

## Lesson C2–1

---

# Understanding Life Processes

---

**Unit C.** Animal Wildlife Management

**Problem Area 2.** Wildlife Biology and Ecosystems

**Lesson 1.** Understanding Life Processes

### **New Mexico Content Standard:**

**Pathway Strand:** Natural Resources and Environmental Systems

**Standard:** III: Apply scientific principles to natural resource management activities.

**Benchmark:** III-C: Examine natural cycles and related phenomena to describe ecological concepts and principles.

**Performance Standard:** 1. Describe the hydrologic cycle. 2. Describe the nitrogen cycle. 3. Describe succession. 4. Describe population dynamics. 5. Describe primary and secondary producers. 6. Identify potential pollution sources.

**Student Learning Objectives.** Instruction in this lesson should result in students achieving the following objectives:

1. Explain important life processes of wildlife organisms.
2. Describe the life span stages of wildlife.
3. Distinguish between the feeding groups.
4. Describe how ecosystems are important in wildlife biology.

**List of Resources.** The following resources may be useful in teaching this lesson:

**Recommended Resources.** One of the following resources should be selected to accompany the lesson:

Porter, Lynn, Jasper S. Lee, Diana L. Turner, and J. Malcolm Hillan. *Environmental Science and Technology*, 2<sup>nd</sup> Ed. Upper Saddle River, New Jersey: Prentice Hall Interstate, 2003.

Stutzenbaker, Charles D., Brenda J. Scheil, Michael K. Swan, Jasper S. Lee, and Jeri Mattics Omernik. *Wildlife Management: Science and Technology*, 2<sup>nd</sup> Ed. Upper Saddle River, New Jersey: Prentice Hall Interstate, 2003.

**Other Resources.** The following resources will be useful to students and teachers:

Lee, Jasper S. and Diana L. Turner. *AgriScience*. Upper Saddle River, New Jersey: Prentice Hall Interstate, 2003.

Lee, Jasper S. *Natural Resources and Environmental Technology*. Danville, Illinois: Interstate Publishers, Inc., 2000.

Morgan, Elizabeth M., Jasper S. Lee, and Elizabeth Wilson. *AgriScience Explorations*, 3rd Ed. Upper Saddle River, New Jersey: Prentice Hall Interstate, 2004.

## List of Equipment, Tools, Supplies, and Facilities

Writing surface

Overhead projector

Transparencies from attached masters

Copies of student lab sheets and materials to carry out the activities

**Terms.** The following terms are presented in this lesson (shown in bold italics):

abiotic factor

biophage

biotic factor

carnivore

circulation

digestion

ecosystem

elimination

food

food chain

food web

growth

herbivore

ingestion  
life processes  
life span  
locomotion  
omnivore  
photosynthesis  
reproduction  
respiration  
saprophage  
secretion  
sensation

**Interest Approach.** Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

*Bring into class a cross-section cut from the base of a tree that shows the growth rings or go outside to a tree stump. (One from a dead tree is fine.) Show students how a tree's age is determined. Have students study, analyze, and count the number of rings. Ask them to give an estimate on the age of the tree. How does a tree's age reflect the life cycle of the tree? If a cross-section is not available, sketch a cross-section on the writing surface. Have students indicate the age of the tree represented by your drawing. Another part of this interest approach is to discuss the presence of "layered edges" on fish scales similar to tree rings. Observe a fish scale from a large fish with a hand lens. Are layers present? Move from the interest approach into the objectives and anticipated problems for the lesson.*

## Summary of Content and Teaching Strategies

**Objective I:** Explain important life processes of wildlife organisms.

**Anticipated Problem:** What are the life processes of wildlife organisms? Why are they important?

- I. All living things have life processes.
  - A. **Life processes** are essential functions of a living organism in order to remain in the living condition.
    1. Supporting life processes is a part of managing wildlife populations.
    2. When life processes stop, an organism dies.
    3. There are eight life processes used in wildlife science.
  - B. **Growth** is the process of an organism increasing in size by adding cells, by the cells getting larger, or by replacing cells.
    1. With young organisms, growth is primarily adding cells to increase size.

2. With mature organisms, growing new cells is needed to replace those that are lost.
  3. Growth requires food with essential nutrients.
- C. **Food** is any substance that nourishes an organism.
1. Animals get their food by swallowing, otherwise known as **ingestion**.
  2. Once ingested, **digestion**, which is the process that changes food into forms that can be absorbed by the animal, occurs.
  3. Once digested, the remaining food materials are expelled from the body by the process of **elimination**.
  4. Plants make their food by the process of **photosynthesis**.
- D. **Circulation** is the movement of substances within an organism.
1. Food nutrients, digested food, and other substances are involved in circulation.
  2. Animals have a circulatory system that involves the heart, and blood vessels.
- E. **Respiration** is the process by which an organism provides its cells with food and oxygen.
1. Oxygen and carbon dioxide are the two primary substances important in respiration.
  2. Animals use structures, such as lungs and gills, for respiration.
- F. **Secretion** is the production within an organism of substances needed for life processes.
1. Specialized body structures, known as glands, are often responsible for secretion.
- G. **Sensation** is the ability of an organism to feel or otherwise gather information and respond to its environment.
1. Animal's sensation is easier to understand than plants.
  2. Animals typically have touch, taste, sight, smell, and hearing.
- H. All organisms have some type of movement.
1. Internal movements are needed for an organism to carry out life processes.
  2. **Locomotion** is the movement of an animal from one place to another.
- I. **Reproduction** is the process by which organisms give rise to new organisms of the same species.
1. This is not a life process that is essential for living; however it is essential for a species to perpetuate itself.
  2. Reproduction may involve sexual or asexual reproduction.

*Afterward, use their input to outline the major points on the writing surface. Have students record the information in their notebooks. Another approach is to have students read the "Life Processes" section in Chapter 5 of Wildlife Management. Use TM: C2-1A to present key terms in life processes. Ask students to name examples of these processes with wildlife animals in the local area.*

**Objective 2:** Describe the life span stages of wildlife.

**Anticipated Problem:** What are the life span stages of wildlife?

- II. *Life span* is the period of life of an organism which includes five stages.
- A. The first stage is the beginning.
    - 1. With animals, life span begins with birth or hatching.
    - 2. Most animal babies require some support from their mothers, although some can live without care provided.
  - B. The second stage is growth and development.
    - 1. New organisms grow and develop to reach maturity.
    - 2. If nutritious food is available in an organism's environment, they will typically grow rapidly.
  - C. The third stage maturity.
    - 1. Mature organisms are fully developed, although some additional growth or changes may occur.
    - 2. Maturity includes the ability to reproduce.
  - D. The fourth stage is decline.
    - 1. Eventually, organisms begin to lose their ability to maintain themselves, and aging sets in.
    - 2. Life processes may occur at a slower rate and the organisms loses its strength and weakens.
  - E. The fifth stage is death.
    - 1. Death is the end of the life of an organism.
    - 2. The protoplasm in its cells is no longer active.
    - 3. Upon death, an organism decays and the nutrients return to the earth to support future life.

Have students read the section on "Life Span" in Chapter 5 of **Wildlife Management**. Use their input to outline the major concepts on the writing surface. Refer students to Figure 5-3 in the chapter or use TM: C2-1B to present the life stages of a tree. Have students discuss local examples of life stages.

**Objective 3:** Distinguish between the feeding groups.

**Anticipated Problem:** What are the different feeding groups?

- III. There are two ways that feeding groups are classified.
- A. Feeding groups can be classified by whether what they eat is living or dead.
    - 1. A **biophage** is a wildlife animal that eats living plants or animals.
    - 2. A **saprophage** is a wildlife animal that eats dead animals or plants. They are sometimes known as scavengers.

- B. Feeding groups can be based on food material that they eat.
  - 1. A **herbivore** is a wildlife animal that eats only plant food material.
  - 2. A **carnivore** is a wildlife animal that eats only the flesh of other animals. Carnivores are usually the larger animals that prey on the smaller animals.
  - 3. An **omnivore** is a wildlife animal that eats both plant and animal material.

Have students read the sections on “Feeding Groups” and “living and Nonliving Feeders” in Chapter 5 of *Wildlife Management*. Afterward, use student input to outline the major concepts on the writing surface or use TM: C2–1C.

**Objective 4:** Describe how ecosystems are important in wildlife biology.

**Anticipated Problem:** What is an ecosystem? How are they important in wildlife biology?

- IV. Every living thing has a particular environment in which it survives.
  - A. An **ecosystem** is the community of living and nonliving things in a particular environment or area.
    - 1. Ecosystems may be large or small and include air, water, and land.
    - 2. Ecosystems are always changing. If a drastic change occurs, an organism is forced to seek a new place to live or it dies.
  - B. Two major factors in an ecosystem are biotic and abiotic.
    - 1. A **biotic factor** is a living organism, such as an animal or plant. Biotic factors depend on the abiotic factors for life-giving needs.
    - 2. **Abiotic factors** are the nonliving things, such as water, sunlight, and soil. Without abiotic factors, organisms cannot live.
  - C. Ecosystems have an organized energy transfer system.
    - 1. A **food chain** is the sequence in a community in which animal wildlife species get their food. All species have different food chains.
    - 2. The differences in the food chains form unique, interconnected **food webs**.

Have students read “Wildlife Biology and Ecosystems” in Chapter 5 of *Wildlife Management*. Use TM: C2–1D to show a simple food chain. Use TM: C2–1E to show a sample complete food web. LS: C2–1B can be used as an activity to relate food chains and food webs in this objective.

**Review/Summary.** Focus the review and summary of the lesson on the student learning objectives. Have students explain the content associated with each objective. Have pre-drawn food chains for students to use in demonstrating their knowledge. Use student responses as the basis for re-teaching. Questions at the end of the chapter in the textbooks and in the activity manuals may be used in the review/summary process.

**Application.** Application can involve one or more of the following student activities.

Dissect an Owl Pellet—LS: C2-1A

Food Chain to Food Web—LS: C2-1B

**Evaluation.** Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is attached.

## Answers to Sample Test:

### Part One: Matching

1=d, 2=e, 3=a, 4=h, 5=b, 6=i, 7=c, 8=j, 9=g, 10=f

### Part Two: Completion

1. elimination
2. Respiration
3. Circulation
4. locomotion
5. reproduction

### Part Three: Short Answer

1. All living things, no matter how diverse, have certain life processes. Life processes are essential functions for maintaining the life of an organism. When they stop, the organism dies. Supporting life processes are important in wildlife management.
2. The eight life processes used in wildlife science are:
  1. Growth and repair—organisms must grow if they are to live; cell replacement is known as repair
  2. Food—all wildlife organisms need food to live; growth, repair, and movement all require food nutrients
  3. Circulation—the movement of substances within an organism; circulatory systems in animals keep the blood flowing through the body
  4. Respiration—the process by which an organism provides its cells with food and oxygen; a continuous process in all organisms
  5. Secretion—the production of substances within an organism needed for life processes
  6. Sensation—the ability of an organism to feel or gather information and respond to its environment; animals have touch, taste, sight, smell, and hearing
  7. Movement—all organisms move in some way

8. Reproduction—the process by which organisms give rise to new organisms of the same species; not a life process that is essential for living, but essential for a species to perpetuate itself

---

# Test

---

## Lesson C2–1: Wildlife Biology and Ecosystems

### Part One: Matching

*Instructions.* Match the term with the correct response. Write the letter of the term by the definition.

- |               |                   |              |
|---------------|-------------------|--------------|
| a. food chain | e. saprophage     | i. digestion |
| b. carnivore  | f. biophage       | j. ingestion |
| c. herbivore  | g. abiotic factor |              |
| d. omnivore   | h. biotic factor  |              |

- \_\_\_\_\_ 1. An animal that eats both plant and animal materials.
- \_\_\_\_\_ 2. A wildlife animal that eats dead animals or plants.
- \_\_\_\_\_ 3. The sequence in a community in which animal wildlife species get their food.
- \_\_\_\_\_ 4. A living organism.
- \_\_\_\_\_ 5. An animal that eats only the flesh of other animals.
- \_\_\_\_\_ 6. The process that changes food into forms that can be absorbed by the animal.
- \_\_\_\_\_ 7. An animal that eats only plant foods.
- \_\_\_\_\_ 8. Eating or taking in food.
- \_\_\_\_\_ 9. The nonliving things.
- \_\_\_\_\_ 10. A wildlife animal that eats living plants or animals.

### Part Two: Completion

*Instructions.* Provide the word or words to complete the following statements.

1. Once digested and the nutrients absorbed, the remaining food materials are expelled from the body by a process known as \_\_\_\_\_.
2. \_\_\_\_\_ is the process by which an organism provides its cells with food and oxygen.
3. \_\_\_\_\_ is the movement of substances within an organism.
4. The movement of an animal from one place to another is known as \_\_\_\_\_.
5. The process by which organisms give rise to new organisms of the same species is known as \_\_\_\_\_.



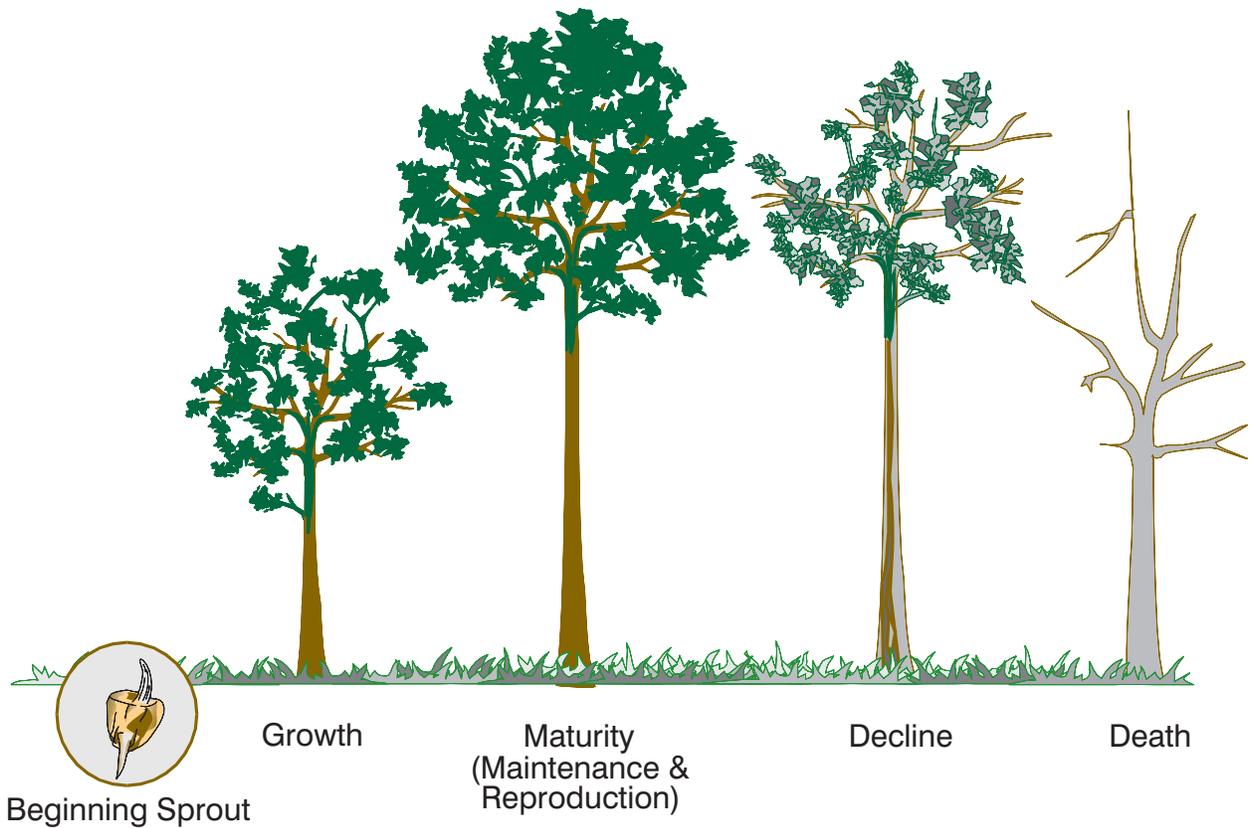
# LIFE PROCESSES

**Essential functions of a living organism to remain in the living conditions.**

**Eight are:**

- ◆ **Growth**
- ◆ **Food: plants=photosynthesis, animals=ingestion, digestion, and elimination**
- ◆ **Circulation**
- ◆ **Respiration**
- ◆ **Secretion**
- ◆ **Sensation**
- ◆ **Movement (internal and locomotion)**
- ◆ **Reproduction**

# THE LIFE STAGES OF A TREE



*(Courtesy, Interstate Publishers, Inc.)*

# ANIMAL FEEDING GROUPS

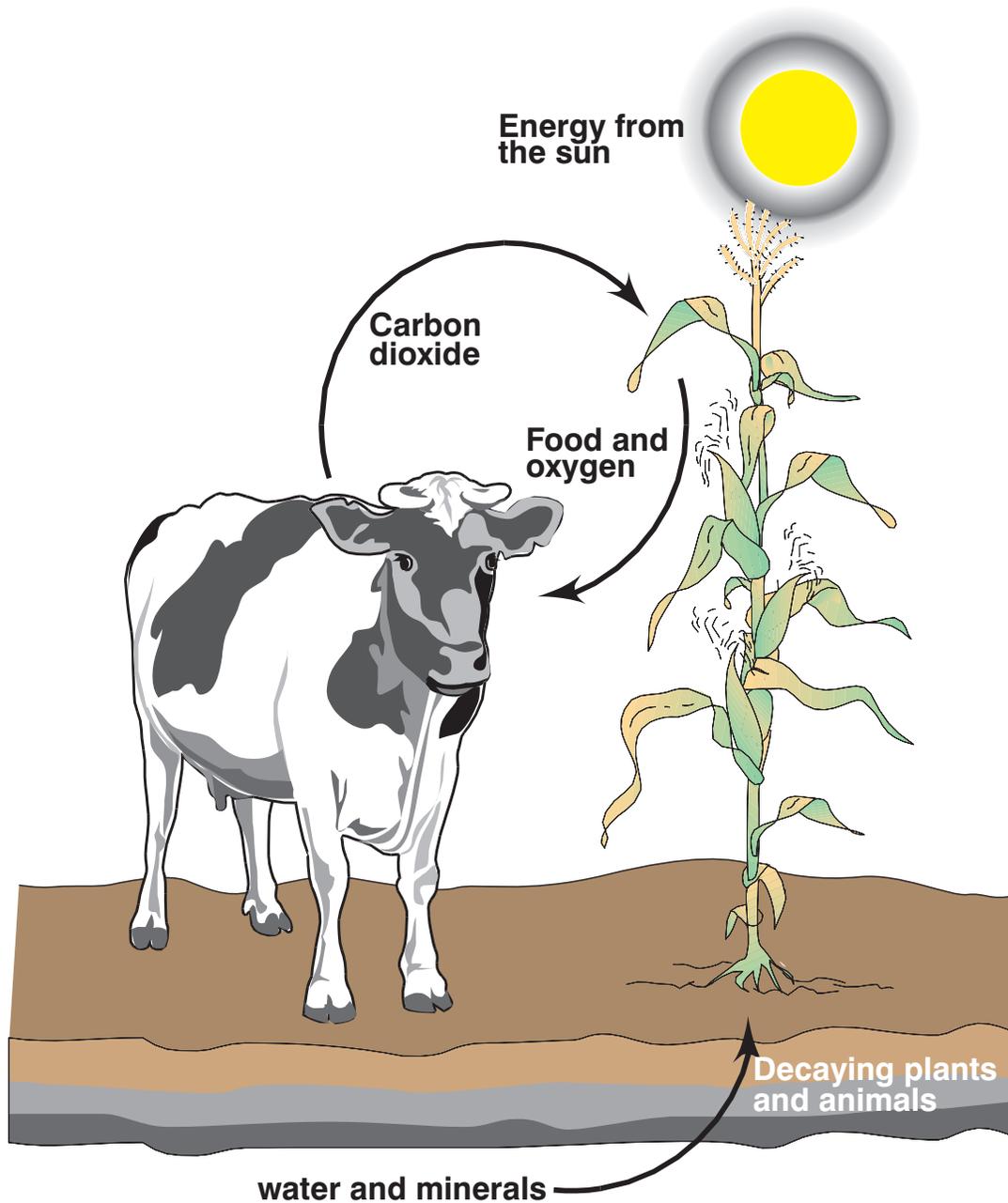
## Feeders:

- ◆ **Biophage-eats living plant or animal materials**
- ◆ **Saprophage-eats dead materials**

## Feeding Groups:

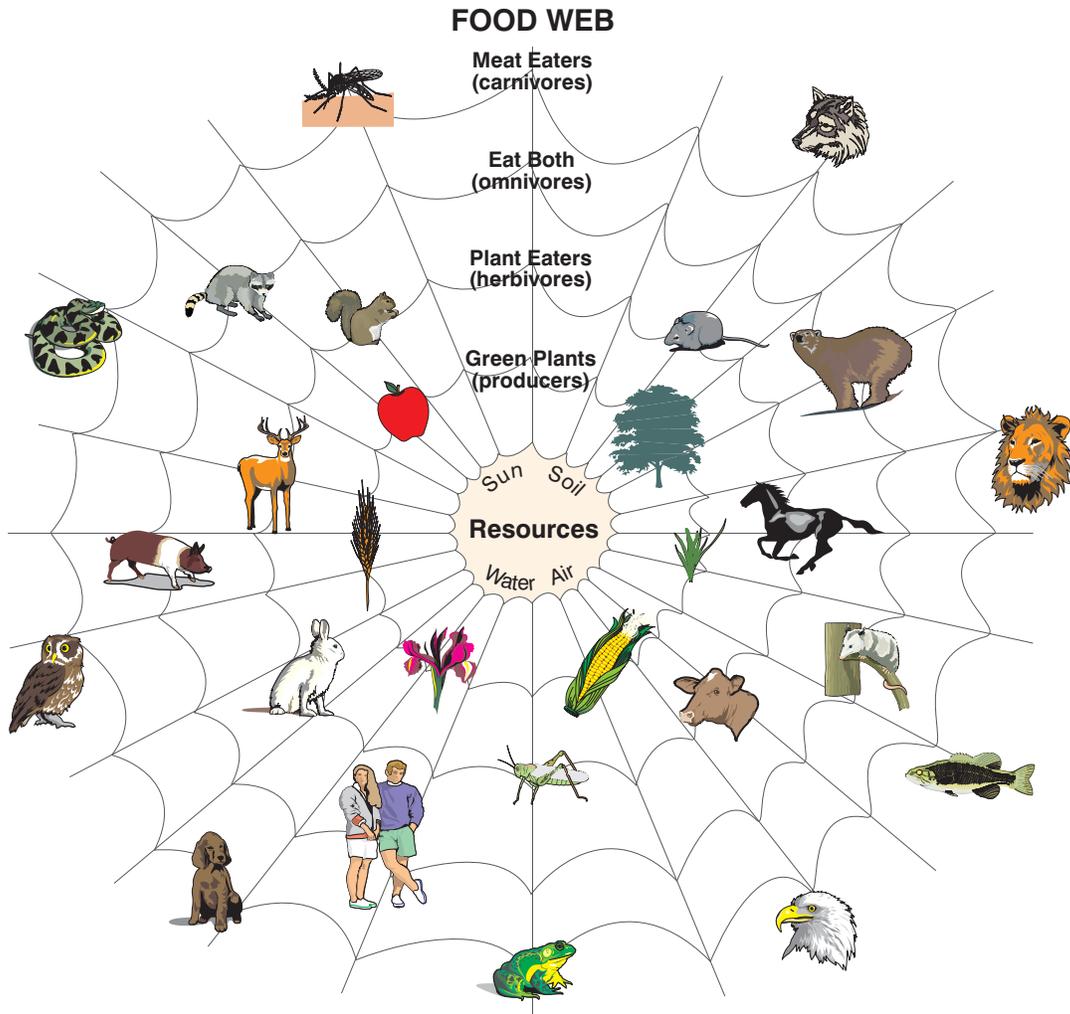
- ◆ **Herbivore- eat plant materials**
- ◆ **Carnivore- eat flesh of animals**
- ◆ **Omnivore- eat both plant and animal materials**

# SIMPLE FOOD CHAIN



(Courtesy, Interstate Publishers, Inc.)

# FOOD WEB FOR TERRESTRIALS SPECIES



*(Courtesy, Interstate Publishers, Inc.)*

---

# Lab Sheet

---

## Dissect an Owl Pellet

**Purpose:**

The purpose of this activity is to discover what owls eat by dissecting an owl pellet. (Note: This activity can be carried out by individuals or in pairs.)

**Objectives:**

1. To recognize an owl pellet.
2. To be able to carefully dissect and identify the contents of an owl pellet.
3. To describe the eating habits of an owl.

**Materials:** (These are materials needed for individuals or pairs.)

1. One owl pellet (can be ordered from a supply company)
2. Metal dissecting utensils
3. Ruler or measuring tape
4. Magnifying glass (optional)

**Procedure:**

1. Measure the owl pellet.
2. Carefully pull apart the hairs from the owl pellet.
3. Carefully pick apart any skeletons you may find from the pellet. Try to keep them in one piece. (They will be much easier to identify later.)
4. Study the findings. Try to identify the uncovered prey item.

**Questions:**

1. What was the size of the owl pellet?
  
  
  
  
  
  
  
  
  
  
2. What did you find in the owl pellet?
  
  
  
  
  
  
  
  
  
  
3. What is an owl pellet? How do owl pellets form?

---

# Lab Sheet

---

## Food Chain to Food Web

**Purpose:**

The purpose of this activity is to think about the wildlife food chain and relate it to a food web.

**Objectives:**

1. To learn about animal wildlife in your area.
2. To form conclusions from wildlife food chains.
3. To make a food web from a simple food chain.

**Materials:**

1. Book reference material, such as encyclopedia or magazine.
2. Old wildlife magazine for cutting out animal pictures.
3. Pen, pencil, or marker.
4. 2 sheets of paper.
5. Scissors.

**Procedure:**

1. Select a species of animal wildlife.
2. Use reference materials or other sources of information to determine the food chain in which the species is found.
3. Write down the food chain.
4. On a separate sheet of paper or poster board, draw a food web diagram that shows relationships within the food chain to the food chain of other organisms.
5. You may cut out pictures from an old wildlife magazine and paste them in the appropriate place on the food web.
6. Display your food web on the bulletin board.

**Questions:**

1. What was your selected species of animal wildlife?
2. Write down your food chain below.