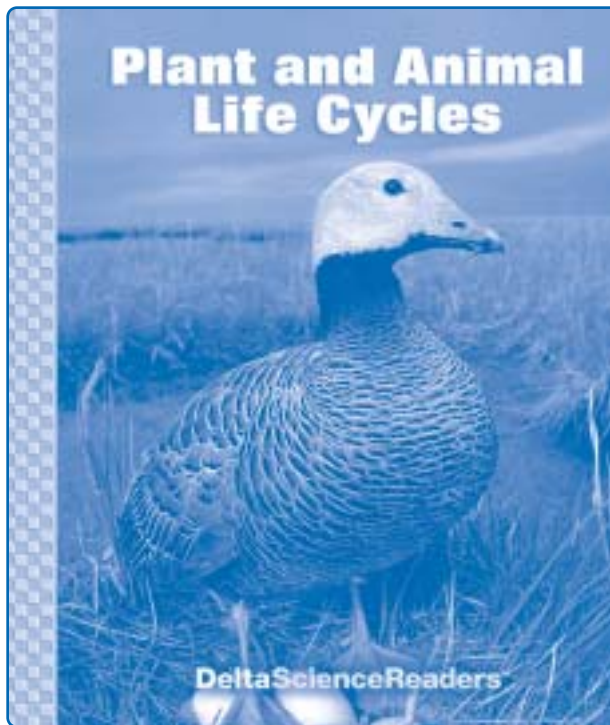


Plant and Animal Life Cycles



Delta Science Readers are nonfiction student books that provide science background and support the experiences of hands-on activities. Every **Delta Science Reader** has three main sections: *Think About . . .*, *People in Science*, and *Did You Know?*

Be sure to preview the reader Overview Chart on page 4, the reader itself, and the teaching suggestions on the following pages. This information will help you determine how to plan your schedule for reader selections and activity sessions.

Reading for information is a key literacy skill. Use the following ideas as appropriate for your teaching style and the needs of your students. The After Reading section includes an assessment and writing link.

OVERVIEW

In the Delta Science Reader *Plant and Animal Life Cycles*, students read about the life cycles of a variety of plants, animals, and fungi. They learn how some living things grow, change, and reproduce. They also read about a famous wildlife biologist—Jane Goodall—and her unique, long-term study of chimpanzees in Africa. Finally, students learn about emperor penguins and compare the sizes and weights of some newborn animals.

Students will

- ▶ discover facts about the life cycles of plants, animals, and fungi
- ▶ learn the different parts of flowering plants and how these plants reproduce
- ▶ read about ways plants reproduce other than by seeds
- ▶ learn about birds, mammals, insects, amphibians, fish, and reptiles
- ▶ discuss the function of a table of contents, headings, and a glossary
- ▶ interpret photographs and diagrams to answer questions
- ▶ complete a KWL chart
- ▶ organize information in a variety of ways

READING IN THE CONTENT AREA SKILLS

- Compare and contrast plant and animal life cycles
- Recognize causes and effects in the process of pollination
- Draw conclusions from text information
- Identify main ideas and supporting details about ways plants reproduce
- Describe the sequences of events in metamorphosis and in life cycles
- Demonstrate critical thinking
- Interpret graphic devices
- Summarize

NONFICTION TEXT ELEMENTS

Plant and Animal Life Cycles includes a table of contents, headings, photographs and illustrations, captions, diagrams, a table, boldfaced terms, and a glossary.

CONTENT VOCABULARY

The following terms are introduced in context and defined in the glossary: *amphibian, bird, conifer, decompose, dormant, fish, flowering plant, fruit, fungus, germinate, hibernate, insect, larva, life cycle, life span, mammal, metamorphosis, migration, nymph, ovary, pistil, pollen, pollination, pupa, reproduce, reptile, root, seed coat, seed food, spore, stamen, tiny plant, yeast.*

optional vocabulary: *cold-blooded, warm-blooded; endoskeleton, exoskeleton; invertebrate, vertebrate*

BEFORE READING

Build Background

Access students' prior knowledge of plant and animal life cycles by displaying and discussing the cover. Ask, *What do you*

think will happen to the goose's eggs? (Baby geese will hatch from them.) What other animals do you know that hatch from eggs? (Students will probably mention different kinds of birds. Some may know that insects and most fish and reptiles lay eggs.) Read the title aloud, and invite students to share what they know about the topic from their personal experiences and hands-on explorations in science.

To stimulate discussion, ask questions such as these: *What do you think a life cycle is? How might the life cycles of plants and animals be different? How might they be the same?*

Begin a class KWL chart by recording facts students know about life cycles in the K column. You may wish to copy the KWL chart and ask students to maintain their own charts as they read.

K What I Know	W What I Want to Know	L What I Learned	+ What I Want to Explore Further

Preview the Book

Take a few minutes to have students look through the book. Explain the steps involved in previewing nonfiction: think about the title, read the table of contents, read the headings, read boldfaced words, and examine any photographs, illustrations, charts, and graphics.

Call attention to the various nonfiction text elements and explain how they can help students understand and organize what they read. Point out that the table of contents lists all the main headings in the book and their page numbers. Ask, *How do the headings help you know what you will learn about?* Point to some of the photographs and ask

questions such as, *What does this picture show you? How do you think it will help you understand the text?* Explain that the words in boldface type are important words related to plant and animal life cycles. Remind students that these words are defined in the glossary. Choose one word and have students find its definition in the glossary.

Preview the Vocabulary

You may wish to preview some of the vocabulary words before reading, rather than waiting to introduce them in the context of the book. Possibilities include creating a word wall, vocabulary cards, sentence strips, or a concept web.

For example, some of the words can be categorized according to whether they are plants, animals, or fungi. Develop a three-column chart like the one that follows:

Plant	Animal	Fungus
conifer	amphibian	mold
flowering	bird	mushroom
plant	fish	yeast
	insect	
	mammal	
	reptile	

Set a Purpose

Discuss with students what they might expect to find out from the book, based on their preview. Encourage them to use the questions on the KWL chart to set an overall purpose for reading.

GUIDE THE READING

Preview the book yourself to determine the amount of guidance you will need to give for each section. Depending on your schedule and the needs of your class, you may wish to consider the following options:

- **Whole Group Reading** Read the book aloud with a group or the whole class. Encourage students to ask questions and make comments. Pause as necessary to clarify and assess understanding.
- **Shared Reading** Have students form pairs or small groups and read the book together. Ask students to pause after each text section. Clarify as needed and discuss any questions that arise or have been answered.
- **Independent Reading** Some students may be ready to read independently. Have them rejoin the class for discussion of the book. Check understanding by asking students to explain in their own words what they have read.

Tips for Reading

- If you spread out the reading over several days, begin each session by reviewing the previous day's reading and previewing what will be read in the upcoming session.
- Begin each text section by reading or having a volunteer read aloud the heading. Discuss what students expect to learn, based on the heading. Have students examine any illustrations or graphics and read accompanying captions and labels.
- Help students locate context clues to the meanings of words in boldface type. Remind them that these words are defined in the glossary. Provide help with words that may be difficult to pronounce.
- As appropriate, model reading strategies students may find helpful for nonfiction: adjust reading rate, ask questions, paraphrase, reread, visualize.

Think About ... (pages 2-13)

Pages 2, 3 *What Is a Life Cycle?* and *Plant Life Cycles: Plants from Seeds*

- Have students read the text on page 2. Have them compare and contrast the information about living things. Ask, *How are most living things alike?* (They grow, change, and reproduce. Most need sunlight, air, food, and water.) *How are they different?* (They have different life cycles and life spans.)
- If appropriate, ask students to speculate about living things that might not need sunlight, air, food, or water. (Some organisms live without sunlight in the deep ocean and in caves. Some tiny living things called bacteria can get energy to live without using oxygen. Green plants, algae, phytoplankton, and some bacteria make their own food using energy from the sun. Some bacteria and microscopic worms can survive indefinitely without water.)
- Then have students look at the diagrams and labels. Explain: *The words cycle and circle are related. Just as you can run your finger around and around a circle, a cycle repeats itself in the same order. Ask, How do the arrows help show that the life cycles keep repeating?* (They go around in a circle.)
- Guide students to compare and contrast the plant and animal life cycles. Ask, *How does the plant start?* (as a seed) *How does the animal start?* (as an egg) *What is the same about plant and animal life cycles?* (Young plants and animals grow into adult plants and animals.)
- Have students read the text on page 3 in the first column and look at the diagram and labels. Ask, *How does the diagram of the seed help you understand its parts?* (It shows what the text is talking about.) Assess understanding by having students

summarize the information in the text. (A flower forms fruits and seeds. A seed contains a tiny plant and stored food. It stays dormant, or not growing, until it gets enough warmth and moisture. Then the seed splits open, and the tiny plant sends out roots and shoots.)

- Have students read the text about conifers in the second column and look at the photograph and caption. Assess understanding by having them summarize the difference between a conifer and a flowering plant. (Conifers do not have flowers; they grow cones in which the seeds form.)
- Invite students to share what they know about conifers such as pine trees and spruce trees. (Their needles don't all fall off in the fall as leaves on other trees do. The trees stay green all winter.) Tell students that another name for these conifers is evergreens, because they are always green.

Conifers were some of the first plants on Earth to reproduce by making seeds.

Pages 4, 5 *Inside a Flower*

- Have students read the text about flowers on page 4. Then have them look at the photograph and read the caption and labels. Have students point to the labels on the flower. Ask, *What is the purpose of the pistil, stamens, ovary, and pollen?* (They make seeds.)
- Have students read the first paragraph on page 5 to learn what pollination is. Ask, *What effects does the pollen have when it contacts the pistil?* (The flower begins to make fruit and seeds. The ovary swells and ripens.) *What happens to the ovary?* (It becomes a fruit.)
- Have students study the photograph above the first column and read the caption. Then assess their understanding of the definition of *fruit*: *What is a fruit?*

(A fruit is the part of a plant that covers and protects seeds.) *Is an orange a fruit?* (yes) *Is a potato a fruit?* (no) *Why not?* (It doesn't have seeds.)

- Have students finish reading the page, look at the photograph, and read the caption. Ask, *How are many flowers pollinated?* (They are pollinated by insects, such as butterflies and bees, that carry pollen from one flower to another.) *How do flowers attract insects?* (Insects are attracted to the nectar, colorful petals, scent, and shapes of the flowers.)

Page 6 *Plants from Spores and Other Ways Plants Reproduce*

- Have students read the text about plants from spores on page 6 and look at the accompanying photograph and caption. Ask, *What are two differences between a spore and a seed?* (A seed is made by a flower and is inside a fruit. Spores are not made by flowers and are not inside fruits.) Encourage students to speculate about why so few spores out of millions live to make new plants. (Most spores do not land in a spot with the right conditions.)
- Have students read the text about other ways plants reproduce and look at the photograph and caption. Ask, *What is the main idea of this section?* (Some plants reproduce from other plant parts.) *What details tell more about this main idea?* (The bulbs of tulips and garlic divide to produce new plants. Potatoes are actually modified stems called tubers. The eyes are buds. New potato plants can grow from these buds. New strawberry plants grow from nodes on runners. Gardeners grow new plants from cuttings.)

Page 7 *Animal Life Cycles: Birds*

- As appropriate for your class, discuss the following at relevant points during the reading of *Animal Life Cycles* on pages 7–12:

vertebrate an animal with a backbone, or spine (examples: human, bird, snake, fish)

invertebrate an animal without a backbone (examples: insect, jellyfish, worm, clam, octopus)

warm-blooded an animal that keeps its body warm through its own metabolism (examples: all birds and mammals)

cold-blooded an animal whose temperature changes with the temperature of its environment (examples: most reptiles, fish, amphibians, all invertebrates)

endoskeleton a hard skeleton inside an animal's body (examples: all vertebrates)

exoskeleton a hard skeleton that surrounds an animal's body and supports it from the outside (examples: lobster, clam, scorpion, spider, beetle)

- Before students read page 7, write the word *animal* on the board. Ask, *What are some kinds of animals?* List examples students suggest. If no one mentions animals in a given category, such as insects, raise the subject: *Is a grasshopper an animal? Is a clam?* Explain: *Animals are living things that generally eat food and can move at least part of their body. Insects and many other creatures that you may not think of as animals are members of the animal kingdom.*
- Have students read the introduction and the first paragraph on page 7. Tell students to think about animals they are familiar with. Then ask, *What makes birds different from all other animals?* (They have feathers.) *Can all birds fly?* (no) Encourage students to name birds that are unable to fly. (Students may mention penguins and ostriches. Other flightless birds are the emu and kiwi.)
- Have students read the second paragraph and look at the photograph and caption. Ask, *What surprised you the most about hummingbirds?* (Responses will vary.)

- You may wish to share the following information about hummingbirds with students: Hummingbirds are the only birds that can fly backward, hover in one place, and fly straight up or down. They have a tubelike beak with a long tongue that lets them take nectar from flowers. Hummingbirds eat while hovering.

Page 8 *Mammals*

- Have students read the first paragraph on page 8 to find out about mammals. Have students discuss what makes a mammal different from other animals. (It has fur or hair. It feeds on milk from the mother.)
- Then have students look at the photograph, read the caption, and read the rest of the page to learn about bears. Ask, *What did you learn about the life spans of mammals?* (They're different. Some animals live just a few years, and others live for many years.)

A marsupial is a mammal that develops inside a pouch. The young are not fully developed when they are born. They crawl into a pouch on the mother's abdomen, where they feed on the mother's milk and continue to develop. Kangaroos, opossums, and koalas are marsupials.

A monotreme is a mammal that lays eggs! After they hatch, the young feed on the mother's milk. There are only three species of monotremes: the duck-billed platypus and two species of spiny anteater.

Page 9 *Insects*

- Have students read the first paragraph on page 9 about insects. Explain that an insect's head contains its mouthparts, eyes, and other sense organs; its thorax is where its legs and wings (if it has wings) are; and the abdomen contains the organs that digest food.

- Explain that *antennae* is the plural of *antenna*. Write both words. Tell students that many science words come from ancient Latin and Greek, and their plural forms are different from the plurals of English words. Antenna comes from a Latin word.
- Have students read the paragraphs about insect life cycles and look at the diagram and labels. Elicit that two kinds of insect life cycles are described: (1) egg, nymph, adult; examples are grasshoppers, dragonflies, cockroaches; and (2) egg, larva, pupa, adult; examples are butterflies, bees, flies, and beetles.

Point out and discuss each stage in the life cycle of a butterfly. Assess students' understanding by having them describe the sequence of events in the metamorphosis of a butterfly. (A larva hatches from an egg. Later, the larva forms a cocoon around itself and becomes a pupa. The pupa changes inside the cocoon and hatches into an adult butterfly.) Explain that *larvae* is the plural of *larva*, another word from Latin. The plural of *pupa* is *pupae*.

Further Facts

- The adult life span of some species of mayfly may be as short as 90 minutes. Adult life spans of other species range from several hours to 14 days.
- Most butterflies live only a few days to weeks after emerging from the pupa but some species of butterfly that migrate or hibernate can live up to 8 or 9 months or longer.
- A queen honeybee will live for about two years but worker and drone honeybees live from 20 days to 4 months.
- A queen leaf-cutting ant can live 10 years or more. Queen termites may live up to 30 years.

- After 17 years of dormancy underground, one species of cicada emerges for five weeks and then dies.

Page 10 *Amphibians*

- Have students read the first paragraph on page 10 about amphibians. Tell students that even as adults, amphibians other than toads usually live in damp places or near water. Toads, however, live mainly on land, returning to water only to breed and lay eggs.
- Have students read the next two paragraphs and study the diagram. Ask, *What other animals undergo metamorphosis?* (insects) Assess understanding by having students summarize the differences between tadpoles and adult frogs. (Tadpoles live in water, breathe with gills, have no legs, and have a long tail. Frogs live on land, breathe with lungs, have legs, and have no tail.)

Further Facts

- Amphibians evolved from fishes that had stubby leg-like fins. They emerged from the oceans and moved onto dry land about 360 million years ago.
- Salamanders and newts keep their tails as adults. Salamanders breathe using lungs or gills or by absorbing oxygen through their moist skin.
- Amphibians have soft, leathery eggs that must be kept moist. They lay their eggs in water.
- Some tree frogs lay their eggs on vegetation near ponds. When the eggs hatch, the tadpoles drop into the water.

Page 11 *Fish*

- Have students read the first paragraph on page 11. Ask them to summarize the main ideas. (Fish come in many kinds, sizes, and shapes. Most fish lay eggs, and others give birth to live young. Fish breathe with gills. Most fish have scales.)

- Have students read the other paragraphs, look at the photograph, and read the caption. Ask them to summarize the sequence of events in the life cycle of an Atlantic salmon. (A young salmon hatches from an egg. After two years, it swims downriver to the ocean. It lives in the ocean until it is an adult. Then it migrates back up the same river. The female salmon lays her eggs. After that, most adult salmon die.) Tell students that only some fish migrate as salmon do.

Page 12 *Reptiles*

- Have students read the text about reptiles on page 12. Then have them look at the photographs and captions. Ask, *What are some kinds of reptiles?* (crocodiles, alligators, turtles, lizards, snakes) *What are the main ideas you learned about reptiles?* (They have dry skin, scales, and breathe with lungs. Most lay eggs, and some give birth to live young. Most young reptiles can live on their own right away.)

Primitive reptiles evolved from amphibians about 320 million years ago.

Page 13 *Fungus Life Cycles*

- Before students read page 13, challenge them to name something that looks like a plant but is not a plant. Give a hint: *You can see these in the produce section of the market. Many have short, thick stems and a broad cap. They are good to eat.* (mushrooms)
- Then have students read the first paragraph to learn about fungi. Ask, *What is a fungus?* (It is a living thing that is not a plant or an animal.) *What are two examples of fungi?* (mushrooms, bread mold) Explain that *fungus* comes from ancient Latin, and its plural is *fungi*.

- Remind students that plants make their own food. Explain that what makes fungi different is that they absorb food substances from dead or living matter. Ask, *What important role does this way of getting energy serve?* (Fungi break down and recycle dead plants and animals.)
- Have students read the second paragraph and look at the photograph and caption to find out about the life cycle of fungi. Then ask them to summarize the stages of the life cycle. (A spore grows threadlike structures called hyphae. The hyphae produce more spores.) Ask, *What other living things reproduce using spores?* (mosses and ferns) *Why do you think mosses and ferns are classified as plants, not fungi?* (They make their own food as other plants do.)
- Have students read the third paragraph about yeast. Ask, *How is the way yeast cells reproduce different from the way mushrooms and molds reproduce?* (Yeasts don't produce spores. The cells divide in two in a warm environment with nutrients and water.) Ask, *What is one useful thing yeasts do?* (They make bread dough rise.)

People in Science (page 14)

Jane Goodall, Wildlife Biologist

- Before they read, ask students how they think scientists learn about animal life cycles, behavior, and life spans. (by observing the animals) Then have them read page 14 to find out about a famous woman scientist who studied chimpanzees.

- Encourage students to discuss what personal qualities made Jane Goodall a good scientist. (She was patient, hard-working, spent many hours observing chimpanzees, and took careful notes.) *What hardships do you think she had to face?* (Students may mention loneliness, boredom, and the physical problems of jungle life.)
- Inform students that in all, Goodall spent fifteen years studying the chimpanzees of Gombe. Ask, *What do you think made her continue this study for so long?* (Accept reasonable responses, such as her love for the chimpanzees and her desire to learn about them.)

Further Facts

- Jane Goodall was born in London, England, in 1934. Her work at Gombe began in July 1960.
- In 1965 Goodall received a Ph.D. in ethology (the study of animal behavior under natural conditions) from Cambridge University in England.
- Goodall's famous account of her life among the chimpanzees, *In the Shadow of Man*, was published in 1971.
- Goodall wrote that after watching chimpanzee mothers with their infants, she used some of the same techniques in raising her own child Hugo (who was called Grub).

Did You Know? (page 15)

About Emperor Penguins

- Before they read, ask students whether they have ever seen penguins at a zoo or an aquarium. Invite them to share what they know about these unusual birds. If necessary, tell students that penguins cannot fly. They use their short, stubby wings as flippers to swim underwater.
- Then have students read page 15 to find out about emperor penguins, look at the photograph, and read the caption. Ask, *What is the most interesting or surprising fact you learned about emperor penguins?* (Responses will vary.)
- Have students study the table of Newborn Animal Sizes. Engage students in a discussion and comparison of the facts presented. Ask, *Which of these animals has the largest newborn?* (the gray whale) *Which has the tiniest?* (the opossum) *Which newborn animal do you think has the biggest parent?* (the gray whale) *What size do you think an adult giant panda is?* After students speculate, tell them that an adult giant panda is 1.5 m (5 feet) tall and weighs 100 kg (220 pounds)!
- Explain that opossum young are so tiny because when they are born they are not fully developed. They continue growing in a pouch on the mother until they are old enough to leave the pouch. They are marsupials.

AFTER READING

Summarize

Complete the KWL chart you began with students before reading by asking them to share the answers to their questions. Call on volunteers to retell each text section. Then have students use the information in the KWL chart to write brief summary statements.

Discuss with students how using the KWL strategy helped them understand and appreciate the book. Encourage them to share any other reading strategies that helped them understand what they read.

Direct attention to the fourth column in the chart and ask: *What questions do you still have about plant and animal life cycles? What would you like to explore further?* Record students' responses. Then ask: *Where do you think you might be able to find this information?* (Students might mention an encyclopedia, science books, and the Internet.) Encourage students to conduct further research.

Review/Assess

Use the questions that follow as the basis for a discussion of the book or for a written or oral assessment.

1. What is a life cycle, and what do the life cycles of plants, animals, and fungi have in common? (A life cycle is the changes that take place during a living thing's life from when it begins to when it ends. All these living things grow, change, and reproduce.)
2. What parts of a plant are involved in making seeds, and how do they do this? (The pistil, stamens, pollen, and ovary make seeds. The stamen makes pollen. When pollen is ripe the stamen releases the pollen. The ovary is where new fruits and seeds form.)

3. What are the six main categories of animals discussed, and what do they have in common? (The six categories of animals are birds, mammals, insects, amphibians, fish, and reptiles. Almost all animals come from eggs. Most need air to breathe, water, and food to eat. They all reproduce.)

Writing Link/Critical Thinking

Present the following as a writing assignment.

Jane Goodall spent fifteen years studying chimpanzees. She made many important discoveries. How can a study of any living thing be useful and important? Explain what we can learn from studying living things. (Accept reasonable responses.) If you could spend time studying a living thing, what would you choose? Why?

Science Journals: You may wish to have students keep the writing activities related to the Reader in their science journals.

References and Resources

For trade book suggestions and Internet sites, see the References and Resources section of this teacher's guide.