

SCIENCE

Student Book

▶ **4th Grade | Unit 10**

SCIENCE 410

UNDERSTANDING GOD'S WONDERFUL CREATION

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UNDERSTANDING GOD'S WONDERFUL CREATION

The nine Science LIFEPACs that you have already completed in this series have helped you understand more about God's great creation.

The distant stars, the sun, the moon, and the billions of galaxies in space all point to a God of order. The earth, speeding around the sun, travels in an exact orbit. In this LIFEPAC® you will review the solar system, plants, and animals. Matter, water, and weather will also be discussed.

A review of man's discoveries will be included. You will recall how man has used gravity, electricity, and magnetism to help him in his work. Man has also made simple and complex machines to speed up his work and make it easier.

Man is beginning to recognize that he has been selfish and careless with the resources God has placed upon the earth. A review of ecology, communities, and conservation will help you to better understand these problems.

Objectives

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

1. Tell who created the universe.
2. List the planets in their order from the sun.
3. Explain the difference between astronomy and astrology.
4. Name the three forms of matter and give an example of each.
5. Describe matter, molecules, and atoms.
6. Tell what an element is.
7. Recognize four causes of weather.
8. Identify five instruments used in predicting weather.
9. Tell who discovered the laws of gravity and how gravity affects things on the earth and moon.
10. Explain how objects, atoms, electrons, and electricity relate to each other.
11. Tell about magnets, magnetic materials, and electromagnets.
12. Identify five scientists and tell what they were famous for.
13. Name and give examples of six simple and several complex machines.
14. Tell about communities of living things and how the living things depend upon each other.
15. Tell ways that resources can be conserved and preserved.



1. GOD'S WONDERFUL CREATION

A close-up photograph of a person's hand holding a small, realistic globe of the Earth. The hand is positioned at the bottom of the frame, with fingers gently cradling the globe. The globe shows the continents and oceans in detail. The background is a soft, out-of-focus light blue.

Do you remember how far the earth is from the sun? The earth is just the right distance—about 93 million miles (150 million kilometers). If this distance were much greater, all life on earth would freeze. If it were less, the world would burn up. God's plan for His creation is perfect. In this part of your LIFE PAC, you will review and study about the solar system, including the earth.

You will recall the parts of a plant and their functions. You will also review how a loving God has provided for plants and animals in order that they may serve us and help keep us alive.

Objectives

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

1. Tell who created the universe.
2. List the planets in their order from the sun.
3. Explain the difference between astronomy and astrology.
14. Tell about communities of living things and how the living things depend upon each other.

Vocabulary

Study these new words. Learning the meanings of these words is a good study habit and will improve your understanding of this LIFEPAC.

asteroid (as' tu roid): Any of the very small planets revolving around the sun.

astrology (u strol' u jē): A false science that claims to tell a person's future by studying the heavenly bodies.

extinct (ek stingkt'): No longer living.

gravity (grav' u tē): The natural force that causes objects to move toward each other.

habitat (hab' u tat): A place where an animal or plant naturally lives and grows.

invertebrate (in vèr' tu brit): An animal without a backbone.

meteoroid (mē' tē u roid): An object in space which becomes a meteor when it enters the earth's atmosphere.

photosynthesis (fō tu sin' thu sis): The process in a plant that changes light into food.

vertebrate (vèr' tu brit): An animal that has a backbone.

Note: All vocabulary words in this LIFEPAC appear in **boldface** print the first time they are used. If you are unsure of the meaning when you are reading, study the definitions given.

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

Solar System

Before plants, animals, or man was placed upon the earth, God had spoken the sun and moon into existence. The sun, earth, moon, planets, and smaller objects called **meteoroids**, comets, and **asteroids**, make up what we call the solar system. He had made the stars, also.

Origin. On the fourth day of Creation God said (Genesis 1 :14), "Let there be lights in the firmament of the heaven to divide the day from the night." The Bible account tells us that the lights were to be "... the greater light to rule the day." On the fourth day, God also created the moon. God called it "... the lesser light to rule the night." The Bible tells us that God also made the stars.

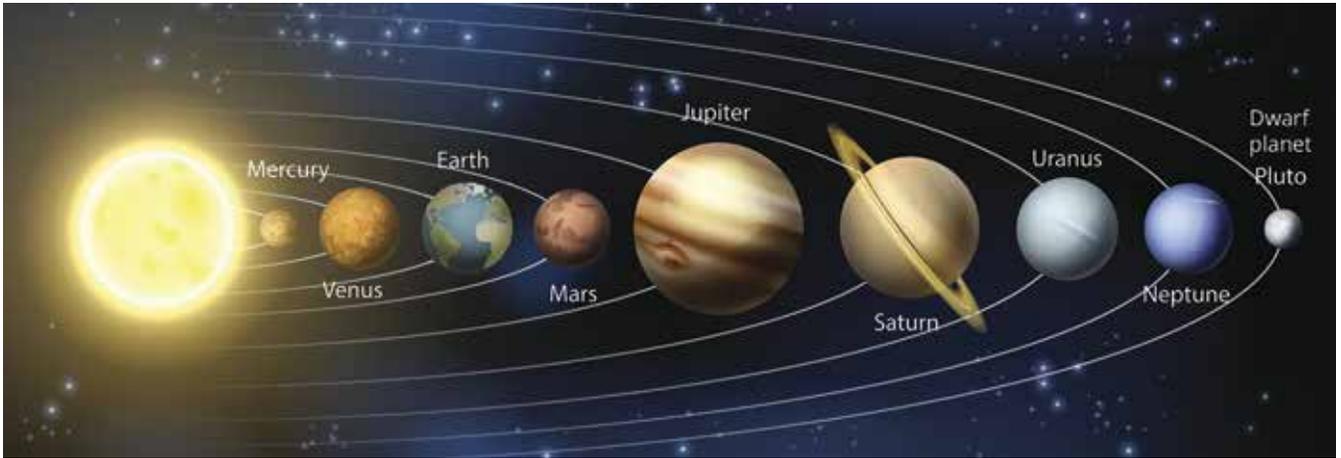
Sun. Our sun is a star. It is the center of our solar system. The earth, moon, planets, and smaller heavenly bodies revolve around the sun. Without the sun, life on this planet earth would be impossible. Without the sun there could be no weather. The tilt of the earth causes our seasons. The heat from the sun moves the air, causing the wind. The sun seems to rise in the east and set in the west because of the rotation of the earth. The earth rotates on its axis once every twenty-four hours. The revolution of the earth around the sun occurs once every 365 1/4 days. Our year is measured by this revolution. The sun also moves. It spins on its axis and rushes through the Milky Way at a speed of 43,000 miles (69,187 kilometers) an hour.

Moon. Our nearest neighbor in space, the moon, is about 240,000 miles (386,160 kilometers) from the earth. Since the moon has no air or water, no life is there. The **gravity** on the surface of the moon is only about one-sixth of that on the earth. If a person weighs sixty pounds here on earth, he would weigh only ten pounds on the moon. If he could lift fifty pounds here, he could lift three hundred pounds there. Two astronauts made the first landing on the moon in 1969. They brought back samples of soil and rocks for study.



| Moon landing

Planets. Do you remember how many planets are revolving around the sun? Eight planets, including the earth, orbit the sun. You will recall that Mercury is the nearest to the sun. The other planets, in order from the sun, are Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Pluto was once included in the list of planets but because of its size it has been reclassified as a dwarf planet. (For twenty years at a time Pluto is closer to the sun than Neptune.)



| Our Solar System

Stars. The number of stars that we can see on a clear night without a telescope is between three thousand and five thousand. Man has estimated an endless number of galaxies with billions and billions of stars in each galaxy.

Because stars have been studied for centuries by astronomers, some people confuse astronomy and **astrology**. Astronomy is a scientific study of the universe. Astronomy is a true science. Astrology is superstition. Astrologers make a business of trying to tell people's fortunes by studying the planets and stars. The Bible warns against believing in astrology. Scientists know that such dependence on the stars is nonsense. We study astronomy to better understand the universe, not to learn about ourselves or our future.



| Telescope

**Write true or false.**

- 1.1** _____ The earth revolves around the sun, causing day and night.
- 1.2** _____ The sun travels through the Milky Way at a high speed.
- 1.3** _____ God created the moon on the seventh day.
- 1.4** _____ Without the sun, life on earth would be impossible.
- 1.5** _____ Eight planets orbit the sun.
- 1.6** _____ Four planets orbit the earth.
- 1.7** _____ Astrology is a superstition warned against in the Bible.
- 1.8** _____ The earth is the center of the solar system.
- 1.9** _____ Comets are smaller objects in space that orbit the sun.
- 1.10** _____ Asteroids orbit the moon once every twenty-four hours.

**Write the letter of the correct answer on each line.**

- 1.11** Two astronauts landed on the moon in _____ .
a. 1969 b. 1909 c. 1979
- 1.12** The planet nearest the sun is the planet _____ .
a. Mercury b. Venus c. Earth
- 1.13** The scientific study of the universe is called _____ .
a. geology b. astrology c. astronomy
- 1.14** The number of stars that can be seen on a clear night without a telescope is _____ .
a. 200 to 500
b. 3,000 to 5,000
c. 5,000,000 to 10,000,000
- 1.15** An instrument used to study the stars is the _____ .
a. telescope b. periscope c. barometer

- 1.16** The Bible account of creation tells us that the sun and moon were created to rule _____ .
- a. the earth
 - b. day and night
 - c. the people of the earth

- 1.17** Astronomy is a _____ .
- a. superstition
 - b. science
 - c. false religion



Answer these questions.

- 1.18** What are the four large bodies that make up the solar system?
- a. _____
 - b. _____
 - c. _____
 - d. _____
- 1.19** What are the smaller objects in the solar system called?
- a. _____
 - b. _____
 - c. _____
- 1.20** If a boy weighs 60 pounds on earth, how much would he weigh on the moon?
- _____

Earth

Plants, animals, and man depend on God's wonderful creation and each other for life. In this part of your LIFE PAC, you will review the structure of plants and how plants function. You will recall that the five important parts of plants are the roots, stems, leaves, flowers, and fruit.

Animals, too, are an important part of God's creation. You will recall how

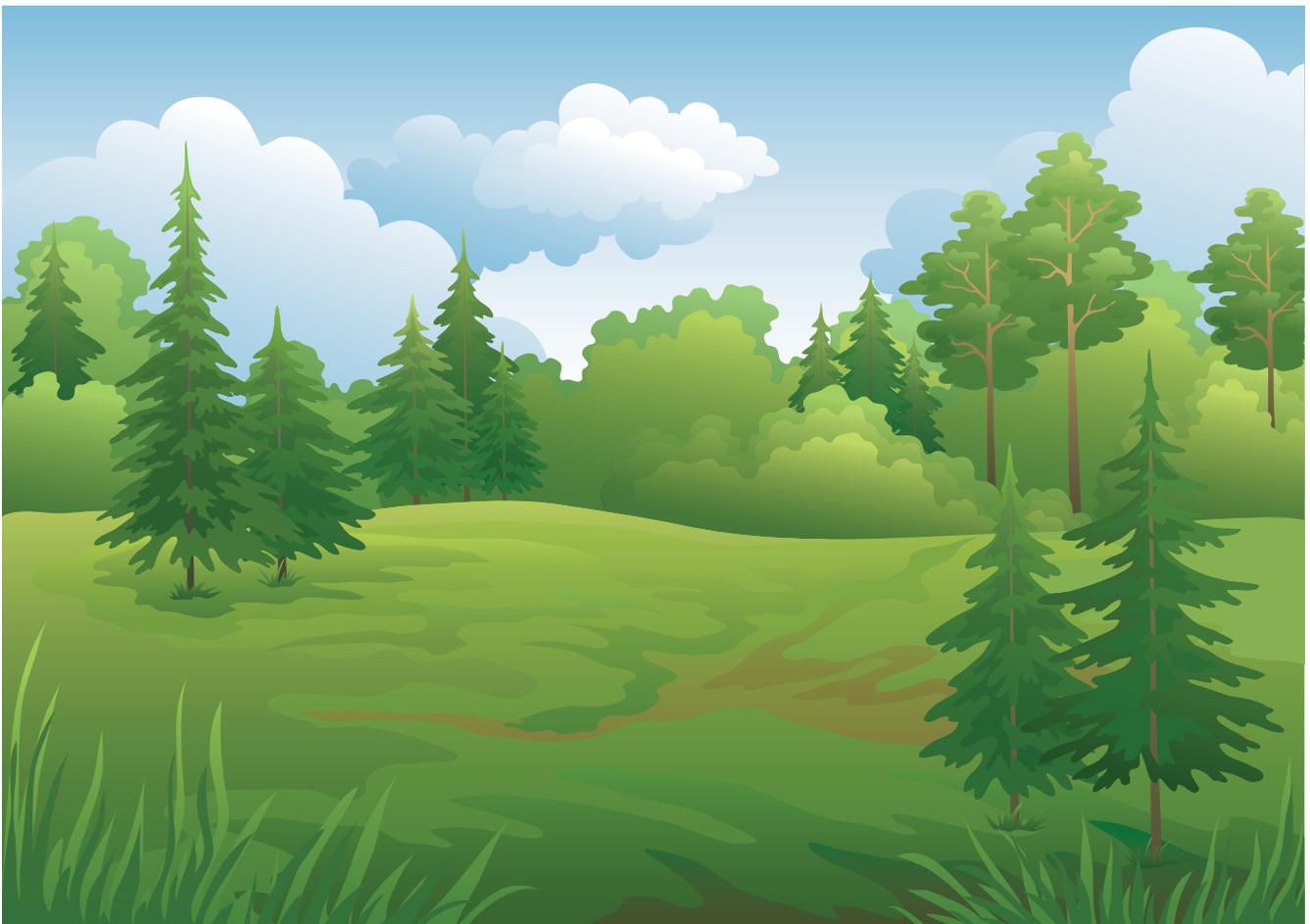


wonderfully animals are made. Animals can travel long distances by walking, running, flying, or swimming. Each animal is suited for living in the community where he has been placed. Animals eat and digest many different types of food. They breathe by means of lungs, gills, and pores. You will also review in the LIFEPAC something about the actions of mammals, fish, birds, and insects. You will also recall how animals are provided for and protected by God and man.

Plants. When God created the earth, He created both nonliving and living things. Plants are living things. Like all of God's creation, plants were made by design. They serve many purposes in the world. Individual plants have parts that make up their total structure. Those parts, the roots, stems, leaves, flowers, and fruit, are necessary for the plants to live, grow, and reproduce.

You remember that all living things need air, light, water, and food. Before God put plants on the earth, He placed all the necessary things on the earth to help plants grow. He made each part of the plant with something special to do.

The roots of a plant reach into the earth's soil to drink up the water and take up



minerals. The water and minerals move up through the stem to feed the leaves, the buds, and the flowers.

From the air the green leaves take carbon dioxide. Light from the sun shines upon the leaves. The carbon dioxide gas combines with the water in the leaves. By the process of **photosynthesis**, the leaves put all these elements together to make food.

Some plants, such as beets and carrots, store their food in their roots. Other plants store food in their stems (celery) or in their fruit (apple and orange trees). In addition to food, some plants are used for shelter and enjoyment.

Plants also have another very important use. They breathe in some of the carbon dioxide that man and animals exhale. The plants then give off oxygen into the air. This process keeps both animals and humans alive. It keeps a balance of fresh air in our natural surroundings.

Leaves drop to the ground and decay or rot. Decaying leaves put minerals back in the soil. The plants, leaves, wind, animals, and decay all work together to keep life going. This process is called the *decay cycle*.



| Decaying tree

**Write true or false.**

- 1.21** _____ Plants take only oxygen from the air to make food.
- 1.22** _____ Plants need air, light, water, and food to grow.
- 1.23** _____ The stems and leaves of carrots are storehouses for the food they make.
- 1.24** _____ Plants take up minerals from the soil.
- 1.25** _____ Each part of a plant has something special to do.

**Answer these questions.**

- 1.26** What are the five important parts of a plant?
- a. _____ b. _____
- c. _____ d. _____
- e. _____
- 1.27** What are two important uses of plants?
- a. _____ b. _____
- _____

**Complete these sentences.**

- 1.28** Photosynthesis is the process by which plants take in a. _____ from the air to make b. _____. This process is done in the green c. _____ of the plants while the d. _____ is shining.



Draw lines to match these items.

- | | |
|--|---|
| <p>1.29 God</p> <p>1.30 decay</p> <p>1.31 leaves</p> <p>1.32 stems</p> <p>1.33 roots</p> <p>1.34 water</p> | <p>a. make food</p> <p>b. created plants</p> <p>c. take minerals from the soil</p> <p>d. moves up the stem</p> <p>e. carry water to leaves</p> <p>f. means <i>become rotten</i></p> |
|--|---|



Review parts of a flower. Refer to Science LIFE PAC 401. Read about flowers and study Section 2. Study the diagram of the parts of a flower. Then complete this chart. The first item is done for you.

1.35

PARTS OF A FLOWER	WHAT THE PART DOES
<p>sepal</p> <p>a. <i>stem</i></p> <p>b. <i>receptacle</i></p> <p>c. <i>petal</i></p> <p>d. <i>pistil</i></p>	<p style="text-align: center;">protects part of the flower</p> <hr/> <hr/> <hr/> <hr/>



Teacher check:

Initials _____ Date _____

Animals. In Science LIFE PAC 402 you studied about different animals. You learned that animals with a backbone are called **vertebrates**. Animals without backbones are called **invertebrates**.

Mammals are vertebrates. They have hair and nearly all of them breathe through their lungs. Female mammals produce their own milk to feed their babies. The blood of mammals stays about the same temperature all the time.

Mammals are called warm-blooded animals. The elephant is the largest land mammal. However, the whale is the largest of all mammals and the shrew is the smallest.

In addition to mammals, you studied about birds, fish, and insects. Birds migrate long distances. The Arctic tern migrates from the Arctic to the Antarctic, a round trip flight of 22,000 miles (35,000 kilometers). Some birds migrate at night, others by day. Some travel alone, others in flocks.

What a wonderful God we have! He created birds with instinct that helps them fly long distances and return without getting lost.



Read again the story of the Whistling Swans in Science LIFE PAC 402

- 1.36** Notice how well the swans are adapted to the long flights they make from South Carolina to their breeding grounds in the arctic. Notice, too, how their bones, wings, and feathers are made in such a way as to make flying easier.



Teacher check:

Initials _____ Date _____

No one knows except the Creator just what instinct is or how it guides birds and animals in such distant trips. We only know that both birds and animals have what is called instinct and use it in ways that we cannot understand.

The instinct and special senses that God has given birds, insects, and animals are wonderful gifts that help to protect them. The bat is a good example. Although this little mammal cannot see very well, it flies by means of a built-in type of "radar." This built-in system keeps the bat from hitting objects. It also helps it to fly at night when many insects are in the air. The bat needs the insects for food.

The green turtle is another living example of instinct. Instinct guides this reptile long distances through ocean water back to the little island where it was born.



Match these items

- | | | |
|-------------|------------------------|-----------------------------|
| 1.37 | _____ invertebrates | a. Canadian bird lover |
| 1.38 | _____ breeding grounds | b. smallest mammal |
| 1.39 | _____ migrate | c. fell over Niagara Falls |
| 1.40 | _____ vertebrates | d. largest mammal |
| 1.41 | _____ shrew | e. inner knowing |
| 1.42 | _____ instinct | f. where eggs are hatched |
| 1.43 | _____ whale | g. large land mammals |
| 1.44 | _____ elephants | h. without backbones |
| 1.45 | _____ Jack Miner | i. to travel long distances |
| 1.46 | _____ whistling swan | j. animals with a backbone |

Bees belong to the insect family. Like most insects, bees have three pairs of legs and four wings. The worker bee's hind legs have an area called "pollen baskets." These "baskets" carry pollen from the flowers to the hive. Only one queen bee is in a hive, but there may be as many as 75,000 worker bees. A few male bees, called drones, take care of the eggs so they will hatch. The worker bees keep the hive at an even temperature of 95° Fahrenheit (35 degrees Celsius) in order to keep the food supply cool. Bees also send out scouts to locate pollen. When the scouts return, they perform a dance to show the workers which way and how far they should go in order to get pollen.



Write true or false.

- 1.47** _____ Bees keep their hives at an even temperature of 110 degrees to protect their food.
- 1.48** _____ Drones in a beehive have no work to do.
- 1.49** _____ Bees called scouts communicate by means of a dance.
- 1.50** _____ Worker bees have a basket on their hind legs to carry pollen from the flowers to the hive.
- 1.51** _____ The whistling swans build their nests in South Carolina.
- 1.52** _____ A drone is a male honeybee.

Man has realized that some species of animals are in danger. He has formed wildlife sanctuaries to protect certain kinds of animals that are in danger of becoming **extinct**. People are trying to get wildlife to return by providing **habitats** for the animals. They are leaving some thickets, weed patches, and marshes undisturbed so that wildlife will return. These wildlife refuges may help prevent more animals becoming extinct.



Write true or false.

- 1.53 _____ A bird refuge is a place where birds can fly to for protection.
- 1.54 _____ God has provided for His creation.
- 1.55 _____ Some people are becoming interested in keeping animals from becoming extinct.
- 1.56 _____ Farmers are draining swamps and marshes to provide a habitat for wildlife.
- 1.57 _____ *Extinct* means *no longer existing*.
- 1.58 _____ A sanctuary is a place that animals should avoid.
- 1.59 _____ A habitat is a place where an animal or plant would naturally live.
- 1.60 _____ Instinct is a mysterious guiding force within animals which scientists do not fully understand.



Review the material in this section to prepare for the Self Test. The Self Test will check your understanding of this section. Any items you miss on this test will show you what areas you will need to restudy in order to prepare for the unit test.

SELF TEST 1

Match these items (each answer, 2 points).

- | | | | | |
|--------------|-------|----------------|----|--|
| 1.01 | _____ | photosynthesis | a. | animals without backbones |
| 1.02 | _____ | roots | b. | largest mammal |
| 1.03 | _____ | stamen | c. | instrument used to study the stars |
| 1.04 | _____ | vertebrate | d. | geology |
| 1.05 | _____ | migrate | e. | holds sac that contains pollen |
| 1.06 | _____ | receptacle | f. | take minerals from the soil |
| 1.07 | _____ | invertebrate | g. | scientist who studies stars |
| 1.08 | _____ | whale | h. | animals with backbones |
| 1.09 | _____ | astrology | i. | reptile |
| 1.010 | _____ | telescope | j. | superstition |
| 1.011 | _____ | astronomer | k. | attaches flower to stem |
| | | | l. | process of making food in green leaves |
| | | | m. | travel long distances |

Complete these statements (each answer, 4 points).

- 1.012** Astrology is a superstition warned against in the _____
_____.
- 1.013** The sun is the center of the _____ system.
- 1.014** Plants take up minerals from the _____.
- 1.015** Animals without backbones are called _____.
- 1.016** Scouts in a beehive communicate with other worker bees by means of a
_____.
- 1.017** The whistling swans build their nests in the _____.
- 1.018** The scientific study of the stars is _____.

- 1.019** Plants take _____ from the air to make food.
- 1.020** The carrot plant stores food in its _____ .
- 1.021** The apple tree stores food in its _____ .

Write the letter and the word that make the sentence correct (each answer, 3 points).

- 1.022** When leaves die and go back into the ground with their minerals, we call this cycle the _____ cycle.
 a. water b. decay c. life
- 1.023** Besides giving us shelter and food, trees give us _____ .
 a. oxygen b. carbon dioxide c. sickness
- 1.024** The planet nearest the sun is _____ .
 a. Venus b. Mars c. Mercury
- 1.025** No air or water is on the _____ .
 a. desert b. earth c. moon
- 1.026** The _____ on the surface of the moon is only about one-sixth of that on the earth.
 a. water b. air c. gravity
- 1.027** Small objects in space that orbit the sun are _____ .
 a. planets b. comets c. galaxies

Write true or false (each answer, 1 point).

- 1.028** _____ A habitat is a place where plants or animals naturally live and grow.
- 1.029** _____ *Extinct* means *no longer existing*.
- 1.030** _____ God created the moon on the sixth day of creation.
- 1.031** _____ Plants need air, light, food, and water to grow.
- 1.032** _____ Farmers drain swamps and marshes to provide a refuge for wildlife.

Answer these questions (each answer, 1 point).

1.033 What are the five important parts of a plant?

a. _____ b. _____ c. _____ d. _____ e. _____

1.034 To which family (mammal, fish, bird, or insect) do each of these animals belong?

a. bee _____

b. bear _____

c. mosquito _____

d. whale _____

e. bat _____

f. whistling swan _____

g. salmon _____

h. robin _____

i. elephant _____

j. dog _____



Teacher check:

Score _____

Initials _____

Date _____





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