

SCIENCE 502

PLANTS: LIFE CYCLES

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INTRODUCTION

Plants are among the living things that God has created upon the earth. In the Book of Genesis, we read: “And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself, upon the earth: and it was so. And the earth brought forth grass, and herb yielding seed after his kind, and the tree yielding fruit, whose seed was in itself, after his kind: and God saw that it was good.” (Genesis 1:11-12). All of these living things are the part of God’s creation called plants.

In this LIFE PAC® you will learn about various kinds of plants, fungi, and protists. Fungi and protists have some similarity to plants, but they are also different. You will examine aspects of the life cycles of these living things. You will learn about some differences among plants, fungi, and protists. You will also learn about their common structures of and the ways they reproduce. Finally, you will have an opportunity to observe some of these living things close-up during experiments!



OBJECTIVES

Read these objectives. These objectives tell what you should be able to do when you have completed this LIFEPAAC. Each section will list according to the numbers below what objectives will be met in that section.

When you have finished this LIFEPAAC, you should be able to:

1. Classify all living things into one of five kingdoms.
2. Identify the main kinds and parts of plants.
3. Describe the life cycles of plants, fungi, and some protists.
4. Identify the main reproductive parts of seed-bearing and spore-bearing organisms.
5. Classify plants, fungi, and protists you observe.
6. Explain differences between the main categories of plants, fungi, and protists.
7. Relate the structure of plants, fungi, and protists with their reproduction in a life cycle.

VOCABULARY

Study these words. Learning the meaning of these words and their pronunciations will help you read and understand this LIFEPAAC better.

absorbs (ab sôrbz'). A body takes some liquid into itself by osmosis and holds it in.

adulthood (ə dult' hüd). The time of life when an organism is grown up enough to reproduce.

algae (al' jē). A group of water plants. Some have many cells. Others have one cell.

angiosperms (an' jē ō spurmz). A name given to flowering plants.

anther (an' thər). The part of a plant where pollen is made.

botany (bot' n ē). The study of plants.

delicate (del' ə kit). Easily hurt or broken.

digestion (də jes' chən). The act of changing food into a form that cells use for energy.

embryo (em' brē ō). The little plant inside a seed.

exposed (ek spōzd'). Uncovered or opened up.

fertilization (fēr' tl ə zā' shən). When a sperm cell joins an egg cell, a new life is started.

filament (fil' ə mənt). One of the male parts of a flowering plant that connects to the anther.

fungi (fun' jī). One of the five main kingdoms of living things. They do not produce chlorophyll.

gymnosperms (jim' nuh spurmz). A name given to nonflowering plants that produce seeds.
They are cone-bearers.

hyphae (hi' fe). Plural of *hypha*. The thread-like bodies of certain fungi.

monerans (mo ner' uns). Very tiny and simple organisms that are one of the five main kingdoms of living things.

offspring (ôf' spring). The result of reproduction. A new organism that will grow up to be similar to the parent.

ovary (ô' vər ē). The part of the plant that makes and holds the egg cells.

petal (pet' l). The brightly colored part of the flower that is easiest to see.

pistil (pis' tl). The part of a flower where seeds form and that is made up of the ovary, style, and stigma.

pollen (pol' ən). Grains of dusty powder formed by flowers to carry sperm cells.

protists (prō' tists). One of the five main categories of living things. They are tiny organisms.

sacs (saks). Plural of *sac*. Little bags on certain plant parts that hold something.

sperm (spèrm). The male cell that must join the female cell to begin new life.

spores (spôrz). Plural of *spore*. Spores are tiny, specialized structures that are able to grow into a new organism. Spores help an organism survive and move from place to place.

stamen (stă' mən). The part of the flower where pollen is stored. It is made up of the anther and the filament.

stigma (stig'mə). The part of the flower that takes in pollen.

style (stīl). The tube that connects the stigma to the ovary.

vegetative (vej' ə tă' tiv). The parts of a flowering plant that include the roots, stems, and leaves. It is also another form of reproduction of some plants.

yeast (yēst). A single-celled fungi.

Note: These words appear in **boldface** print the first time they are used in this LIFEPAC. If you are unsure of the meaning when you are reading, restudy the definition given in this LIFEPAC.

Pronunciation Key: hat, āge, cāre, fär; let, ēqual, tèrm; it, īce; hot, ōpen, ôrder; oil; out; cup, pūt, rüle; child; long; thin; /ʒh/ for then; /zh/ for measure; /ə/ represents /a/ in about, /e/ in taken, /i/ in pencil /o/ in lemon, and /u/ in circus.

I. CLASSIFYING LIVING THINGS AND PLANTS

INTRODUCTION

God has created a great variety of living things on the earth. God has placed these living things throughout the earth in all regions and environments. Many scientists today classify all living things into five main groups. These five groups are sometimes called *kingdoms*. The five kingdoms of living things are (1) animals, (2) plants, (3) **fungi**, (4) **protists**, and (5) **monerans**.

These living things are classified within one of these five kingdoms because they share certain basic characteristics. There are several characteristics that scientists consider when classifying living things. Some of these basic

characteristics include the physical structure and make-up, the means of obtaining food, and the means of reproduction. For example, protists and monerans are simple, tiny organisms made up of one cell or only a few types of cells, while plants and animals are complex organisms made up of many types of cells. Fungi can be simple, one-celled organisms, or they may be more complex. But all fungi are organisms that lack chlorophyll, the green coloring that many plants use to make food and oxygen. Therefore, fungi must obtain their food from outside sources. The following table shows some characteristics and examples of living things within each of the five kingdoms.

Review these objectives. When you have completed this section, you should be able to:

1. Classify all living things into one of five kingdoms.
2. Identify the main kinds and parts of plants.
3. Describe the life cycles of plants, fungi, and some protists.
4. Explain differences between the main categories of plants, fungi, and protists.

Restudy these words. They will appear for the first time in Section I of this LIFEPAAC.

adulthood	algae	botany
fungi	monerans	protists
spores	vegetative	yeast

TABLE I. Classifying Living Things

Kingdom	Cell Type	Food	Examples
Animals	multicellular	obtain from outside sources	worms, insects, fish, birds, mammals
Plants	multicellular	produce their own	moss, trees, flowering plants
Fungi	unicellular or multicellular	obtain from outside sources	mushrooms, yeast , molds
Protists	unicellular or multicellular	produce their own and obtains from outside sources	protozoa, paramecium, green algae , red algae
Monerans	unicellular or multicellular	engulfed from outside sources	bacteria, blue-green algae

In this LIFEPAC, we will examine some similarities and differences among various types of plants, fungi, protists, and monerans. We will especially focus on plants. In the next LIFEPAC, we will focus on animals.

In this section of the LIFEPAC, we will explore the kinds of plants, the structure of plants, and explain what is meant by the *life cycle* of living things.



Write the answers on the lines.

- 1.1 _____ has created a great variety of living things.
- 1.2 Scientists classify all living things into five _____.
- 1.3 The five _____ of all living things are:
- a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____



Answer these questions.

- 1.4 What are some of the basic characteristics that scientists consider when classifying living things? _____
- _____
- _____
- _____
- _____
- 1.5 How do fungi differ from green plants? _____
- _____
- _____
- _____
- _____
- 1.6 What are two examples in each of the five kingdoms of living things? _____
- _____
- _____
- _____
- _____

KINDS OF PLANTS

Plants are very important to us. Plants furnish people with the oxygen we breathe. The food we eat comes from plants or animals that eat plants. Plants also supply us with clothing from the fibers of plants such as cotton. Much of our shelter comes from plants, such as the lumber from trees used in building our homes. God has given us plants to support our life on earth.

Plants are one of the most common of the living things that you see every day. Grass, trees, flowers, and shrubs are some of the types of plants that are around you. There are probably over 260,000 kinds of plants on the earth! They vary greatly in size. Some plants that grow on forest floors are so tiny that they can barely be seen. Others, such as the giant sequoia trees growing in California are among the largest of all living things. These trees can grow to over 290 feet high and measure over 30 feet wide!

The study of plants is called **botany**, and the people who study plants are called botanists. Botanists classify plants into five basic groups. You will learn more about two of these plant groups in this LIFE PAC. One of these groups is seed-bearing plants. You will learn more about seed-bearing plants in Section II of this LIFE PAC. Ferns are another important group of plants. You will learn more about ferns in Section III of this LIFE PAC.



Giant Sequoia Trees in California

ACTIVITY!

Activity 502.A Observing Plants

- 1.7 Go outside to your yard or to a park and observe the different kinds of plants that you see. Make a list of as many types of plants as you can identify and share this list with your parent or teacher.



Adult Check

Initial

Date

PARTS OF PLANTS

All living things, including plants, are made up of cells. All plants are multicellular; that is, they have many cells. The cells are organized in each plant to perform different functions. Each group of cells with a similar function is called a *tissue*. Plants have several types of tissues. As you learned in a previous LIFEPAAC on cells, there are four main types of plant tissues: (1) epidermal, (2) connective, (3) storage, and (4) support. The epidermal tissues provide plant cover in the leaves as well as the roots. The connective tissues help the water, gases, and food compounds to travel to various parts of the plant. Storage tissues are contained in the leaves to store fat-type materials for the plant. Some plants, such as beets, carrots, radishes, and sweet potatoes, also have storage tissues in the roots to help store food for the plant. Finally, the support tissues help support the plant and keep it stable.

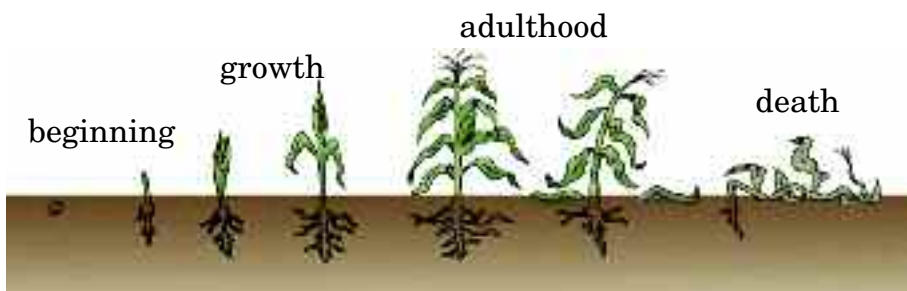
Plants also have different *parts*. Flowering plants, the most common type of plants, have four main parts: (1) roots, (2) leaves, (3) stems, and (4) flowers. The roots, stems, and leaves are called the **vegetative** parts of a plant. The flowers, fruits, and seeds are known as the reproductive parts of the plant. We will learn more about the reproductive parts of flowering plants in Section II of this LIFEPAAC.

LIFE CYCLES

All living things go through *life stages*. For example, they all have a beginning life stage and an ending life stage. Most living things also have a growth stage and a stage for **adulthood**. All of these stages for a living thing are called a *life cycle*. Similarity in life cycles is also one way we can classify or categorize living things. Many types of plants have similar life cycles. Some plants also have a similar life cycle to types of fungi and protists. Therefore, in this LIFEPAAC, we will focus on similarities in life cycles among various types of plants, fungi, and protists.

The stages of life are important in the life cycle of any living thing. For example, consider the life cycle of a typical corn plant. The four stages of the life cycle of a corn plant are (1) beginning, (2) growth, (3) adulthood, and (4) death — or end. The beginning stage of a corn plant starts when a new seed is made. After the seed is planted and receives proper nourishment of water and minerals, it enters the growth stage. The seed begins to develop into a mature plant. The mature plant occurs when the plant reaches adulthood and begins to produce ears of corn and many new seeds. Finally, the last stage is when the corn plant comes to an end and dies. These four stages in the lifetime of a corn plant are the life cycle of the corn plant.

LIFE CYCLE OF A CORN PLANT



The Four Parts of a Flowering Plant

In the remaining sections of this LIFE PAC, we will explore the similar life cycles of 3 categories of living things: (1) seed-bearing plants, (2) **spore**-bearing plants and fungi, and one-celled fungi and protists.



Answer true or false.

- 1.8 _____ Plants furnish people with oxygen.
- 1.9 _____ Plants do not vary greatly in size.
- 1.10 _____ Plants are both unicellular and multicellular.
- 1.11 _____ Cells that perform similar functions in a plant are called tissue.
- 1.12 _____ The roots, stems, and leaves of flowering plants are called the vegetative parts.
- 1.13 _____ All living things have a life cycle.
- 1.14 _____ The last life stage of a corn plant occurs when the seed begins to grow.



Answer these questions.

- 1.15 What are the four types of tissues in a plant?
- a. _____
- b. _____
- c. _____
- d. _____
- 1.16 What are the four main parts of flowering plants?
- a. _____
- b. _____
- c. _____
- d. _____
- 1.17 What are the four life stages of a corn plant?
- a. _____
- b. _____
- c. _____
- d. _____



Review the material in this section in preparation for the Self Test. The Self Test will check your mastery of this particular section. The items missed on this Self Test will indicate specific areas where restudy is needed for mastery.

SELF TEST 1

Match these items (each answer, 2 points).

- | | | | | |
|-------|-------|--------------------|----|--|
| 1.01 | _____ | animals | a. | the study of plants |
| 1.02 | _____ | plants | b. | flowers, fruits, and seeds |
| 1.03 | _____ | fungi | c. | roots, stems, and leaves |
| 1.04 | _____ | protists | d. | provides plant cover on leaves and roots |
| 1.05 | _____ | monerans | e. | storage tissue |
| 1.06 | _____ | kingdoms | f. | over 290 feet high |
| 1.07 | _____ | botany | g. | five main groups of all living things |
| 1.08 | _____ | reproductive parts | h. | bacteria, blue-green algae |
| 1.09 | _____ | vegetative parts | i. | protozoa, red algae |
| 1.010 | _____ | epidermis | j. | yeast, molds |
| | | | k. | moss, trees |
| | | | l. | insects, birds |

Complete these statements (each answer, 4 points).

- 1.011 _____ has created a great variety of living things.
- 1.012 Some of the basic characteristics of all living things include the physical structure and make-up, the means of obtaining _____, and the means of reproduction.
- 1.013 Fungi can be unicellular or _____.
- 1.014 There are probably over _____ kinds of plants on earth.
- 1.015 All living things go through _____ stages.

Complete the life stages of a corn plant in the proper order (each answer, 5 points).

- 1.016 _____
- 1.017 _____
- 1.018 _____
- 1.019 _____

Write the correct letter and answer on the blank (each answer, 4 points).

- 1.020 All fungi lack _____.
a. roots b. stems c. chlorophyll
- 1.021 People who study plants are called _____.
a. botanists b. chemists c. physicians
- 1.022 A mature corn plant occurs when the plant reaches _____.
a. five feet b. old age c. adulthood
- 1.023 The total number of life stages for a living thing is called a _____.
a. growth period b. life cycle c. tissue

1.024 Some plants have a similar life cycle to _____.
a. fungi b. protists c. both a and b

Answer this question (each answer, 5 points).

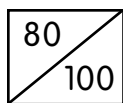
1.025 What are the four main parts of a flowering plant?

a. _____

b. _____

c. _____

d. _____



Score
Adult Check

Initial **Date**