract the reader from the content.	Writer makes three-four errors in grammar or spelling that distract the reader from the content.	Writer makes more than four errors in grammar or spelling that distract the reader from the content.
<b>Conclusion (Organization)</b>	The conclusion is strong and leaves the reader with a feeling that they understand what the writer is "getting at."	The conclusion is recognizable and ties up almost all the loose ends.	The conclusion is recognizable, but does not tie up several loose ends.	There is no clear conclusion, the paper just ends.

# Ecology Crossword Puzzle



Appendix H, page 2

**Across**

5. a series of plants and animals that are linked together because they feed on each other
6. fog mixed with smoke
8. a plant that makes its own food
9. to treat materials that have been thrown away, in order to use them again
12. eats only plants
13. air that is dirty or not pure
14. an animal that eats the food
15. area where a plant or animal naturally grows and lives

**Down**

1. what comes out of your car's exhaust
2. eats dead plants and animals
3. eats only meat
4. land that is polluted and dirty
7. eats both meats and plants
10. water that is dirty or not pure
11. careful use and protection of natural resources

Appendix I  
**Ecology Crossword Puzzle Answer Key**

**Across**

- 5. food chain
- 6. smog
- 8. producer
- 9. recycle
- 12. herbivore
- 13. air pollution
- 14. consumer
- 15. habitat

**Down**

- 1. emissions
- 2. decomposer
- 3. carnivore
- 4. land pollution
- 7. omnivore
- 10. water pollution
- 11. conservation

Appendix J  
Ecology Word Search

J O B C A A L V O Q C H Y E E H V F P T Z  
 S C R I A I N Y I R Z A R Z K S I U Q G Y  
 N B E F K R E U U P T B B J U B M R Q U J  
 O C S C O P N H E R B I V O R E F U K C X  
 I J O S P O V I X G K T U K E R R Z E N V  
 S T P N S L D H V Q I A D T C O K Q K M I  
 S M M W S L B C T O C T C O U V E U N B G  
 I H O X H U U S H R R S K W D I G C U R B  
 M Z C G K T M Y D A R E C L O N V T I B M  
 E Y E M U I Y E U P I U A J R M Q F X Y A  
 L Q D N K O T W R Y V N R J P O Q E W I Y  
 F A S J H N N A D O D Z M E Y N L A H Q W  
 Y C G N P U F W Q P U D C L Z A S T O Z L  
 R E U J T Q X V O V X P A F G W S X X C L  
 P N O I T U L L O P R E T A W E C S S I Z  
 R J C H F Y L Q W V A O C H M W X C G T V  
 O F L F O U H D J A S J T F V M C N T R W  
 Y P F T T F E T V R N S V L B E U N F Y Q  
 Y S F I T W W N U B C B H K V V Y D M O U  
 W A O C D K O B W M Y M W G W T U F I E B  
 Y N X N T M J L N K M W R J T J T B X I V

AIR POLLUTION  
EMISSIONS  
OMNIVORE  
WATER POLLUTION

CARNIVORE  
FOOD CHAIN  
PRODUCER

CONSUMER  
HABITAT  
SMOG

DECOMPOSER  
HERBIVORE  
LAND POLLUTION

Appendix K

Ecology Word Search Answer Key

J	O	B	C	A	A	L	V	O	Q	C	H	Y	E	E	H	V	F	P	T	Z
S	C	R	I	A	I	N	Y	I	R	Z	A	R	Z	K	S	I	U	Q	G	Y
N	B	E	F	K	R	E	U	U	P	T	B	B	J	U	B	M	R	Q	U	J
O	C	S	C	O	P	N	H	E	R	B	I	V	O	R	E	F	U	K	C	X
I	J	O	S	P	O	V	I	X	G	K	T	U	K	E	R	R	Z	E	N	V
S	T	P	N	S	L	D	H	V	Q	I	A	D	T	C	O	K	Q	K	M	I
S	M	M	W	S	L	B	C	T	O	C	T	C	O	U	V	E	U	N	B	G
I	H	O	X	H	U	U	S	H	R	R	S	K	W	D	I	G	C	U	R	B
M	Z	C	G	K	T	M	Y	D	A	R	E	C	L	O	N	V	T	I	B	M
E	Y	E	M	U	I	Y	E	U	P	I	U	A	J	R	M	Q	F	X	Y	A
L	Q	D	N	K	O	T	W	R	Y	V	N	R	J	P	O	Q	E	W	I	Y
F	A	S	J	H	N	N	A	D	O	D	Z	M	E	Y	N	L	A	H	Q	W
Y	C	G	N	P	U	F	W	Q	P	U	D	C	L	Z	A	S	T	O	Z	L
R	E	U	J	T	Q	X	V	O	V	X	P	A	F	G	W	S	X	X	C	L
P	N	O	I	T	U	L	L	O	P	R	E	T	A	W	E	C	S	S	I	Z
R	J	C	H	F	Y	L	Q	W	V	A	O	C	H	M	W	X	C	G	T	V
O	F	L	F	O	U	H	D	J	A	S	J	T	F	V	M	C	N	T	R	W
Y	P	F	T	T	F	E	T	V	R	N	S	V	L	B	E	U	N	F	Y	Q
Y	S	F	I	T	W	W	N	U	B	C	B	H	K	V	V	Y	D	M	O	U
W	A	O	C	D	K	O	B	W	M	Y	M	W	G	W	T	U	F	I	E	B
Y	N	X	N	T	M	J	L	N	K	M	W	R	J	T	J	T	B	X	I	V

# FOOD CHAINS-HABITATS-ECOLOGY ASSESSMENT

NAME \_\_\_\_\_

1. What is a habitat?

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2. What four things are needed to have a balance of nature?

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

3. Describe an urban habitat.

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4. Describe a wetland habitat.

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5. Describe a coral reef habitat.

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Appendix L, page 2

Match these words with the definitions below. You will use each word once.  
Spelling counts.

PRODUCER      CONSUMER      DECOMPOSER  
CARNIVORE      OMNIVORE      HERBIVORE

- A(n) \_\_\_\_\_ is a plant and makes its own food.
- A(n) \_\_\_\_\_ is not a plant and can't make its own food.
- A(n) \_\_\_\_\_ eats dead plants and animals.
- A(n) \_\_\_\_\_ eats only meat.
- A(n) \_\_\_\_\_ eats only plants.
- A(n) \_\_\_\_\_ eats both plants and animals.

6. What is water pollution?

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7. What is air pollution?

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8. What are three things you can do to help prevent pollution?

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_

9. What is a food chain?

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**Appendix L, page 3**

10. Use the space below to draw a picture (using arrows) of a food chain and label it.

## **FOOD CHAINS-HABITATS-ECOLOGY ASSESSMENT ANSWER KEY**

1. **What is a habitat?**  
A habitat is where a plant or animal lives.
  
2. **What four things are needed to have a balance of nature?**
  5. Food
  6. Water
  7. Space
  8. Shelter
  
3. **Describe an urban habitat.**  
An urban habitat is in a city amongst trees, houses, and buildings.
  
4. **Describe a wetland habitat.**  
A wetland habitat is a grassy place covered with water.
  
5. **Describe a coral reef habitat.**  
A coral reef habitat is a habitat with clean water, fish, and coral.

**Match these words with the definitions below. You will use each one once. Spelling counts.**

PRODUCER      CONSUMER      DECOMPOSER  
CARNIVORE      OMNIVORE      HERBIVORE

- A PRODUCER is a plant that makes its own food.  
A CONSUMER is not a plant and cannot make its own food.  
A DECOMPOSER eats dead plants and animals.  
A CARNIVORE eats only meat.  
An HERBIVORE eats only plants.  
An OMNIVORE eats both meats and plants.

Appendix M, page 2

6. **What is water pollution?**  
Water pollution is when harmful liquids, solids, or gases get into the water. This is harmful to plants and animals that use the water.
7. **What is air pollution?**  
Harmful gases being put into the air causes air pollution. This air is dangerous to plants and animals.
8. **What are three things you can do to help prevent pollution?**
  7. Put trash where it belongs
  8. Recycle
  9. Ride a bike or walk instead of using a car
  10. Turn off the lights when we don't need them
  11. Don't leave the water running
  12. Etc.
9. **What is a food chain?**  
A food chain is a series of plants and animals that are linked together because they feed on each other.
10. **Use the space below to draw a picture (using arrows) of a food chain and label it.**

Answers may vary but should include a producer and consumer and no less than three steps in the food chain.