

# Lessons at a Glance

## Science Content: Big Ideas

The Life Cycles Unit concentrates on the following Big Ideas. Along with the scientific Habits of Mind discussed on pages 6-7, these concepts should be reinforced throughout the unit. The lessons in which each big idea is introduced or is a major focus are indicated in parentheses.

### *Introductory and Culminating Lessons*

- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. (Lessons 1, 2, and 26)

### *Humans*

- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. The stages of the human life cycle repeat from one generation to the next. (Lessons 3 and 4)
- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. Rapid physical growth is a natural part of the human life cycle until adulthood. (Lessons 7 and 24)
- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. Intellectual growth is a natural part of the human life cycle. (Lessons 8 and 25)
- Humans, like all animals, need food, water, air, shelter, security, and healthy sanitary conditions in order to survive. Humans also have emotional, social, and intellectual needs. (Lesson 9)

### *Trees*

- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. Physical growth and change are natural parts of the tree life cycle. (Lessons 5, 6, 11, 16, 19)
- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. Trees are more likely to survive and thrive in each stage of their life cycle when their survival needs are met. (Lesson 10)
- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. A tree has multiple annual cycles within its life cycle. (Lesson 20)

### *Seed to Seed*

- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. Seeds are an important stage in the life cycle of a plant. (Lesson 12)
- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. Plants are more likely to survive and thrive in each stage of the life cycle when their survival needs are met. (Lesson 13)
- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. Flowers are an important stage in the pea plant life cycle. (Lesson 18)
- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. Fruits are the final stage in the pea plant life cycle. (Lesson 23)

### *Butterflies*

- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. Caterpillars are an important stage in the butterfly life cycle. (Lesson 14)
- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. Physical growth and change are natural parts of the butterfly life cycle. (Lesson 15)
- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. Chrysalises are an important stage in the butterfly life cycle. (Lesson 17)
- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. The adult is the final stage in the butterfly life cycle. (Lesson 21)
- All living organisms have life cycles that include being born, growing up, reproducing, and, eventually, dying. The adult butterfly may reproduce and lay eggs that hatch to create the next generation. (Lesson 22)

## Lesson Overviews

The following overviews briefly summarize each lesson in the Life Cycles Unit. Core lessons are indicated with an asterisk. Suggestions for scheduling and flexible implementation are shown in gray.

### *\*Lesson 0–Doing Science*

Children sharpen their awareness of scientific thinking as they conduct a self-directed exploration and then reflect on the processes they engaged in. In the context of these experiences, they are introduced to the work of scientists and to the Science Companion “I Wonder” circle, which provides a visual representation of many of the facets of scientific inquiry, exploration, and discovery.

### *\*Lesson 1–Introduction to Life Cycles*

Children are introduced to the Life Cycles Unit. They brainstorm the concept of a cycle and discuss some of the cycles in their own lives. They also create a life-cycle diagram for a human.

### *\*Lesson 2–Exploring Life Cycles and Spans*

Children look at living organisms pictured with their offspring. They notice that many offspring resemble their parents. They discuss the life cycle of a housefly, an organism whose offspring do not resemble the parents. The children complete life cycle diagrams for a bean, a frog, and a sheep, and explore the concept that life spans of living things vary.

### *\*Lesson 3–Humans: Life Cycles and Generations*

Children identify the human life stages portrayed in a family reunion photograph and recreate the life cycles of a grandmother, mother, and daughter using a “Pictures from a Family Photo Album” worksheet.

### *Lesson 4–Humans: Life Cycles and Generations— Interview*

Children interview classroom guests from their parents’ and grandparents’ generations, using questions prepared in advance. During the interview process, the children develop a sense of the passage of time inherent to generations.

This lesson can be taught during social studies.

### ***\*Lesson 5–Trees: Fall Observations***

The children begin a yearlong study of a class tree. They use their senses of sight, hearing, smell, and touch to observe the tree. They also predict which parts of the tree and its surroundings might grow or change during the year.

### ***\*Lesson 6–Trees: Fall Measurements***

Children take baseline measurements of the class tree in order to track its physical growth from the fall to the spring.

This lesson can be taught during mathematics.

### ***\*Lesson 7–Humans: Measuring My Physical Growth—Fall***

Children take baseline measurements of themselves in order to track their physical growth from the fall to the spring.

This lesson can be taught during mathematics.

### ***\*Lesson 8–Humans: Measuring My Intellectual Growth—Fall***

In the first session of this two-session lesson, children find that making new connections in the brain is the basis for intellectual growth. In the second session, children explore a food sample and map out on a brain diagram the connections being made in their brains as they explore.

The children also discuss how their work in science will lead to many new understandings over the course of the year and begin to track these by making their first entry on the “New Understandings” and “Things Scientists Do to Explore” pages in their science notebooks.

### ***\*Lesson 9–Humans: Survival Needs***

Children consider the basic survival needs of all animals as they design an adventure of their choice. They share their design illustrations and descriptions with the class and explain how particular needs would be met on their adventure. The children recognize the basic needs of all animals as well as the needs humans have above and beyond these basic needs.

This lesson can be taught during social studies.

### ***\*Lesson 10–Trees: Growth Rings***

Children examine a cross section of a tree and learn how to determine its age. They observe that the distance between tree rings varies and speculate about the reasons why.

### ***\*Lesson 11–Trees: Winter Observations***

Children discuss how the weather during winter might affect the tree, and make observations of the tree and its surroundings. They also discuss the concept of dormancy.

### ***\*Lesson 12–Seed to Seed: Examining and Planting Seeds***

Children begin a study of the life cycle of a pea plant. They examine seeds and learn about seed germination. They identify the parts of a seed that are instrumental to growth and plant seeds that they will observe over the next two months.

### ***\*Lesson 13–Seed to Seed: Transplanting and Stressing Sprouts***

Children continue studying the life cycle of a pea plant. They transplant pea sprouts and begin tracking the plants' growth in both an optimal and a stressful environment.

### ***\*Lesson 14–Butterflies: Baby Caterpillars***

Children begin studying the life cycle of Painted Lady butterflies. They observe, measure, and draw young caterpillars. They also start a life span calendar for the caterpillars that turn into butterflies.

### ***\*Lesson 15–Butterflies: Larger Caterpillars***

Children continue studying the life cycle of Painted Lady butterflies. They become more familiar with caterpillars: how they look, how they move, and how they behave. The children watch caterpillars eating and observe their limbs and locomotion. They also learn the caterpillar's basic body parts. These observations will help them compare and contrast caterpillars to the dramatically different butterflies that emerge after metamorphosis.

### ***\*Lesson 16–Trees: Spring Observations***

Children discuss how spring weather affects the tree, and make observations of the tree and its surrounding environment. They also discuss the stages of a tree's life cycle, and identify the likely stage of the class tree.

### ***\*Lesson 17–Butterflies: Chrysalises***

Children continue studying the life cycle of Painted Lady butterflies. They observe the pupa stage. During this stage, the caterpillar changes form and becomes a chrysalis as it creates a protective skin and prepares to metamorphose into an adult butterfly. The children continue their observations and discussions of the butterfly life cycle, with an emphasis on the concept of metamorphosis.

### ***\*Lesson 18–Seed to Seed: Looking at Flowers***

In this two-session lesson, children continue their study of the life cycle of a pea plant. In session 1, they listen to a read-aloud book, and consider the part the flower plays in the life cycle of a plant. In session 2, the children review the parts of the flower and begin to understand how the flower plays a critical role in seed formation.

Session 1 can be taught during language arts.

### ***\*Lesson 19–Trees: Spring Measurements***

Children take final measurements of the class tree and calculate its physical growth since the beginning of the school year.

This lesson can be taught during mathematics.

### ***\*Lesson 20–Trees: Study Results***

Children culminate their yearlong study of the class tree by illustrating the annual cycle of a deciduous tree and attaching it to a “Life Cycle of a Tree” poster. They discuss how the poster reveals the many annual cycles that occur within a single life cycle of a deciduous tree.

### ***\*Lesson 21–Butterflies: Adult Butterflies***

Children explore the final stage in the metamorphosis of the butterfly—the adult. If the timing is right, the children witness the dramatic emergence of a butterfly from its chrysalis. Otherwise, they experience the excitement of discovering that the adult butterflies have emerged as beautiful winged creatures. They also examine the eating behavior and physical features of the adult butterfly, and then compare and contrast these characteristics with those of the caterpillar.

### ***Lesson 22–Butterflies: Generations***

Children explore the final stage in the life cycle of the butterfly—the adult. If the timing is right, children witness butterflies mating, laying eggs, or both. Additionally, they observe butterfly eggs and discover the birth of a second generation as caterpillars hatch and the life cycle continues.

### ***\*Lesson 23–Seed to Seed: Observing Fruits and Seeds***

Children continue studying the life cycle of a flowering plant. They examine the fruits that developed on the class pea plants as well as a wide range of other fruits. They learn that the ovary is the part of the flower that develops into the fruit and reflect on the life cycle of the pea plant.

### ***\*Lesson 24–Humans: Measuring My Physical Growth—Spring***

Children take final measurements and calculate their physical growth since the beginning of the school year.

This lesson can be taught during mathematics.

### ***\*Lesson 25–Humans: Measuring My Intellectual Growth—Spring***

The children reflect on the learning, or intellectual growth, they achieved in science over the school year. They review their new understandings and the science skills they've learned, and demonstrate the skill they practiced all year. Finally, the children discuss how making and strengthening connections in the brain is how they learn best.

### ***\*Lesson 26–Comparing Cycles***

In this two-session lesson, the children create a “Who Am I?” guessing game packet for their families using their knowledge of the life cycles of the organisms they studied during this unit. The game is played using information that the children have recorded about the life spans, survival needs, and types of changes that humans, trees, pea plants, and butterflies undergo as they grow.

Session 1 can be taught during language arts.

***Skill Building Activity: Measuring Length and Circumference***

The children practice measuring the length and circumference of objects and rounding them to the nearest centimeter.

***Skill Building Activity: Observing and Describing***

Children practice making accurate and detailed descriptions before and after observing a familiar object. In doing so, they discover the importance of careful observation and detailed description in science.

***Skill Building Activity: Using Magnifiers***

Children learn how to use a magnifying lens, like the ones supplied in the Science Companion ExploraGear. There is also an extension in which children learn how to use a jeweler's loupe.