

SCIENCE

Student Book

▶ **5th Grade | Unit 1**

.....

SCIENCE 501

CELLS

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LIFEPAC Test | **Pull-out**

CELLS

In the Book of Genesis, we read that God created everything, including all living things. In this LIFEPAC®, you will explore the tiny unit that God made part of all living things. This tiny unit that is part of all living things is called a cell. All living things that God has created contain cells.

Because most cells are so tiny, they can only be seen with the aid of a microscope. Therefore, it was only after microscopes were invented that men and women were able to explore the tiny world of cells. In 1665, an Englishman named Robert Hooke examined a slice of cork under a crude microscope. He noticed that the cork was made up of small chambers that were similar in appearance. He called these small units “cells.” Later, other people discovered more information about cells. They discovered new information about the make-up of cells, the types of cells, and the ways that cells grow and divide. They discovered much about the work and energy processes that take place within cells. Scientists are still making new discoveries today about cells and the fascinating things that happen in them.

In this LIFEPAC, you will also learn much about the make-up, types, and growth of cells. As you explore the fascinating world of cells, think about the wonderful work of God in making such tiny, complex, and orderly units to be part of all living things. Like King David in Psalm 143:5, you can think about the wonderful work of God’s hands in creating such a great variety of cells: “I meditate on all thy works; I muse on the work of thy hands.”

Science 500 Supplies

Many of the things that you will need to perform the experiments in Science 500 can be found around the home. For instance, instead of using test tubes, you may substitute baby-food jars and lids. Instead of a beaker, you may use a mayonnaise jar. Some of the things you will need to successfully perform the experiments you will just need to borrow or buy. There are resources in your area where you may be able to find these materials. Your local school may lend you a microscope or perhaps you can buy an older one from them when they purchase new ones. There may be discount department stores in your area that sell these things for low cost. Ordering science material through the mail or over the Internet is also a possibility. With each complete boxed set of science curriculum, you should receive an order blank from a trusted supplier for science supplies in the sizes and amounts that you will need to successfully perform the experiments.

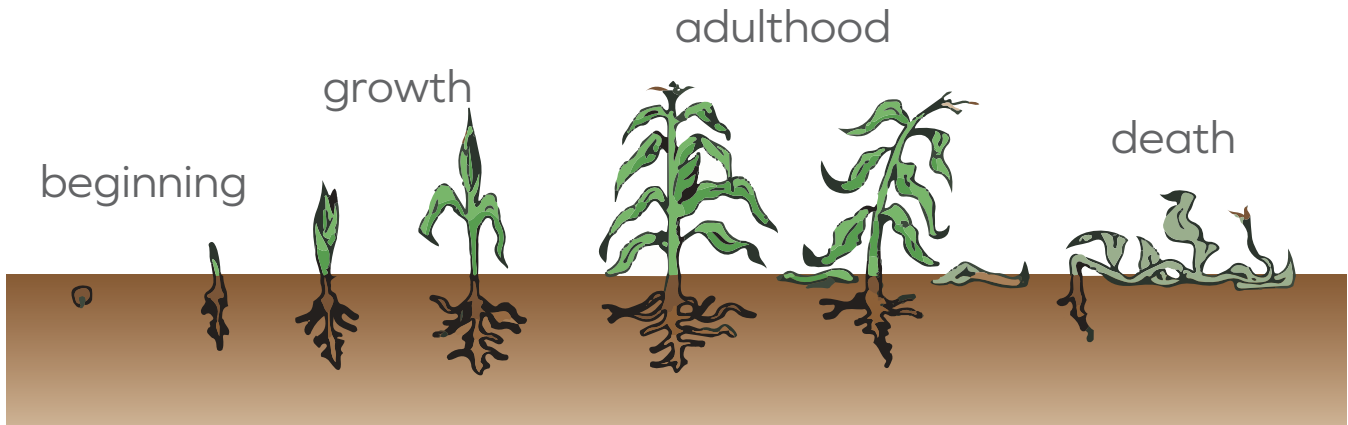
If you did not receive an order blank, call the Alpha Omega Publications Customer Services Department for more information.

A suggested support item for this course is the 5th Grade Science experiments video, SD0501. The video includes presentations of many of the experiments in this course. Several of the experiments that require special equipment or materials are demonstrated on these videos. They can either be used for answering the questions of the lab report or as a demonstration of the procedure prior to performing the experiment. A notice is included with each experiment in the LIFEPAC where the video is available.

Remember, it is the supervisors' or parents' responsibility to make sure that all students follow proper safety procedures for experiments and lab work. Any questions that you have about chemicals or supplies should be directed to the supplier of those materials. It cannot be assumed that all necessary warnings and precautions are contained in this material.



As a Christian school curriculum publisher, we discuss what is taught and believed regarding the creation and origins of life on our planet from the Christian point of view. It is the responsibility of the family to decide what they desire to be learned by their students in the school and the home, and whether or not the biblical view is what they want to be taught. There are a number of Christian websites on the Internet, however, that may be examined to get further information on the origins of life from a biblical point of view. One of them is the Creation Research Institute website.



| Life cycle of a corn 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.



| Energy from the sun is stored in food.



| Animals benefit from this stored energy.



| The stored energy in food also gives us energy.

Sources of energy. God has provided us with many sources of energy. Our main source of energy is the sun. Each day, a great amount of energy is released from the sun. The sun's energy comes to us in the forms of heat energy and light energy. Only a small portion of the sun's energy falls on the earth. However, this small amount of the sun's energy is more than enough to support life on our planet.

Energy from the sun provides for most of the other energy sources that we have on earth. It does this because the sun's energy can be stored in matter. This energy in matter can be used as other sources of energy for us. For example, you have already learned that part of the sun's energy is stored in green plants as food. This food can be used as an energy source for other living things. The food is eaten and the cells of living things *burn* it for energy. The cells in your body burn food and provide the energy you need to move, grow, and do all of your activities.

God has provided many other sources of energy. For example, **nuclear** energy, chemical energy, and solar energy are also sources of energy being used today. You will learn more about some of these sources of energy later in this LIFE PAC.



Complete this activity.

1.7

Do a word search for *sources of energy* in the puzzle below. There are eleven sources of energy that have been mentioned so far in this LIFE PAC. All eleven words are in the puzzle. The words are either listed across or down. None of the words are listed backwards or diagonally. When you find the words, circle them and write them in the spaces below.

Word Search

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

Across

Down

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____
- f. _____

- g. _____
- h. _____
- i. _____
- j. _____
- k. _____

EXPERIMENT 507.A

MOLD FOSSIL COPY



View 507 Mold Fossil Copy:
Grade 5 Science experiments video

You will examine what happens when a mold fossil is made. Your result will not be a real fossil. It will be a copy of a mold fossil.

These supplies are needed:

a small plastic container (about 10 centimeters across)
modeling clay
a seashell or bone

Follow these directions carefully. Check the box when each step is completed.

1. Press the modeling clay into the bottom of the plastic container. The clay should be at least 1 centimeter thick.
2. Smooth the surface of the clay.
3. Carefully press the shell or bone into the clay. (If you use a shell, press the outside of the shell into the clay.)
4. Lift the shell or bone out of the clay. You should have a clear imprint remaining in the clay.
5. Keep your mold fossil copy from this experiment in a safe place to use in the next experiment.

SELF TEST 1

Match these items (each answer, 3 points).

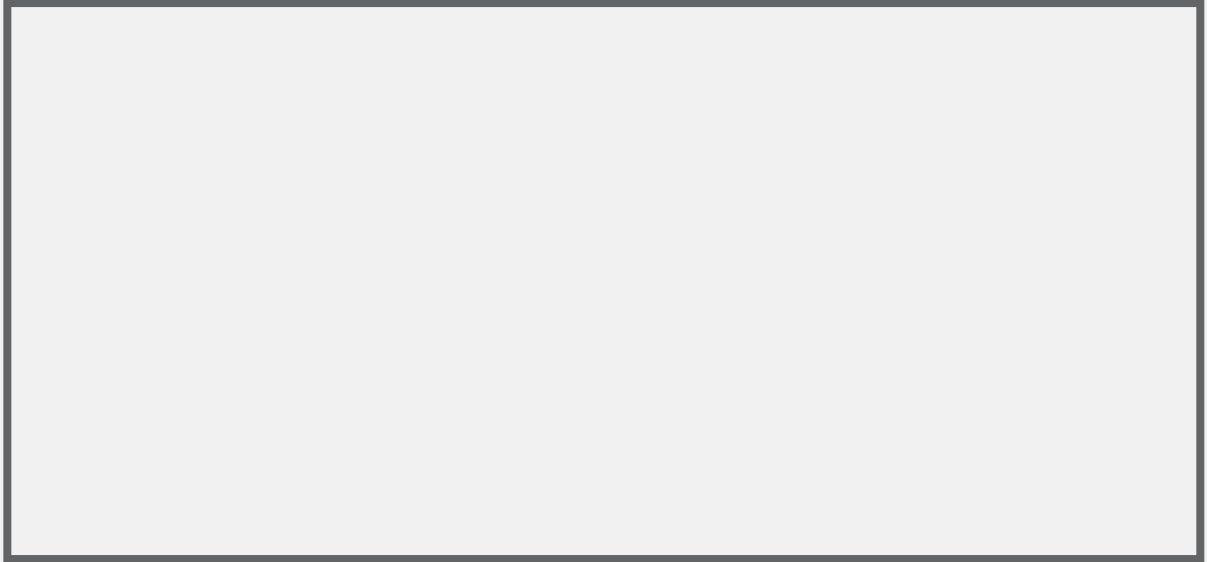
- | | | |
|------|-------------------|-------------------------------|
| 1.01 | _____ color | a. common property of matter |
| 1.02 | _____ volume | b. special property of matter |
| 1.03 | _____ odor | c. not a property of matter |
| 1.04 | _____ mass | |
| 1.05 | _____ density | |
| 1.06 | _____ inertia | |
| 1.07 | _____ brittleness | |
| 1.08 | _____ measurement | |
| 1.09 | _____ solubility | |
| 1.10 | _____ liquid | |

Answer true or false (each answer, 2 points).

- 1.011 _____ Matter is the substance that we can sense and observe.
- 1.012 _____ Matter does not go through change or cycles.
- 1.013 _____ All matter in the universe has some common properties.
- 1.014 _____ Ten gallons of water is a measurement of its mass.
- 1.015 _____ An object's weight is always the same as its mass.
- 1.016 _____ Inertia causes an object at rest to remain at rest.
- 1.017 _____ Density is the amount of mass in a given volume of material.
- 1.018 _____ Changing from liquid to gas is a chemical change.
- 1.019 _____ Gas molecules of material move slower than those of a liquid of the material.

Draw this diagram (this answer, 5 points).

- 1.015** Draw a diagram of the earth. Label the main parts using these terms: *inner core*, *outer core*, *mantle*, *crust*.



Write the correct answer on each line (each answer, 3 points).

- 1.016** _____ is a very common sedimentary rock made of tiny grains of clay.
 a. Limestone b. Slate c. Shale d. Granite
- 1.017** Many sedimentary rocks were probably formed at the time of _____.
 a. Earth's creation b. the Flood
 c. Adam d. Abraham
- 1.018** Marble rock was once _____.
 a. shale b. limestone c. granite d. wood
- 1.019** One physical test for rocks is to check their _____.
 a. size b. weight c. color d. flatness
- 1.020** Melted rock from a volcano is called _____.
 a. lava b. magma c. strength d. faulting
- 1.021** The earth's landforms are _____.
 a. always the same b. constantly changing
 c. very rare d. mainly mountains



SCIENCE

Teacher's Guide

► **5th Grade**

SCIENCE 500

Teacher's Guide

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INSTRUCTIONS FOR SCIENCE

The LIFEPAC curriculum from grades two through twelve is structured so that the daily instructional material is written directly into the LIFEPACs. The student is encouraged to read and follow this instructional material in order to develop independent study habits. The teacher should introduce the LIFEPAC to the student, set a required completion schedule, complete teacher checks, be available for questions regarding both content and procedures, administer and grade tests, and develop additional learning activities as desired. Teachers working with several students may schedule their time so that students are assigned to a quiet work activity when it is necessary to spend instructional time with one particular student.

The Teaching Notes section of the Teacher's Guide lists the required or suggested materials for the LIFEPACs and provides additional learning activities for the students. The materials section refers only to LIFEPAC materials and does not include materials which may be needed for the additional activities. Additional learning activities provide a change from the daily school routine, encourage the student's interest in learning and may be used as a reward for good study habits.

If you have limited facilities and are not able to perform all the experiments contained in the LIFEPAC curriculum, the Science Project List may be a useful tool for you. This list prioritizes experiments into three categories: those essential to perform, those which should be performed as time and facilities permit, and those not essential for mastery of LIFEPACs. Of course, for complete understanding of concepts and student participation in the curriculum, all experiments should be performed whenever practical. Materials for the experiments are shown in Teaching Notes—Materials Needed.

A suggested support item for this course is the 5th Grade Science Experiments Video, SD0501. The video includes presentations of many of the experiments in this course. Several of the experiments that require special equipment or materials are demonstrated on these videos. They can either be used for answering the questions of the lab report or as a demonstration of the procedure prior to performing the experiment. A notice is included with each experiment in the LIFEPAC where the video is available.

TEACHING NOTES

MATERIALS NEEDED FOR LIFE PAC

Required

- optical microscope
- slides
- slide covers
- toothpicks
- diluted iodine solution
- 3 small jars half-full of water
- onion bulb
- knife or scalpel
- tweezers
- small eyedropper
- sterile needle
- ink stain
- pond water
- cotton ball
- rubbing alcohol

Suggested

- 5th Grade Science Experiments Video

ADDITIONAL LEARNING ACTIVITIES

Section 1: The Basic Unit of Living Things: A Cell

1. Introduce students to the use of a microscope. Show them how to magnify and focus. Have students look at a drop of water, hair, paper, thread, and so forth for practice.
2. Students: Make drawings of a cell and label the nucleus, membrane, and cytoplasm. Under the drawing list the three parts and write a one-sentence description for each.
3. Prepare slides of several different fruits and vegetables. Observe and discuss your slides.
4. Look up information on Robert Hooke and write a short report.
5. Be creative! Write a few paragraphs and illustrate a story titled: "A Cell Named _____ (your name) _____." Include your parts and functions.

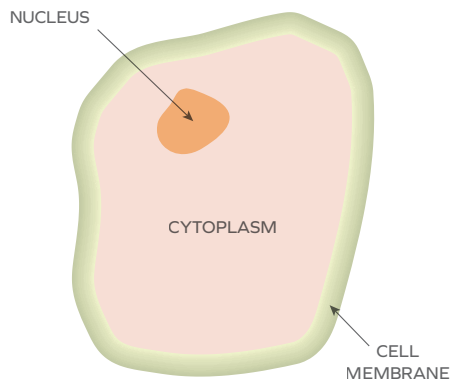
Section 2: The Life and Activity of Cells

1. Have two green stalks of celery, one firm and one wilted. Discuss their color and rigidity. Encourage students to study Section 2 to find out why stalk #2 is weak and wilted.
2. Divide the class into pairs. Instruct each student to draw five different kinds of cells that they studied in Section 2. Have students exchange papers and label their partner's drawing.
3. Instruct the students to make a word find puzzle using the vocabulary words in this section of the LIFE PAC. Students can exchange puzzles and write the meanings of the words they unscrambled.

ANSWER KEYS

SECTION 1

- 1.1 cells
- 1.2 cork
- 1.3 basic unit
- 1.4 unicellular
- 1.5 multicellular
- 1.6 b
- 1.7 f
- 1.8 a
- 1.9 d
- 1.10 g
- 1.11 c
- 1.12 Typical 3-part cell

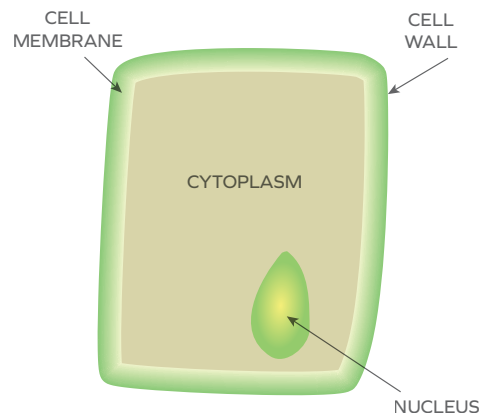


- 1.13 true
- 1.14 false
- 1.15 true
- 1.16 true
- 1.17 false
- 1.18 Microscopes help us to view cells. (Two types of microscopes are optical microscopes and electron microscopes.) It is also helpful to use dyes to view cells.
- 1.19 Compare to the cell illustrations shown in the LIFE PAC.
- 1.20 The student's additional observations should be noted.

SELF TEST 1

- 1.01 e
- 1.02 k
- 1.03 c
- 1.04 a
- 1.05 i
- 1.06 d
- 1.07 g
- 1.08 b
- 1.09 f
- 1.010 m
- 1.011 c. cells
- 1.012 c. discoveries
- 1.013 b. unicellular
- 1.014 a. a nucleus
- 1.015 d. optical microscope
- 1.016 d. all of these
- 1.017 b. yolk of an ostrich egg
- 1.018 The answer should contain some of the following: A cell is the basic unit of all living things. It is the unit of life. All living things that God has created contain cells. A cell contains at least two basic parts: a cell membrane and protoplasm. Three-part cells contain a cell membrane, cytoplasm, and a nucleus.
- 1.019 The dyes stain certain parts of the cell—such as the cell membrane and the nucleus—so that they stand out more clearly when the cells are viewed under the microscope.

1.020



SECTION 3

- 3.1** Plants take in carbon dioxide through their leaves and water from their roots. In photosynthesis, the chlorophyll in the plant receives the energy needed from the sun to cause a chemical reaction with the carbon dioxide and water. As a result, oxygen gas is produced, along with sugars and other materials that the plant can use as food. The oxygen produced by photosynthesis is given off through the leaves.
- 3.2** No.
- 3.3** Respiration is the opposite of photosynthesis. Oxygen is used up, and water and carbon dioxide are given off.
- 3.4** c. oxygen and sugars
- 3.5** b. both plants and animals
- 3.6** d. red blood cells
- 3.7** c. energy
- 3.8** a. each other
- 3.9** Food is brought into the body through eating and the body's digestive system. Oxygen is brought into the body through breathing. Respiration occurs when the food is combined with the oxygen in the body, giving off energy the body needs to perform life and work.
- 3.10** Plants and animals depend on each other to carry on life. Plants must have adequate carbon dioxide given off by animals and human beings in order for the process of photosynthesis to take place. In turn, animals and human beings rely on plants for the oxygen and much of the food they receive. God has arranged this important cycle of energy in the world.
- 3.11** false
- 3.12** true
- 3.13** true
- 3.14** false
- 3.15** true
- 3.16** true
- 3.17** two
- 3.18** mitosis
- 3.19** cell division
- 3.20** red blood
- 3.21** Nerve
- 3.22** Teacher check

SELF TEST 3

- 3.01** true
- 3.02** false
- 3.03** true
- 3.04** false
- 3.05** true
- 3.06** true
- 3.07** true
- 3.08** true
- 3.09** true
- 3.010** false
- 3.011** true
- 3.012** c. discoveries
- 3.013** d. all of these
- 3.014** a. organelles
- 3.015** a. oxygen
- 3.016** c. White blood
- 3.017** a. cell division
- 3.018** Nerve
- 3.019** Muscle
- 3.020** Phospholipids
- 3.021** Any order:
a. DNA
b. RNA
c. other proteins
- 3.022** Mitosis brings about cell division and two new cells from one original cell. Mitosis starts when the chromatin within the cell begins to rearrange and condense into orderly strands called *chromosomes*. The chromosomes then move into pairs. After that, the chromosome pairs begin to pull apart from each other. Eventually, the chromosome pairs split apart. When they split apart, cell division occurs. Then there are two new cells instead of the original single cell.
- 3.023** Most of the multicellular plants and animals reproduce themselves by the process known as *male-female reproduction*. A cell from a male parent and a cell from a female parent join together to form a new cell. This process begins a new living thing that has characteristics of both parents. The newly formed cell then begins to reproduce itself through mitosis.
- 3.024** In photosynthesis, green plants containing chlorophyll absorb energy from the sun to cause a chemical reaction between carbon dioxide and water to produce oxygen and sugars. Respiration is the opposite of photosynthesis. In respiration, oxygen and food combine to produce energy and carbon dioxide and water are given off.

LIFEPAC TEST

1. d
2. e
3. f
4. b
5. c
6. g
7. h
8. i
9. j
10. k
11. true
12. true
13. true
14. true
15. false
16. true
17. false
18. false
19. true
20. true
21. c. cells
22. a. a nucleus
23. c. oxygen and sugars
24. d. red blood cells
25. b. nuclear membrane
26. Any order:
 - a. optical
 - b. electron
27. Any order:
 - a. nuclear membrane
 - b. chromatin
 - c. nucleolus
28. Any order and any four of the following six:
white blood cells
red blood cells
nerve cells
bone cells
epithelial cells
muscle cells
29. The answer should contain some of the following: A cell is the basic unit of all living things. It is the unit of life. All living things that God has created contain cells. A cell contains at least two basic parts: a cell membrane and protoplasm. Three-part cells contain a cell membrane, cytoplasm, and a nucleus.
30. Food is brought into the body through eating and the body's digestive system. Oxygen is brought into the body through breathing. Respiration occurs when the food is combined with the oxygen in the body, giving off energy the body needs to perform life and work.

ALTERNATE LIFE PAC TEST

1. true
2. false
3. true
4. true
5. true
6. true
7. false
8. false
9. false
10. true
11. Any order:
 - a. carbon dioxide
 - b. water
 - c. sunlight
12. a. - b. Either order:
 - a. oxygen
 - b. food
 - c. carbon dioxide
13.
 - a. oxygen
 - b. carbon dioxide
14.
 - a. fearfully
 - b. wonderfully
15. need drawing and label
16. c. microscope
17. b. male-female reproduction
18. a. organelles
19. a. cell division
20. b. DNA
21. Examples; any order:
 - a. epithelial
 - b. connective
 - c. muscle or nervous
22. Either order:
 - a. oxygen
 - b. sugars or food
23. e
24. f
25. a
26. g
27. b
28. h
29. c
30. i
31. d
32. l

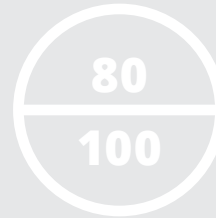
SCIENCE 501

ALTERNATE LIFEPAC TEST

NAME _____

DATE _____

SCORE _____



Write true or false (each answer, 2 points).

1. _____ Cells are the basic unit of life.
2. _____ All cells have a cell wall.
3. _____ Prokaryote cells have only two parts—an outer membrane and inner protoplasm.
4. _____ Almost all cells are microscopic.
5. _____ Scientists are still making new discoveries today about cells.
6. _____ The cell membrane consists of a phospholipid double layer and proteins.
7. _____ The cell wall is usually made up mostly of water.
8. _____ Photosynthesis in plants produces carbon dioxide and water.
9. _____ Protozoa are an example of a multicellular organism.
10. _____ Budding is a process of cell reproduction.

Complete these statements (each answer, 3 points).

11. Photosynthesis works when a. _____, b. _____ and c. _____ are present in the plant.
12. The carbon cycle needs a. _____ and b. _____ from plants and c. _____ from animals.
13. Red blood cells take a. _____ to the cells and b. _____ away from them.
14. Psalms 139:14 says that we are a. _____ and b. _____ made.

