EXPERIENCE BIOLOGY

elementary

STUDENT ADVENTURE GUIDE

Experience Biology Elementary: Student Adventure Guide

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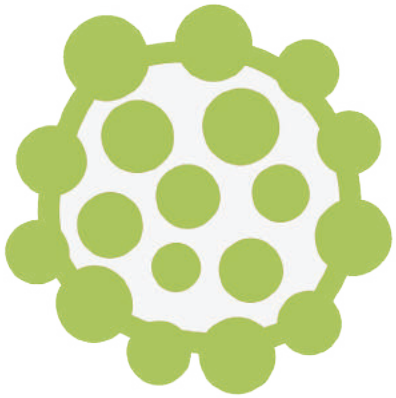


Introduction

Man has been fascinated by the study of living things since the world began in the Garden of Eden. The study of biology began with the discipline of natural history. Naturalists study the world through observation — they're focused on learning about life through the use of the 5 senses.

One of the primary focuses of ***Experience Biology Elementary*** is giving students a taste of what naturalists have been doing for centuries. They'll have the opportunity to explore the world of plants, animals, fungi, bacteria, and protists through observation.

In addition to the online video course, this companion volume guides students through their own exploration of the study of living things. Parents can choose which activities they want to incorporate. After watching each video lesson, parents can...

- Choose books from the reading lists (either to read aloud or assign as independent reading)
- Assign copywork to practice handwriting skills — and learn interesting quotes about biology from the Bible and famous scientists.
- Help their child with hands-on learning activities that will make the lesson come to life!
- Give their kids a short quiz to test what they learned from the lesson.

The lesson cards, used to assist your child in memorizing important biology facts, are sold separately or you may download them as a pdf, included as part of the course.

1

What is Life?

Scientists love the idea of searching for life on other planets, but we haven't even finished finding all the life on our own planet—not even close! There are millions of different kinds of living things on Earth, and probably millions more we have yet to discover.

Recommended Reading

- *What's Smaller than a Pygmy Shrew?* by Robert Wells
- *The Biosphere*, by Gregory L. Vogt, Introduction & Chapter 1
- Genesis 1:1-2:3

ACTIVITY Is it Alive?

How do you know if something is living? You have to examine its characteristics, of course! In class we talked about 5 characteristics of living organisms. In this activity, you'll examine several items to determine if they're living or not.

SUPPLY LIST

- Rock
- Candle flame
- Potted plant
- Yeast in warm water
- Mold growing on bread
- Apple
- Book

INSTRUCTIONS

1. Choose at least 5 items from the supply list above to examine. If you choose the candle, be sure to have a parent help you light the wick.
2. Look at the chart on the next page. Spend time filling in the 5 characteristics of life you learned about from this week's lesson on the left hand side of the table.
3. Across the top, list the items you've chosen to examine.
4. Carefully examine each item and consider whether it has each of the characteristics. If it does, put an x in the box; if it doesn't, leave it blank. If you're unsure, ask your parents to help you look for the answer online or in a book.
5. At the bottom of the page, list the items that you determined are living and those that are not.

Items you're examining

Characteristics of Life					
1.					
2.					
3.					
4.					
5.					

What items are living?

What items are not alive?

LESSON 1: GENESIS 1:1

In the beginning, God created the heavens and the earth.

LESSON 1: GENESIS 1:1

In the beginning, God created the heavens and the earth.

QUESTION:

What are the 5 characteristics of life?

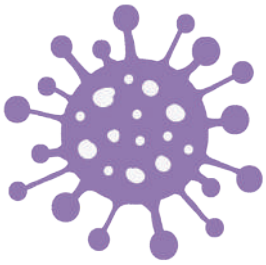
ANSWER:

(1) Growth (2) Respond to the environment (3) Reproduction (4) Require energy (5) Organization in cells

LESSON 1

GENESIS 1:1-2

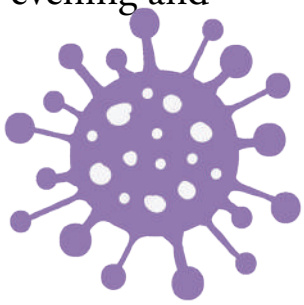
1 In the beginning, God created the heavens and the earth.
2 The earth was without form and void, and darkness was over the face of the deep. And the Spirit of God was hovering over the face of the waters.



LESSON 1

GENESIS 1:3-5

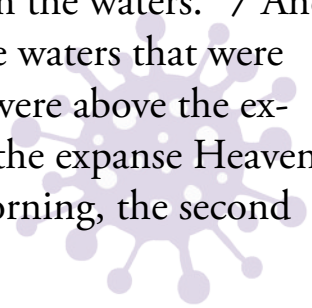
3 And God said, “Let there be light,” and there was light. **4** And God saw that the light was good. And God separated the light from the darkness. **5** God called the light Day, and the darkness he called Night. And there was evening and there was morning, the first day.



LESSON 1

GENESIS 1:6-8

6 And God said, “Let there be an expanse in the midst of the waters, and let it separate the waters from the waters.” **7** And God made the expanse and separated the waters that were under the expanse from the waters that were above the expanse. And it was so. **8** And God called the expanse Heaven. And there was evening and there was morning, the second day.



LESSON 1

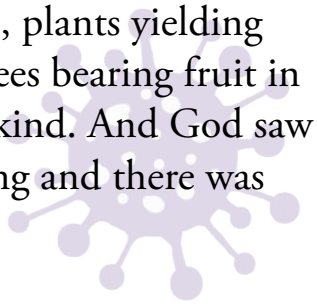
GENESIS 1:9-10

9 And God said, “Let the waters under the heavens be gathered together into one place, and let the dry land appear.” And it was so. **10** God called the dry land Earth, and the waters that were gathered together he called Seas. And God saw that it was good.

LESSON 1

GENESIS 1:11-13

11 And God said, “Let the earth sprout vegetation, plants yielding seed, and fruit trees bearing fruit in which is their seed, each according to its kind, on the earth.” And it was so. **12** The earth brought forth vegetation, plants yielding seed according to their own kinds, and trees bearing fruit in which is their seed, each according to its kind. And God saw that it was good. **13** And there was evening and there was morning, the third day.



LESSON 1

GENESIS 1:14-19

14 And God said, “Let there be lights in the expanse of the heavens to separate the day from the night. And let them be for signs and for seasons, and for days and years, **15** and let them be lights in the expanse of the heavens to give light upon the earth.” And it was so. **16** And God made the two great lights—the greater light to rule the day and the lesser light to rule the night—and the stars. **17** And God set them in the expanse of the heavens to give light on the earth, **18** to rule over the day and over the night, and to separate the light from the darkness. And God saw that it was good. **19** And there was evening and there was morning, the fourth day.

LESSON 1

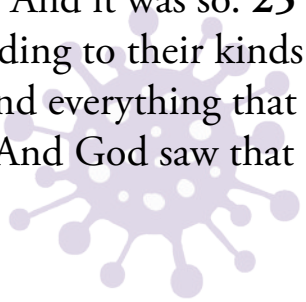
GENESIS 1:20-23

20 And God said, “Let the waters swarm with swarms of living creatures, and let birds fly above the earth across the expanse of the heavens.” **21** So God created the great sea creatures and every living creature that moves, with which the waters swarm, according to their kinds, and every winged bird according to its kind. And God saw that it was good. **22** And God blessed them, saying, “Be fruitful and multiply and fill the waters in the seas, and let birds multiply on the earth.” **23** And there was evening and there was morning, the fifth day.

LESSON 1

GENESIS 1:24-25

24 And God said, “Let the earth bring forth living creatures
according to their kinds—livestock and creeping things and
beasts of the earth according to their kinds.” And it was so. **25**
And God made the beasts of the earth according to their kinds
and the livestock according to their kinds, and everything that
creeps on the ground according to its kind. And God saw that
it was good.



LESSON 1

GENESIS 1:26

26 Then God said, “Let us make man in our image, after
our likeness. And let them have dominion over the fish of
the sea and over the birds of the heavens and over the live-
stock and over all the earth and over every creeping thing
that creeps on the earth.”

LESSON 1

GENESIS 1:27

27 So God created man in his own image,
in the image of God he created him;
male and female he created them.

LESSON 1

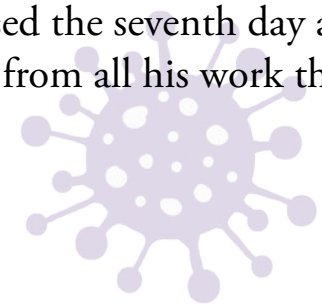
GENESIS 1:28-31

28 And God blessed them. And God said to them, "Be fruitful and multiply and fill the earth and subdue it, and have dominion over the fish of the sea and over the birds of the heavens and over every living thing that moves on the earth." **29** And God said, "Behold, I have given you every plant yielding seed that is on the face of all the earth, and every tree with seed in its fruit. You shall have them for food. **30** And to every beast of the earth and to every bird of the heavens and to everything that creeps on the earth, everything that has the breath of life, I have given every green plant for food." And it was so. **31** And God saw everything that he had made, and behold, it was very good. And there was evening and there was morning, the sixth day.

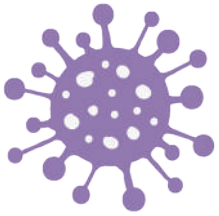
LESSON 1

GENESIS 2:1-3

1 Thus the heavens and the earth were finished, and all the host of them. **2** And on the seventh day God finished his work that he had done, and he rested on the seventh day from all his work that he had done. **3** So God blessed the seventh day and made it holy, because on it God rested from all his work that he had done in creation.

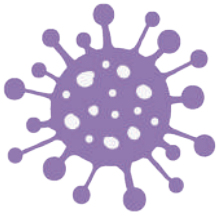


LESSON 1



What is Life?

Lesson 1 Quiz



1. Biology is the study of:

A) water
B) sun
C) life

2. In Genesis 1, it says God created the earth in:

A) 7 days
B) 6 days
C) 1 year

3. Living things grow by:

A) getting bigger
B) worn out cells being replaced with new cells
C) both

4. Responding to the environment is not a characteristic of life.

True
False

5. Living things creating new living things is called:

A) reproduction
B) growth
C) reorganization

6. All living things need energy to grow and reproduce.

True
False

7. Living things contain cells that are:

A) organized
B) unorganized
C) divided into rooms

8. The smallest unit of living things is:

A) energy
B) cell
C) blood

2

The Building Blocks of Life

In order to understand what "life" is, we first have to look at the smallest living thing: the cell. Every living thing has cells—your own body has trillions of cells. They are the smallest, most basic kind of life on Earth.

Recommended Reading

- *The Basics of Cell Life with Max Axiom,* by Amber Keyser, Parts 1 and 2
- *Enjoy Your Cells,* by Fran Balkwill and Mic Rolph
- *The Cell Works*, by Patrick A. Baeuerle and Norbert Landa, p. 8-21; 32-33

ACTIVITY

Exploring the Amazing World of Cells!

Cells have many more parts than we had time to talk about in class. In this activity, you'll have a chance to look a little more closely at cells and their different parts.

SUPPLY LIST

- Colored pencils

INSTRUCTIONS

Read more about the jobs of the different cell parts below. Color parts as directed.

ANIMAL CELL (EUKARYOTIC)

CYTOPLASM: the gel-like fluid inside the cell; ***color yellow***

ENDOPLASMIC RETICULUM: responsible for transporting materials throughout the cell; ***color red***

NUCLEUS: where the DNA is contained, which is the instruction manual for the cell; ***color purple***

GOLGI APPARATUS: packages different materials to be taken outside of the cell; ***color orange***

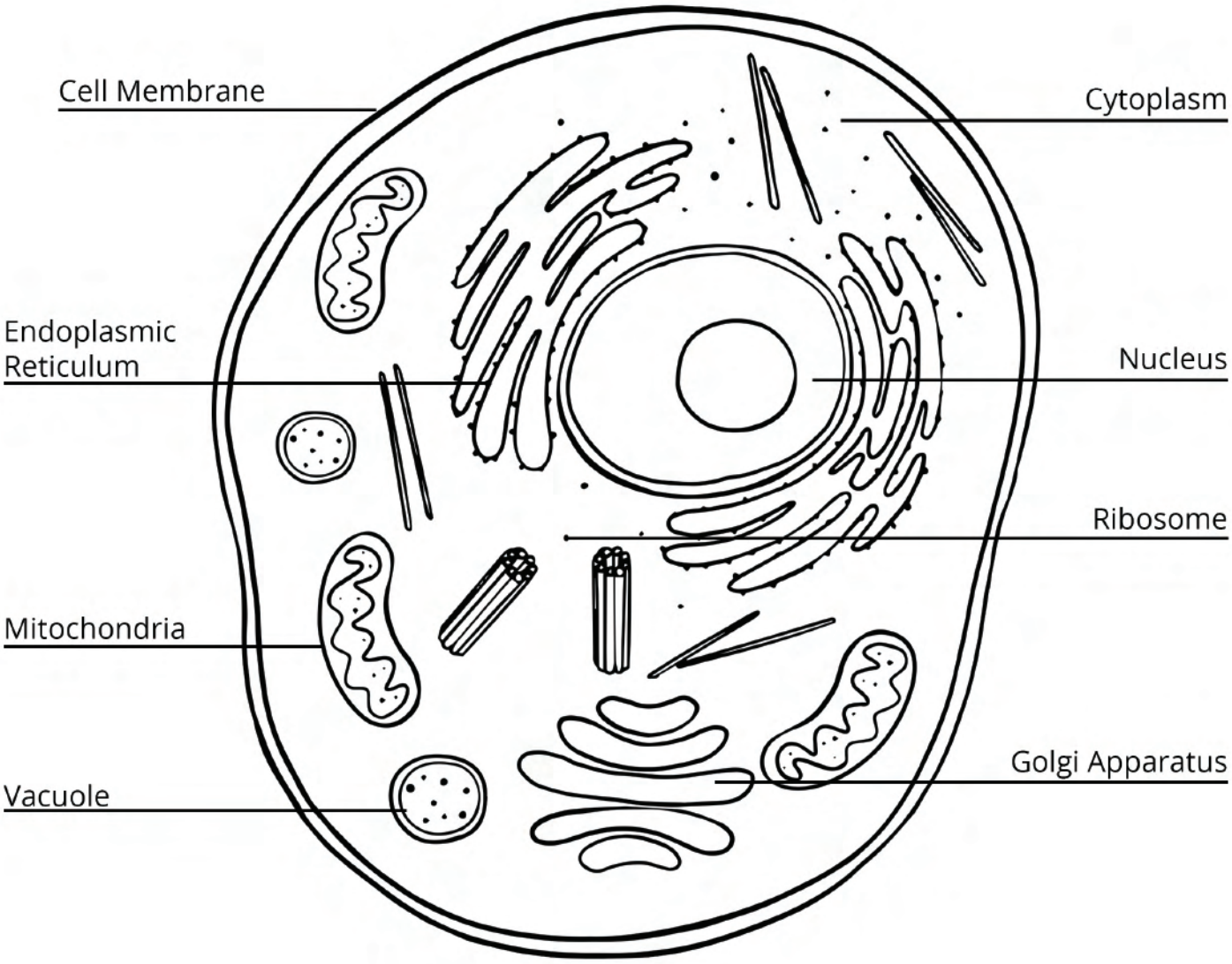
RIBOSOME: builds proteins for the cell; ***color blue***

MITOCHONDRIA: where energy is made for the cell; they take the molecules of food the cell makes and turn it into a type of energy the cell can use; ***color pink***

VACUOLE: storage areas of the cell that can store food or waste products; ***color gray***

CELL MEMBRANE: the outside barrier of the cell; it allows some substances out and lets others in; ***color brown***

ANIMAL CELL


Cell Membrane
Cytoplasm
Endoplasmic Reticulum
Nucleus
Ribosome
Mitochondria
Golgi Apparatus
Vacuole

PLANT CELL (EUKARYOTIC)

CYTOPLASM: the gel-like fluid inside the cell; ***color yellow***

NUCLEUS: where the DNA is contained, which is the instruction manual for the cell; ***color purple***

CHLOROPLASTS: collect energy from the sunlight to create food for the cell; ***color light green***

ENDOPLASMIC RETICULUM: responsible for transporting materials throughout the cell; ***color red***

MITOCHONDRIA: where energy is made for the cell; they take the molecules of food the cell makes and turn it into a type of energy the cell can use; ***color pink***

CELL WALL: covers the cell membrane and gives the cell strength and its shape; ***color dark green***

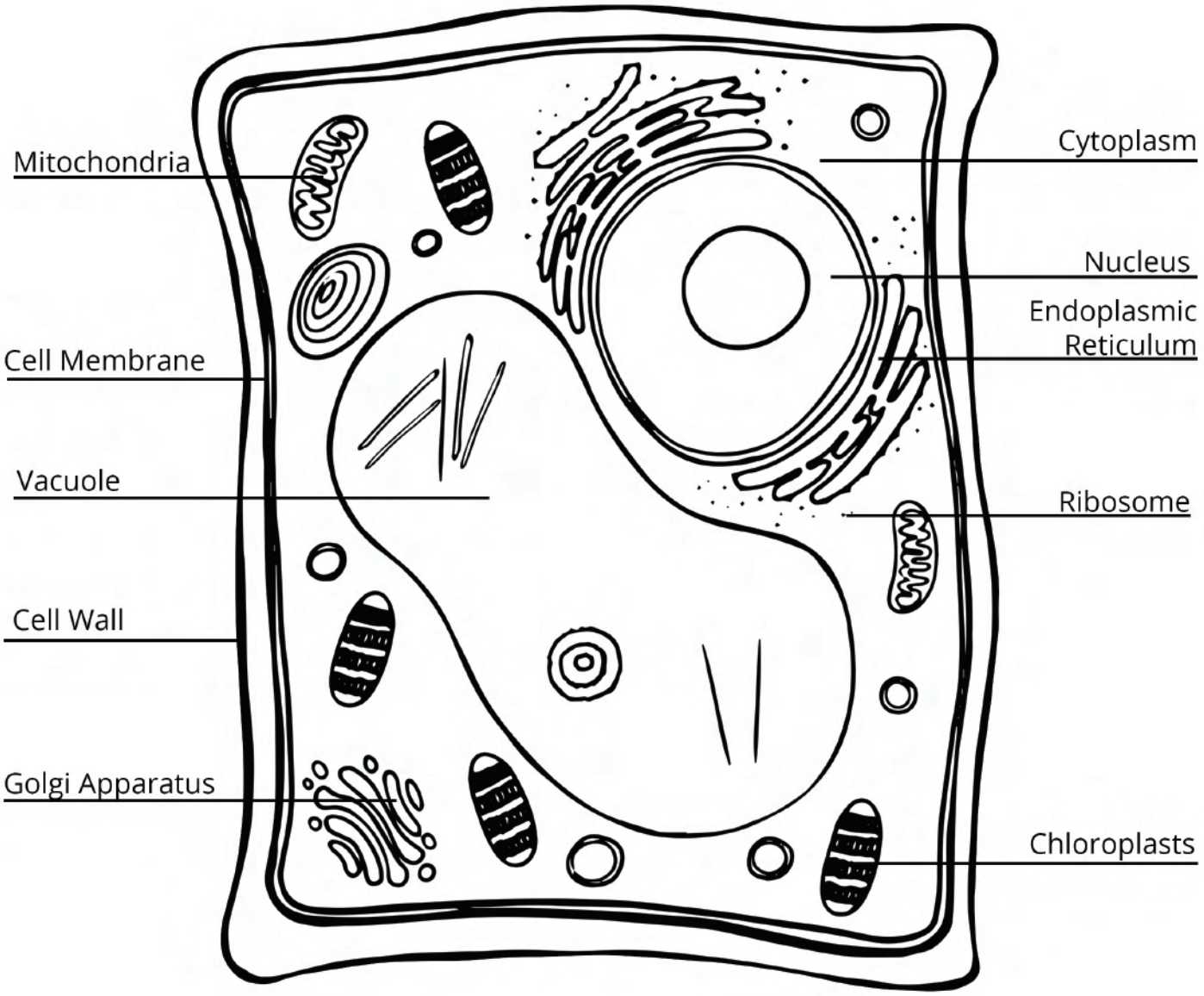
VACUOLE: storage areas of the cell that can store food or waste products; ***color gray***

RIBOSOME: builds proteins for the cell; ***color blue***

GOLGI APPARATUS: packages different materials to be taken outside of the cell; ***color orange***

CELL MEMBRANE: the outside barrier of the cell; it allows some substances out and lets others in; ***color brown***

PLANT CELL


Mitochondria
Cytoplasm
Nucleus
Endoplasmic Reticulum
Cell Membrane
Vacuole
Ribosome
Cell Wall
Golgi Apparatus
Chloroplasts

BACTERIA CELL (PROKARYOTIC)

DNA: the instruction manual that's free-floating throughout the cell; ***color purple***

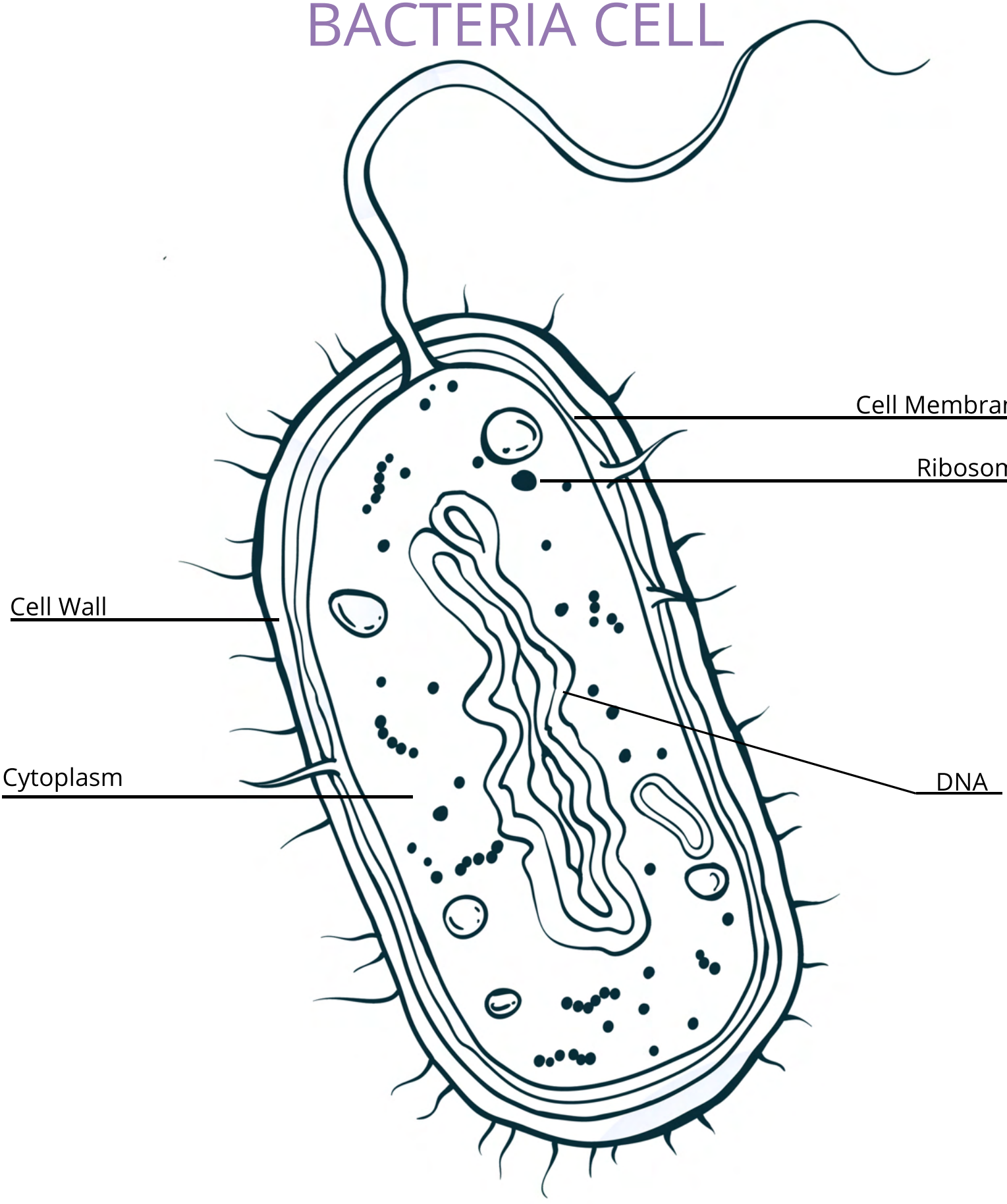
CELL WALL: covers the cell membrane and gives the cell strength and its shape; ***color dark green***

RIBOSOME: builds proteins for the cell; color blue

CELL MEMBRANE: the outside barrier of the cell; it allows some substances out and lets others in; ***color brown***

CYTOPLASM: the gel-like fluid inside the cell; ***color yellow***

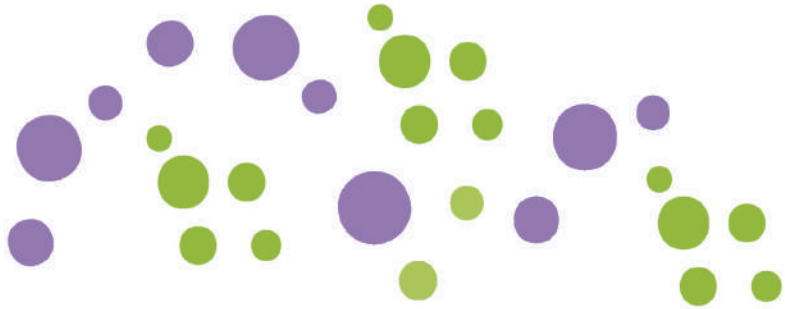
BACTERIA CELL



LESSON 2: MICHAEL DENTON

"The complexity of the simplest known type of cell is so great that it is impossible to accept that such an object could have been thrown together suddenly."

LESSON 2: MICHAEL DENTON



LESSON 2: MICHAEL DENTON

"The complexity of the simplest known type of cell is so great that it is impossible to accept that such an object could have been thrown together suddenly."

LESSON 2: MICHAEL DENTON

QUESTION:
What is the basic unit of organization of all living things?

ANSWER:
The cell

LESSON 2

QUESTION:
What are the three main parts of a cell?

ANSWER:
(1) A cell membrane (2) Cytoplasm
(3) Genetic material

LESSON 2

QUESTION:
What is a prokaryotic cell?

ANSWER:
A cell with free-floating DNA

LESSON 2

QUESTION:
What is a eukaryotic cell?

ANSWER:
A cell with DNA in a nucleus

LESSON 2

The Building Blocks of Life

Lesson 2 Quiz

1. Robert Hooke was the scientist who discovered cells with a homemade microscope.

True
False

2. Which of the following is not true about cell theory:

A) all living things are made up of one or more cells
B) all cells come from other living cells
C) all living things are made up of many cells
D) the cell is the basic unit of organization in living things

3. Which of the following is not one of the 3 main parts of the cell:

A) kryptonite
B) cell membrane
C) cytoplasm
D) genetic material

4. The cell membrane surrounds the cell and doesn't let anything in or out.

True
False

5. Cytoplasm is a jelly-like substance inside the cell.

True
False

6. The instruction manual for the cell is:

A) cytoplasm
B) cell membrane
C) organelles
D) genetic material

7. The two major types of cells are prokaryotic and eukaryotic.

True
False

The Building Blocks of Life

Lesson 2 Quiz

8. Prokaryotic creatures are made up of one cell and have DNA enclosed in a protective structure.

True
False

9. Eukaryotic creatures are mostly multicellular and have DNA enclosed inside a special protective structure called a:

A) nucleus
B) amoeba
C) organelle

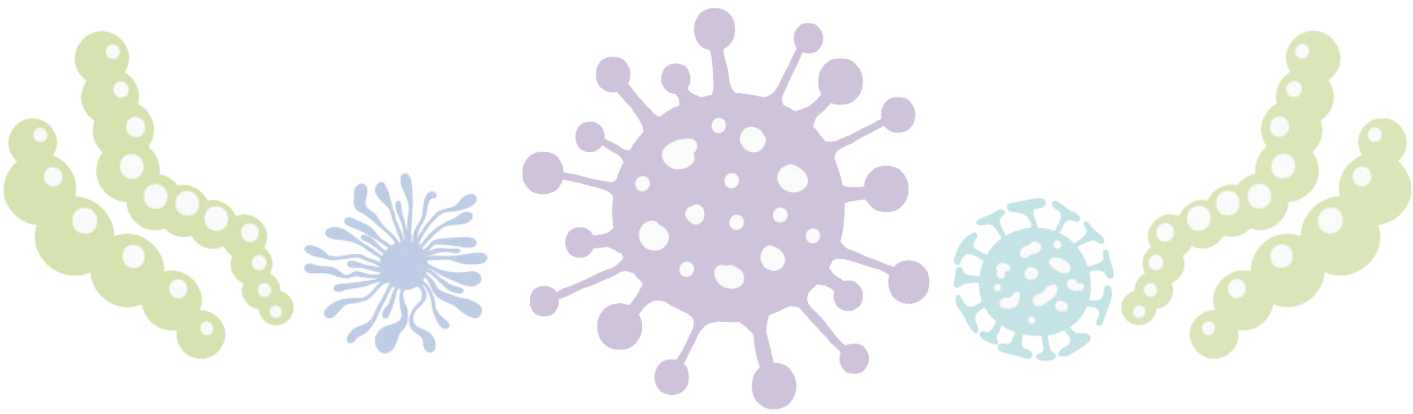
3

The Secret Code of Life!

Almost every cell in your body—in every organism—comes with its own instruction manual. This instruction manual tells each cell exactly what to do. It's called DNA, and DNA is the special code that makes cells so powerful.

Recommended Reading

- *The Basics of Cell Life with Max Axiom,* by Amber Keyser, Parts 3 and 4
- *The Cell Works,* by Patrick A. Baeuerle and Norbert Landa, p. 22-25; 36-37
- *Francis Crick & James Watson: Pioneers in DNA Research*, by John Bankston
- *Understanding DNA: A Breakthrough in Medicine*, by Tony Allan



ACTIVITY Build a Candy DNA

DNA is the instruction manual of the cell. It has a very unique structure that was discovered by Francis Crick and James Watson in the 1950s. During today's activity, you'll be making a replica of DNA — it will be a sweet science treat!

SUPPLY LIST

- 2 pieces of licorice
- Bag of multi-colored mini-marshmallows
- Toothpicks

INSTRUCTIONS

1. The licorice will represent the legs of your DNA and the marshmallows will represent the bases of your DNA.
2. Pink = Adenine (A)
3. Yellow = Thymine (T)
4. Green = Guanine (G)
5. Orange = Cytosine (C)
6. Use the following sequence to build one side of your DNA: T G A C G T T A C A A C
7. Build your DNA by poking a marshmallow through the center onto a toothpick. Then, insert the same end into a piece of licorice. Continue to add each base to your licorice at regular intervals.
8. Now, you'll assemble your base pairs by matching each marshmallow base with its marshmallow base pair. Remember, adenine always pairs with thymine and guanine always pairs with cytosine. Poke the other side of the toothpick through the correct colored marshmallow.
9. Finish assembling your DNA by attaching the other licorice rung of your DNA to the second marshmallow bases you added. You should now have a structure that looks like a licorice marshmallow ladder.
10. Complete your DNA model by carefully twisting the structure until it's in the shape of a double helix.
11. Show your DNA model to friends and family and tell them what each piece represents. They're sure to be impressed with all that you know about DNA!

LESSON 3: PSALM 139:13-14A

For you formed my inward parts;
you knitted me together in my
mother's womb. I praise you, for I
am fearfully and wonderfully made.

LESSON 3: PSALM 139:13-14A

LESSON 3: PSALM 139:13-14A

For you formed my inward parts; you knitted me together in my mother's womb. I praise you, for I am fearfully and wonderfully made.

LESSON 3: PSALM 139:13-14A

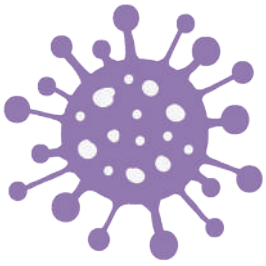
QUESTION:
What is the structure of DNA?

ANSWER:
Double helix

LESSON 3

QUESTION:
DNA has the instructions for the cell to make what?

ANSWER:
Proteins



LESSON 3

The Secret Code of Life!

Lesson 3 Quiz

1. The shape of DNA is a double helix, or two spirals put together that look like a:

A) triangle
B) twisted ladder
C) cone
D) square

2. There are 6 DNA bases.

True
False

3. Each DNA base fits together with another base to form base pairs.

True
False

4. Where are the bases located on the DNA double helix?

A) Rungs
B) Top
C) Legs
D) Bottom

5. RNA, or ribonucleic acid, is a copy of a piece of DNA.

True
False

6. DNA has the instructions for cells to build:

A) sugars
B) proteins
C) towers
D) fats

7. Every cell has:

A) a complete copy of DNA
B) one piece of DNA
C) just certain parts of DNA it needs to know its job

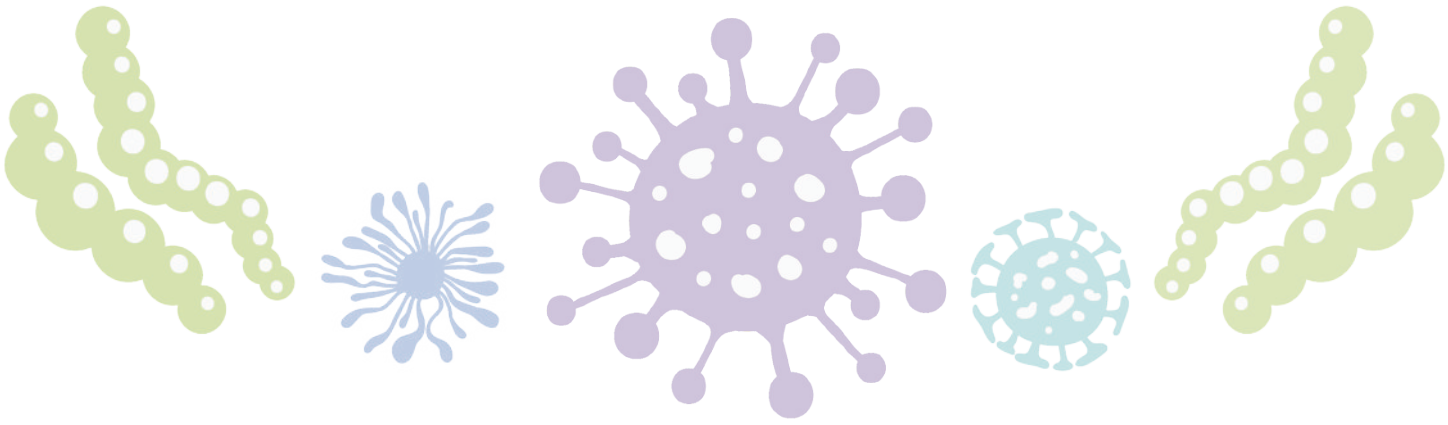
4

Fueled Up!

Just like every car needs gas to move, every living organism needs energy to survive. But not all organisms get their energy in the same way!

Recommended Reading

- *The Cell Works,* by Patrick A. Baeuerle and Norbert Landa, p. 30-31
- *Exploring Ecosystems with Max Axiom,* by Agnieszka Biskup, Parts 1 and 2



ACTIVITY Food Chain Sorting

SUPPLY LIST

- Scissors
- Glue or glue stick
- Crayons, markers, or colored pencils

INSTRUCTIONS

1. Cut out the cards on the following page.
2. Paste the correct definition under the titles “Producers,” “Consumers,” and “Decomposers” on the creature canvas.
3. Then, decide which column each organism you cut out belongs in and paste it on your creature canvas.
4. Color the creatures on your creature canvas.

Cut out the definitions and paste at the top of the creature canvas.

Organisms that make their own food.	Organisms that eat other organisms for food.	Organisms that feed on dead or decaying organisms and turn them into soil.

Cut out the cards can place them in the correct category on the creature canvas.

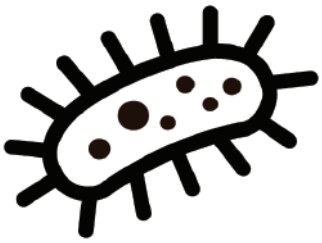

tree

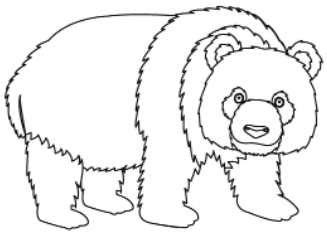

mushroom


rose


cactus


dandelion


bacteria


panda bear


penguin


llama


tiger

CREATURE CANVAS

PRODUCERS	CONSUMERS	DECOMPOSERS

LESSON 4: ALBERT EINSTEIN

"Energy cannot be created or destroyed; it can only be changed from one form to another."

LESSON 4: ALBERT EINSTEIN

LESSON 4: ALBERT EINSTEIN

"Energy cannot be created or destroyed, it can only be changed from one form to another."

QUESTION:
What organisms must eat food for energy?

ANSWER:
Heterotrophs

LESSON 4

QUESTION:
What organisms get their energy from the sun and make their own food?

ANSWER:
Autotrophs

LESSON 4

Fueled Up

Lesson 4 Quiz

1. Energy is:

A) inside the cell's nucleus
B) the ability to do work
C) created in a laboratory

2. How do autotrophs, like plants, get their energy?

A) They eat food
B) They eat the soil
C) They make their food using the sun, water, and carbon dioxide
D) They don't need energy

3. How do heterotrophs, like animals, get their energy?

A) They eat food
B) They eat the soil
C) They make their food using the sun, water, and carbon dioxide
D) They don't need energy

4. Organisms that eat other dead organisms and break them down into nutrients that can be used by other organisms are called:

A) decomposers
B) producers
C) consumers

5. Organisms that eat other organisms for food are called:

A) decomposers
B) producers
C) consumers

6. Organisms that make their own food are called:

A) decomposers
B) producers
C) consumers

7. A diagram with pictures and arrows that shows how energy is moved around between different organisms is called a:

A) food pyramid
B) energy diagram
C) food chain

5

What's in a Name?

There are millions of different types of creatures in this world, and while they're all unique, many share similar characteristics. We can use these characteristics to help categorize them, or divide them into similar groups.

Recommended Reading

- *Karl, Get Out of the Garden!,* by Anita Sanchez
- *The Biosphere,* by Gregory L. Vogt, Chapter 2

ACTIVITY

Silly Creature Classification

Imagine you're transported to a planet in another universe and you stumble upon a community of silly creatures! Now you're tasked with the job of classifying these creatures.

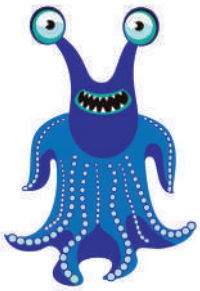
SUPPLY LIST

- Scissors

INSTRUCTIONS

1. Cut out the silly creature cards on the next pages.
2. Determine how you can categorize these creatures. Move them into groups of creatures that are similar.
3. Now spend time categorizing them in a totally different way!
4. Which way do you think was the best to categorize your creatures? Maybe you aren't sure. Sometimes scientists aren't quite sure how to classify new organisms they find either!





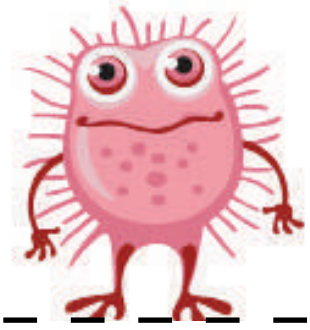


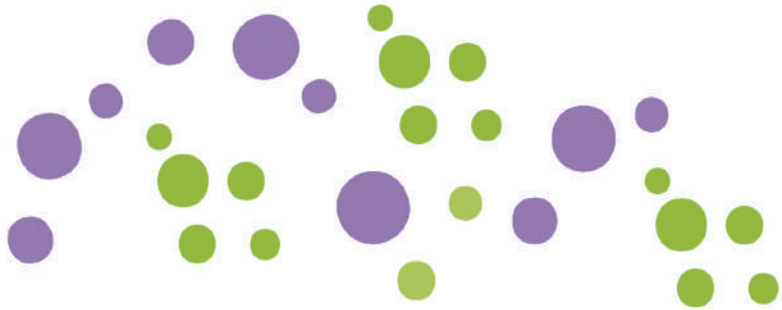












LESSON 5: GENESIS 2:20A

The man gave names to all livestock and to the birds of the heavens and to every beast of the field.

LESSON 5: GENESIS 2:20A

The man gave names to all livestock and to the birds of the heavens and to every beast of the field.

QUESTION:

How are living organisms classified from the least specific to the most specific?

ANSWER:

Kingdom, phylum, class, order, family, genus, and species

LESSON 5

What's in a Name?

Lesson 5 Quiz

1. What is classification?

A) Naming organisms
B) When we put organisms into similar groups
C) Pairing up organisms

2. What is the broadest group of organisms called in our system of classification?

A) Species
B) Class
C) Kingdom
D) Order

3. What is the narrowest, most specific group of organisms called in our system of classification?

A) Species
B) Class
C) Kingdom
D) Family

4. Who created the classification system we use today?

A) James Watson and Francis Crick
B) Robert Hooke
C) Carl Linnaeus

5. How many kingdoms are living things divided into today?

A) 2
B) 3
C) 5
D) 6

6. If you saw a frog in your yard, you would know it was in which kingdom?

A) Plant
B) Animal
C) Fungi
D) Protist

7. If you saw a tree in your yard, you would know it was in which kingdom?

A) Plant
B) Animal
C) Fungi
D) Protist

6

Biomes Everywhere!

Living things don't just live off somewhere all by themselves. They live in an environment. Each living thing lives in a whole community of other living and nonliving things—and the study of these communities is called ecology.

Recommended Reading

- *Exploring Ecosystems with Max Axiom*, by Agnieszka Biskup, Parts 3 & 4
- *The Biosphere*, by Gregory L. Vogt, Introduction & Chapter 5
- *One Small Square: Woods*, by Donald Silver
- *One Small Square: Cactus Desert*, by Donald Silver
- *One Small Square: Rain Forest*, by Donald Silver
- *One Small Square: Savannah*, by Donald Silver
- *One Small Square: Arctic Tundra*, by Donald Silver

ACTIVITY Create a Biome Diorama

What is your favorite biome? Is it the cold arctic tundra? The hot dry desert? Underwater in the aquatic regions? The grasslands? Or maybe you prefer somewhere with trees like the coniferous forests, deciduous forests, or the exotic rainforests? Spend time this week learning more about your favorite biome as you create a diorama!

SUPPLY LIST

- Shoe box (or slightly larger-sized box)
- Magazines (nature magazines are best)
- Construction paper
- Glue
- Markers
- Scissors
- Other various art supplies

INSTRUCTIONS

1. You'll be creating a diorama which is a 3-dimensional display of your favorite biome. Before you get started creating, you'll have to learn more about the biome. Take time to ask some of these questions…
    - How much water is in your biome?
    - What is the weather like?
    - What kinds of animals are there?
    - What kinds of plants are there?
    - What does the ground look like?
2. To begin, cut the top and one of the sides off your box; the bottom and 3 sides should be remaining. You should be able to look at your biome from the top and the front.
3. Decorate the walls and bottom of your box to create the biome's environment using paper, markers, and pictures you cut out of magazines.
4. Gather things from outside to use in your diorama like rocks, twigs, or other things you can paste to the ground. You can make your own figures of plants and animals too!
5. Show your friends and family your diorama. Tell them all of the fun facts you learned about the biome you researched!

LESSON 6: RACHEL CARSON

"Those who dwelt among the beauties and mysteries of the earth are never alone or weary of life."

LESSON 6: RACHEL CARSON

"Those who dwell among the beauties and mysteries of the earth are never alone or weary of life."

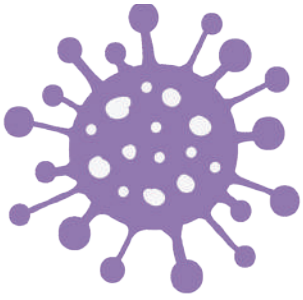
QUESTION:
What is the study of how living and nonliving things interact?

ANSWER:
Ecology

LESSON 6

QUESTION:
A region of the world with a certain kind of climate along with all the living creatures that live there is called what?

ANSWER:
Biome



LESSON 6

Biome Everywhere!

Lesson 6 Quiz

1. The study of how living things and nonliving things in an area all interact with one another is called:

A) biology
B) genetics
C) ecology
D) zoology

2. What are biomes?

A) The different planets and the atmosphere around them
B) Areas of the world with certain kinds of climates, along with all the plants, animals, and other living creatures that live there
C) All of the animals in one location

3. The coldest of all biomes which has very few plants that are able to survive is called:

A) tundra
B) coniferous forest
C) desert
D) grasslands

4. The hottest, driest of all biomes which gets less than 10 inches of rain per year is called:

A) grasslands
B) deciduous forest
C) coniferous forest
D) desert

5. The biome that receives more rainfall and has more plants and animals than any other biome is called:

A) deciduous forest
B) tropical rainforest
C) aquatic
D) tundra

6. The biome with long cold winters and lots of evergreen trees is called:

A) tundra
B) coniferous forest
C) tropical rainforest
D) grassland

7. The biome that has cold winters and warm summers, but does not get enough rain for many trees to survive is called:

A) deciduous forest
B) desert
C) aquatic
D) grassland

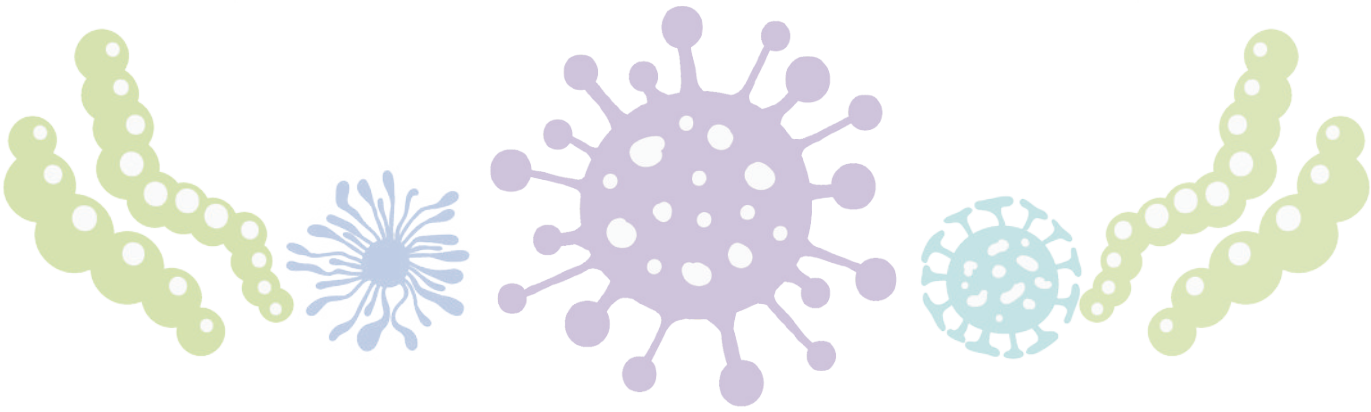
7

Itsy Bitsy Teeny Tiny Creatures

Bacteria don't get a lot of our attention today unless the doctor tells us we have a bacterial infection. But most bacteria are helpful, and they're a much bigger part of our lives than you can imagine!

Recommended Reading

- *Tiny Creatures: The World of Microbes,* by Nicola Davies
- *Archaea: Salt-Lovers, Methane-Makers, Thermophiles, and Other Archaeans,* by David M. Barker
- *Bacteria: Staph, Strep, Clostridium, and Other Bacteria,* by Judy Wearing, p. 6-43
- *The Bacteria Book: The Big World of Really Tiny Microbes,* by Steve Mould, p. 8-25, 32-33, and 60-61



ACTIVITY Growing Bacteria!

Bacteria are nearly everywhere — all around you, on you, and in you! In this activity, you'll have a chance to see bacteria. We'll be comparing the bacteria on your hands before and after you've washed them.

You'll be growing bacteria from your hands in a Petri dish with nutrient agar. Nutrient agar contains the nutrients needed to grow a wide variety of bacteria.

SUPPLY LIST

- 2 Petri dishes with nutrient agar
- Masking tape
- Cotton swabs

SAFETY PRECAUTION:

Be sure you get a parent's assistance for this lab. It's very important to use caution when working with unknown micro-organisms as you do not know whether or not they are bad for you. Once the petri dish is sealed, do not reopen it.

INSTRUCTIONS

1. Obtain a Petri dish containing nutrient agar or you can make the nutrient agar and fill your Petri dish at home. This will serve as the food source for your bacteria to grow on.
2. Run the cotton swab across your hand, lift the lid off the Petri dish, and gently draw a squiggly line back and forth across the agar with the swab. As you're doing this, roll the swab between your fingers.
3. Close the lid of the Petri dish and take a piece of masking tape and wrap it just around the edge of the Petri dish. Do not put tape across the flat top of the dish — this will block your view of the growing bacteria.
4. Go wash your hands for at least 20 seconds with soap and hot water. Scrub them really well.
5. Run the cotton swab across your clean hand, lift the lid off the Petri dish, and gently draw a squiggly line back and forth across the agar. As you're doing this, roll the swab between your fingers.
6. Close the lid of the Petri dish and take a piece of masking tape and wrap it just around the edge of the Petri dish. Do not put tape across the flat top of the dish — this will obscure your view of the growing bacteria.
7. Place your Petri dishes upside down in a dark location, being sure to keep them at room temperature or a bit warmer. A cardboard box is a good place to keep them.
8. After 48 hours, count the total number of colonies in each of your Petri dishes—colonies are the big spots of bacteria. Record those numbers on the table below. Return your Petri dishes to their dark location.
9. After 96 hours, again carefully count the total number of colonies in your petri dishes and record the numbers on the table below. Return your Petri dishes to their dark location.
10. After 144 hours, count the total number of colonies in your Petri dishes and record those numbers as well.

Lab Sheet: Growing Bacteria!

Petri Dish with Bacteria	Colonies after 48 hours	Colonies after 96 hours	Colonies after 144 hours
Before Clean Hands			
After Clean Hands			

Questions

Explain the differences you see between your two Petri dishes.

_____

_____

_____

_____

_____

_____

Do you think washing your hands is a good way to keep from coming in contact with harmful bacteria that could make you sick? Why or why not?

_____

_____

_____

_____

_____

_____

LESSON 7: MICHAEL DENTON

"The simplest of all living systems on the earth today, bacterial cells, are exceedingly complex objects...far more complicated than any machine built by man."

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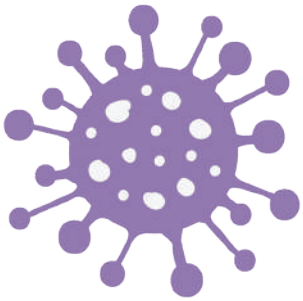
"The simplest of all living systems on the earth today, bacterial cells, are exceedingly complex objects...far more compticated than any machine built by man."

LESSON 7: MICHAEL DENTON

QUESTION:
What are the 2 prokaryotic kingdoms?

ANSWER:
Eubacteria and Archaebacteria



LESSON 7

QUESTION:
How are Archaebacteria different from Eubacteria?

ANSWER:
Their DNA is different and archaebacteria can live in extreme environments.

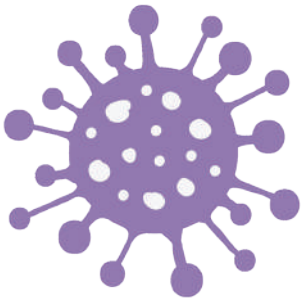
LESSON 7

QUESTION:

Are bacteria producers, consumers, or decomposers?

ANSWER:

Decomposers



LESSON 7

Itsy Bitsy Teeny Tiny Creatures

Lesson 7 Quiz

1. Bacteria reproduce asexually.

True
False

2. Projections called pili are used to help bacteria:

A) stick to surfaces
B) move
C) create proteins

3. There is just one kingdom of prokaryotic organisms.

True
False

4.Bacteria are single cell prokaryotes with free-floating DNA.

True
False

5. What part of the bacteria gives them shape and structure?

A) Cell membrane
B) Cell wall
C) Cytoplasm
D) Ribosomes

6. Archaebacteria can live in extreme environments where no other organisms are found.

True
False

7. Eubacteria are common bacteria found in everyday places and many are helpful to the environment.

True
False

8. Bacteria are decomposers, which means they eat:

A) food that they produce
B) dead or decaying things
C) other organisms

8

The Junk Drawer Kingdom

There are some creatures that don't seem to fit anywhere—they are just too different from other living things we know. That's where the kingdom of protists comes in: it's the living world's island of misfit creatures.

Recommended Reading

- *The Bacteria Book: The Big World of Really Tiny Microbes,* by Steve Mould, p. 54-59

ACTIVITY Protists in Action

We often refer to Kingdom Protista as the "junk drawer kingdom" because there are so many different types of organisms in this kingdom that just don't seem to fit anywhere else. You'll have the opportunity to check out a few protists and see just how different they are for yourself today!

INSTRUCTIONS

1. Log in to your online classroom and navigate to lesson 8.
2. View the 3 videos on the page showing protists in action.
3. Consider the questions below.

QUESTIONS

How do the shape and color of the protists you see differ from one another?

_____

_____

_____

_____

Each of these protists is able to move. What types of structures do they use to move? How do their movements differ from one another?

_____

_____

_____

_____

_____

_____

LESSON 8: GENESIS 1:25A

And God made the beasts of the earth according to their kinds and the livestock according to their kinds and everything that creeps on the ground according to its kind.

LESSON 8: GENESIS 1:25A

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And God made the beasts of the earth according to their kinds and the livestock according to their kinds, and everything that creeps on the ground according to its kind.

LESSON 8: GENESIS 1:25A

QUESTION:

What are the eukaryotic creatures that don't belong to the kingdom of animals, plants, or fungi?

ANSWER:

Protists

LESSON 8

QUESTION:

What are the 3 categories of protists?

ANSWER:

Protozoans (animal-like protists)
Algae (plant-like protists)
Molds (fungus-like protists)

LESSON 8

The Junk Drawer Kingdom

Lesson 8 Quiz

1. Kingdom protista contains creatures that don't fit in with other kingdoms.

True
False

2. All protists are:

A) prokaryotes
B) eukaryotes
C) both

3. Most protists are found:

A) in water
B) near water
C) in soil that contains water
D) all of these

4. Protists are usually divided into how many different groups?

A) 3
B) 4
C) 5

5. Animal-like protists that move and eat similar to animals are called:

A) algae
B) protozoans
C) molds
D) none of these

6. Plant-like protists that are autotrophs and make their own food are called:

A) algae
B) protozoans
C) molds
D) none of these

7. Fungus-like protists that are decomposers are called:

A) algae
B) protozoans
C) molds
D) none of the these

9 The Fungus Among Us!

This lesson is all about some creatures with a very important job —ridding the world of dead and decaying organisms. Fungi are found all over the world in every single biome. Without them, the world would be covered in disgusting, dead organisms.

Recommended Reading

- *The Bacteria Book: The Big World of Really Tiny Microbes,* by Steve Mould, p. 44-53
- *Fungus is Among Us!,* by Joy Keller
- *The Mushroom Fan Club,* by Elise Gravel
- *Fungi: Mushrooms, Toadstools, Molds, Yeasts, and Other Fungi,* by Judy Waring

ACTIVITY Watching Fungi Eat

You might be familiar with yeast as something you can bake with in the kitchen: yeast is what helps bread to rise. Yeast is actually a type of fungi. You'll probably remember from class that fungi are a type of decomposer. In this activity we'll have a chance to watch yeast in action!

SUPPLY LIST

- Very ripe banana
- 2 zip lock bags
- 1 teaspoon yeast

INSTRUCTIONS

1. Cut the banana in half lengthwise.
2. Sprinkle 1 teaspoon of yeast on one half of the banana.
3. Put both halves each in their own ziplock bag, seal the bag, and place them in a warm dark place.
4. Compare what happens to the banana treated with yeast and the one left untreated. Check your bags each day for a week and record your observations on the table on the following page.

DAY	Banana without Yeast	Banana with Yeast
1		
2		
3		
4		
5		
6		
7		

Which banana showed more changes after 7 days? Why do you think this is?

LESSON 9: DEREK JENSEN

"I thought a forest was made up entirely of trees, but now I know that the foundation lies below ground, in the fungi."

LESSON 9: DEREK JENSEN

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"I thought a forest was made up entirety of trees, but now I know that the foundation ties below ground, in the fungi."

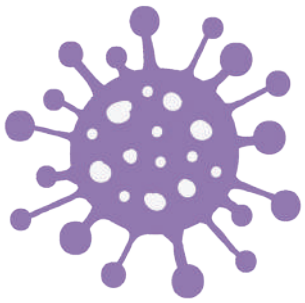
LESSON 9: DEREK JENSEN

QUESTION:

Are fungi producers, consumers or decomposers?

ANSWER:

Decomposers



LESSON 9

The Fungus Among Us!

Lesson 9 Quiz

1. Fungi are made up of what types of cells?

A) Prokaryotic
B) Eukaryotic

2. How do fungi obtain their food?

A) They're autotrophic: they make their own food
B) They're heterotrophic: they consume their food
C) They don't need food

3. Fungi are:

A) producers
B) consumers
C) decomposers

4. What do fungi cells contain that help give them shape and structure?

A) Skeleton
B) Cell walls
C) Cell skeleton

5. Are fungi mobile?

A) Yes
B) No
C) Only during part of their life

6. How are fungi useful to the rest of the world?

A) They break down dead organisms in the environment
B) They can serve as an important type of medication called antibiotics
C) They are a good source of food
D) All of the above

7. What are the thread-like filaments multicellular fungi are made up of?

A) Strings
B) Hyphae
C) Fungi threads

10

What is a Plant?

Plants are everywhere on planet Earth. There are hundreds of thousands of different kinds of plants, and thousands more are discovered each year!

Recommended Reading

- *Plant Parts,* by Richard and Louise Spilsbury, p. 4-5
- *Eli Whitney and the Industrial Revolution,* by Heather Moore Niver
- *The Tree Book: For Kids and their Grown Ups,* by Gina Ingoglia, p. 24-25

ACTIVITY Watch a Plant Grow

In this activity you'll be planting bean seeds two and watching them grow for the next several weeks. You'll have the opportunity to see how they change and sketch the changes you observe.

SUPPLY LIST

- Dry beans (lima beans or kidney beans work well for this activity)
- 1 pint mason jars or other containers
- Potting soil (without added fertilizer)
- Ruler

INSTRUCTIONS

1. Fill your mason jar about 3/4 of the way full with soil.
2. Place 2-3 beans on top of the soil and cover gently with additional soil.
3. Spray some water on top of the soil to keep it damp. Be sure to do this every couple of days making sure the soil stays damp.
4. Place the jar on a window ledge where it will get sunlight.
5. As you're caring for your bean plant, you'll also be monitoring and observing its growth.
6. Each week for the next several weeks, you'll be sketching what your bean plant look like.
7. Use the sketch boxes on the next page to sketch your bean plant as soon as you see it's sprouted. Be sure to record how many days it's been since the bean was planted and how tall the plant is.

Record the date you planted your beans: _____

SKETCH YOUR BEAN PLANT

How many days since your bean was planted? _____

How tall is your bean plant? _____

LESSON 10: GENESIS 1:11A

Let the earth sprout vegetation,
plants yielding seed, and fruit trees
bearing fruit in which is their seed,
each according to its kind, on the
earth.

LESSON 10: GENESIS 1:11A

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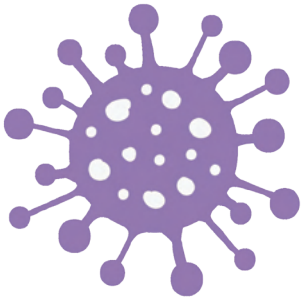
Let the earth sprout vegetation, plants yielding seed, and fruit trees bearing fruit in which is their seed, each according to its kind, on the earth.

LESSON 10: GENESIS 1:11A

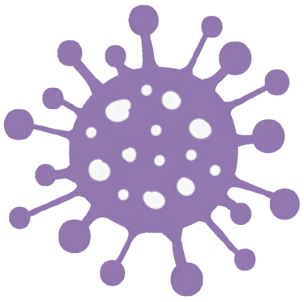
QUESTION:
What are the 4 main organs of a plant?

ANSWER:
Root, stem, leaves, reproductive structures



QUESTION:
Are plants eukaryotic or prokaryotic?

ANSWER:
Eukaryotic



What is a Plant?

Lesson 10 Quiz

1. All plants are made up of what types of cells?

A) Prokaryotic
B) Eukaryotic

2. Plant cells do not have a nucleus for their DNA.

True
False

3. Plants are made up of many cells; they are multicellular.

True
False

4. For extra support and protection, plants cells have:

A) special organelles
B) cell nucleus
C) cell walls

5. Plants only stay in one place, and are immobile.

True
False

6. Since plants make their own food, they are called:

A) heterotrophs
B) autotrophs
C) phototrophs

7. Plants use organelles called chloroplasts to absorb energy from the sun.

True
False

8. An example of plant tissues and organs are:

A) roots and stems
B) leaves and flowers
C) both A and B

11 The Wide World of Plants

With so many different plants in the world, it's tough to keep them all straight. But there are certain features we can see in plants that allow us to put them into helpful categories.

Recommended Reading

- *Plants: Flower Plants, Ferns, Mosses, and Other Plants,* by Shar Levine and Leslie Johnstone (Note: The intro to chapters 4 and 5 refer to the earth being over 100 million years old.)

- *The Tree Book: For Kids and their Grown Ups,* by Gina Ingoglia, p. 26-89
(Note: Fantastic resource for identifying trees during this week's activity.)

ACTIVITY Nature Walk — Exploring Plants

Now that you know a little bit more about the different divisions of plants, take some time to get outdoors and explore plants this week!

SUPPLY LIST

- Copies of Exploring Plants: Observation Journal page
- Pencil

INSTRUCTIONS

1. Walk around outside and try to find examples of plants that are in the four different divisions of plants we discussed in plants:
    - Phylum Bryophyta, the mosses
    - Phylum Pterophyta, the ferns
    - Phylum Coniferophyta, the cone-bearing plants
    - Phylum Anthophyta, the flowering plants
2. Try to find at least one to two different examples of each category of plant you can sketch on the Exploring Plants: Observation Journal page.
3. See if you can identify the species of the plant — use a book or online resource to help you out!

Reminder!

Be sure to continue caring for and monitoring your bean plant. How is it doing?

Take the time to sketch what it looks like and record its height.

EXPLORING PLANTS OBESERVATION JOURNAL

What phylum is this plant in?	What species of plant is this?	Record any noteworthy features of this plant:
☐ Pterophyta ☐ Bryophyta ☐ Coniferophyta ☐ Anthophyta	_____ _____	_____ _____ _____ _____

Sketch Your Plant

SKETCH YOUR BEAN PLANT

How many days since your bean was planted? _____

How tall is your bean plant? _____

LESSON 11: SAMUEL GRISWOLD GOODRICH

"Botany, the science of the vegetative kingdom, is one of the most attractive, most useful, and most extensive departments of human knowledge...the science of beauty."

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"Botany, the science of the vegetative kingdom, is one of the most attractive, most useful, and most extensive departments of human knowledge. . . the science of beauty."

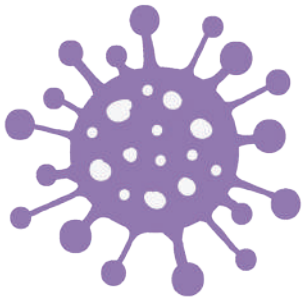
LESSON 11: SAMUEL GRISWOLD GOODRICH

QUESTION:

What phylum of plants reproduce with spores and do not have vascular tissue?

ANSWER:

Phylum Bryophyta, the mosses.



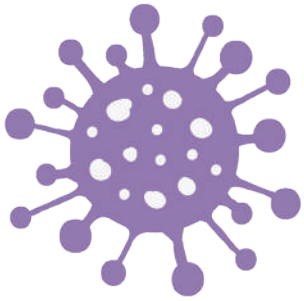
LESSON 11

QUESTION:

What phylum of plants reproduce with spores and do have vascular tissue?

ANSWER:

Phylum Pterophyta, the ferns.



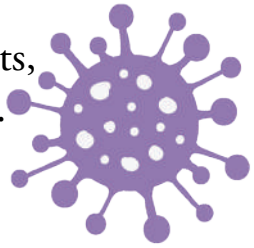
LESSON 11

QUESTION:

What phyla of plants reproduce with seeds and have vascular tissues?

ANSWER:

Phylum Coniferophyta, the cone-bearing plants, and Phylum Anthophyta, the flowering plants.



LESSON 11

The Wide World of Plants

Lesson 11 Quiz

1. The 4 major groups of plants are the mosses, the ferns, the conifers, and the flowering plants.

True
False

2. Vascular plants use special tissue inside the plant to:

A) anchor to soil
B) carry water and minerals
C) reproduce

3. What two structures can plants use for reproduction?

A) Seeds or spores
B) Rhizoids or seeds
C) Spores or minerals

4. Mosses known as Bryophytes are:

A) nonvascular and reproduce with spores
B) vascular and reproduce with seeds found in cones
C) vascular and reproduce with spores
D) vascular and reproduce with seeds found in fruit

5. Ferns known as Pteridophytes are:

A) vascular and reproduce with seeds found in cones
B) nonvascular and reproduce with spores
C) vascular and reproduce with seeds found in fruit
D) vascular and reproduce with spores

6. Gymnosperms including the major phylum conifers, are:

A) vascular and reproduce with spores
B) vascular and reproduce with seeds found in cones
C) vascular and reproduce with seeds found in fruit
D) nonvascular, and reproduce with spores

7. Angiosperms including the major phylum anthophyta, or flowering plants are:

A) vascular and reproduce with seeds found in cones
B) nonvascular and reproduce with spores
C) vascular and reproduce with spores
D) vascular and reproduce with seeds found in fruit

8. Which of the following is not true?

A) Spores are smaller than seeds.
B) Spores have a thick wall around them to provide support and structure.
C) Seeds contain a food supply within them for the embryonic plant.
D) Seeds have a protective coating around them for protection.

12 Mean, Green, Energy-Making Machines

Without leaves, flowering plants would have no way to get the energy they need to survive. In this lesson you'll learn what makes leaves so important and the tricks you can use to tell one plant from another.

Recommended Reading

- *Plant Parts,* by Richard and Louis Spilsbury, p. 6-11
- *Botany: Plants, Cells, and Photosynthesis,* by April Chloe Terrazas
- *The Tree Book: For Kids and their Grown Ups,* by Gina Ingoglia, p. 10-13

ACTIVITY NATURE WALK - EXPLORING LEAVES

In this week's activity you'll continue observing nature around you, but this time you'll specifically be looking at leaves! If it's winter and all of the leaves have fallen from the trees, you might have to save this one until it warms up again.

SUPPLY LIST

- Copies of Exploring Leaves: Observation Journal page
- Pencil
- Wax paper (optional)
- Thin towel (optional)
- Iron (optional)
- Ironing Board (optional)

INSTRUCTIONS

1. Go out on a nature walk and look for all sorts of different leaves. Collect leaves from different plants you find.
2. Sketch the leaves or make a leaf press to include on the Exploring Leaves: Observation Journal Page.
3. After you get home, use the leaves and other information you collected to try to identify the plants you found — use a book or online resource to help you out!

INSTRUCTIONS FOR PRESSING & PRESERVING LEAVES *(optional)*

Instead of sketching your leaves, you can preserve them easily using wax paper. You'll need an adult to help with this!

1. Begin by putting each leaf between 2 pieces of wax paper. Place a towel on top of the wax paper and press on the towel with a warm iron to seal the wax paper together. This will take about 3-4 minutes.
2. Flip the leaf and wax paper over, cover it with a towel, and press on the towel with a warm iron again.
3. Allow the leaves to cool and then peel the wax paper away. You can now paste your leaf onto your Observation Journal Page.

Reminder!
Be sure to continue caring for and monitoring your bean plant. How is it doing? Take the time to sketch what it looks like and record its height.

EXPLORING LEAVES OBESERVATION JOURNAL

Where I found this leaf?	What color is the leaf?	What is the overall shape of the leaf?	What is the leaf's venation?	What species of plant is this?
_____	_____	_____	☐ Parallel	_____
_____	_____	_____	☐ Pinate	_____
			☐ Palmate	

Sketch Your Plant

SKETCH YOUR BEAN PLANT

How many days since your bean was planted? _____

How tall is your bean plant? _____

LESSON 12: LUKE 21:29B-30

And he told them a parable: Look at the fig tree, and all the trees. As soon as they come out in leaf, you see for yourselves and know that the summer is already near.

LESSON 12: LUKE 21:29B-30

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And he told them a parable: Look at the fig tree, and all the trees. As soon as they come out in leaf, you see for yourselves and know that the summer is already near.

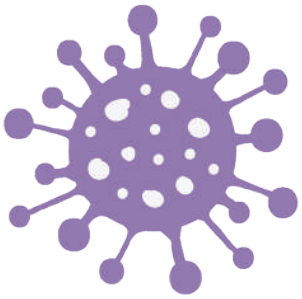
LESSON 12: LUKE 21:29B-30

QUESTION:

Botanists often look at leaves to classify plants. What are three things they look for when looking at leaves?

ANSWER:

Margin, venation, and shape



LESSON 12

QUESTION:

What is the organelle that's responsible for absorbing energy from sunlight for photosynthesis?

ANSWER:

Chloroplasts

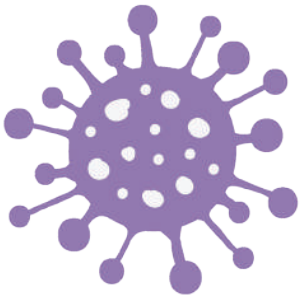
LESSON 12

QUESTION:

What are the small pores in a leaf called that let carbon dioxide in and oxygen out?

ANSWER:

Stoma



LESSON 12

Mean, Green, Energy-Making Machines

Lesson 12 Quiz

1. Chloroplasts are:

A) molecules that help transport water from the roots to the leaves
B) special organelles that absorb energy from the sun
C) small pores on the bottom of the leaf that allow carbon dioxide to enter the leaf and oxygen to exit the leaf

2. The process a plant uses to make its own food is called:

A) energy exchange
B) autotrophing
C) photosynthesis

3. The one cell thick, outside layer of the leaf is called the:

A) epidermis
B) stomata
C) palmate

4. Stomata are:

A) small pores on the bottom of the leaf that allow carbon dioxide to enter the leaf and oxygen to exit the leaf
B) special organelles that absorb energy from the sun
C) molecules that help transport water from the roots to the leaves

5. The edge of the leaf is called the

A) brim
B) margin
C) outer line

6. The lines running through a leaf are veins and the shape of these veins is called venation

True
False

7. Which of the following can give us clues when trying to identify the type of plant we're looking at?

A) Leaf shape
B) Venation
C) Leaf margin
D) All of the above

8. Which are types of venation?

A) Pinnate, palmate, and pinnacle
B) Parallel and pinnate
C) Parallel, pinnate, and palmate

13 Roots and Shoots

What allows a plant to get water from the ground? What allows the food made in plant leaves to get all around a plant? The answer is found in two important organs: stems and roots.

Recommended Reading

- *Plant Parts,* by Richard and Louis Spilsbury, p. 30-39
- *Tops and Bottoms,* by Janet Stevens
- *The Tree Book: For Kids and their Grown Ups,* by Gina Ingoglia, p. 8-9; 18-21

ACTIVITY Traveling Water

Plants need water for survival. Roots pull water from the ground and it's transported up through the stems. Tiny tubes are all throughout the plant, called xylem which move the water. It's usually hard to see how that water moves, but with this activity you'll have a chance to see how it works in action!

SUPPLY LIST

- 2 white carnations
- 3 cups
- Food coloring
- Sharp knife (be sure an adult helps with this!)

INSTRUCTIONS

1. Fill all 3 cups ¾ of the way with water and add enough food coloring to each cup to get a nice vibrant color. Use a different color in each cup.
2. Cut 2 inches off the bottom of each carnation. Then, slice one of the carnation stems lengthwise straight down the middle from the bottom to about halfway up the stem. Be sure to get an adult's help with cutting!
3. Place the carnation that does not have a split stem in one cup of water. Place each half of the cut carnation's stem in different colors of water.
4. Wait until the next day to observe your results.
5. Record your observations on the next page.

Reminder!
Be sure to continue caring for and monitoring your bean plant. How is it doing? Take the time to sketch what it looks like and record its height.

WATCHING WATER TRAVEL OBESERVATIONS

Sketch each of your flowers below. Be sure to use a colored pencil or crayon to show what each flower looks like at the end of your observation.

Split Carnation

Whole Carnation

QUESTIONS:

Are the two colors in the split carnation split or mixed throughout?

_____

Given your observations, do you think the xylem tubes flow all throughout the flower or go straight up?

_____

SKETCH YOUR BEAN PLANT

How many days since your bean was planted? _____

How tall is your bean plant? _____

LESSON 13: PSALM 1:3

He is like a tree planted by streams of water that yields its fruit in its season, and its leaf does not wither. In all that he does, he prospers.

LESSON 13: PSALM 1:3

LESSON 13: PSALM 1:3

He is like a tree planted by the streams of water
that yields its fruit in its season, and its leaf
does not wither. In all that he does, he prospers.

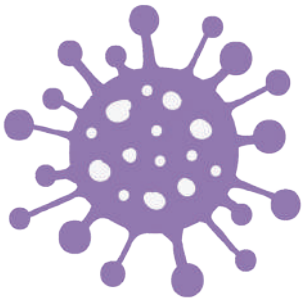
LESSON 13: PSALM 1:3

QUESTION:

What organ transports water, nutrients, and food around a plant?

ANSWER:

Stem



LESSON 13

QUESTION:

What organ collects water and nutrients for a plant?

ANSWER:

Roots

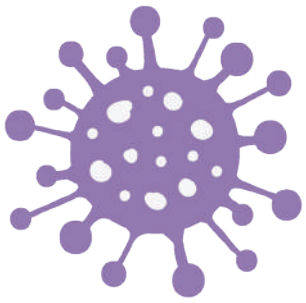
LESSON 13

QUESTION:

In a stem, what transports nutrients and water from the roots up to the leaves?

ANSWER:

Xylem



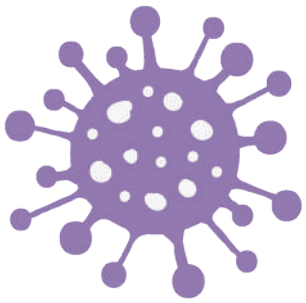
LESSON 13

QUESTION:

In a stem, what transports food made in the leaves down to the roots?

ANSWER:

Phloem



LESSON 13

QUESTION:

What are the two types of roots?

ANSWER:

Taproots and fibrous roots

LESSON 13

Roots and Shoots

Lesson 13 Quiz

1. Plant stems function to support the leaves and flowers of the plant, as well as carry water, nutrients, and food to different parts of the plant.

True
False

2. Some plants store food in their stems, such as potato and asparagus plants.

True
False

3. Stems, sometimes called shoots, and are typically found growing:

A) in trees
B) above ground
C) below ground

4. Xylem tissue carries nutrients and water from the root to the leaves for:

A) gas exchange
B) photosynthesis
C) food absorption

5. Phloem tissue carries the food created by photosynthesis in the leaves down to the:

A) flowers
B) stem
C) roots

6. Roots function to anchor the plant, collect water and nutrients for the plant, and sometimes:

A) store food for the plant
B) borrow nutrients from other plants
C) grow flowers

7. Taproots grow deep into the soil and typically the type of root to:

A) consume energy
B) be a tangled mass
C) store food

8. Fibrous roots have lots of branching roots that form a pattern in the soil.

True
False

14 The Reason for Flowers

Flowers can be beautiful gifts to give someone, but they weren't designed by God just to be pretty decorations for our home. Flowers have a special purpose: they help make seeds which create new mature plants.

Recommended Reading

- *Plant Parts,* by Richard and Louis Spilsbury, p. 14-17
- *Flower Talk: How Plants Use Color to Communicate,* by Sara Levine

ACTIVITY Flower Dissection

While flowers come in many shapes, sizes, and colors they all have generally the same parts. In this lab you'll be examining and identifying the reproductive structures found on various flowers.

SUPPLY LIST

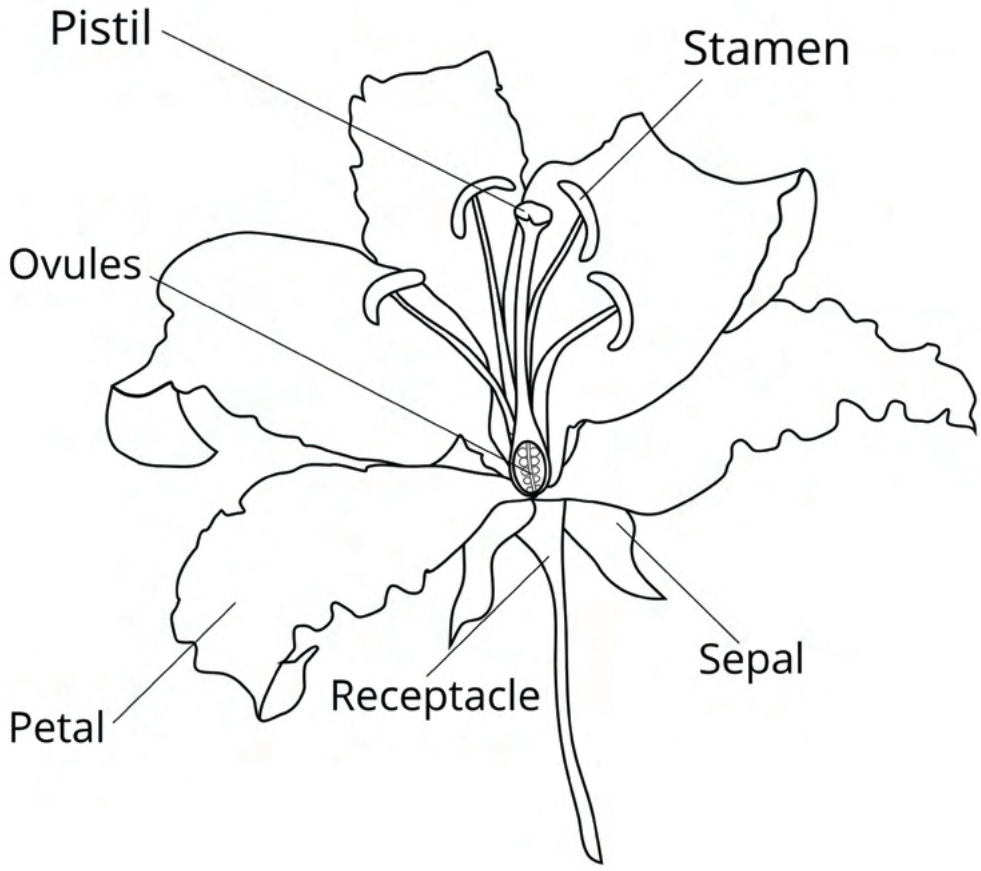
- Flower diagram
- Copies of flower dissection observation page
- Colored pencils
- 2-3 different flowers (gladiola, lily, tulip, or daffodil would all work well)
- Sharp knife

INSTRUCTIONS

1. Begin by examining the flower diagram on the next page to make sure you're familiar with the main parts of the flower. Color the different parts according to directions.
2. Next, with a parent's help, carefully cut your flower down through the base until you have 2 equal halves.
3. Sketch the flower on the flower dissection observation page and label as many of the parts as you're able to find: receptacle, sepals, petals, stamen, pistil, and ovules.

Reminder!
Be sure to continue caring for and monitoring your bean plant. How is it doing? Take the time to sketch what it looks like and record its height.

FLOWER DIAGRAM



RECEPTACLE:	thickened part of the stem from where the flower grows; color light green
SEPALS:	covers and protects the flower before blooming; color dark green
PETALS:	colorful to attract birds and insects to pollinate; color pink
STAMEN:	male reproductive parts; color orange
PISTIL:	female reproductive parts; color yellow
OVULES:	female reproductive cells that become seeds if fertilized; color red

FLOWER DISSECTION OBSERVATION

Type of flower_____

Is your flower: Perfect Imperfect

Sketch your flower below and be sure to label all of the parts you're able to find: receptacle, sepals, petals, stamen, pistil, and ovules.

SKETCH YOUR BEAN PLANT

How many days since your bean was planted? _____

How tall is your bean plant? _____

LESSON 14: GENESIS 1:29

Then God said, "I give you every seed-bearing plant on the face of the whole earth and every tree that has fruit with seed in it. They will be yours for food."

LESSON 14: GENESIS 1:29

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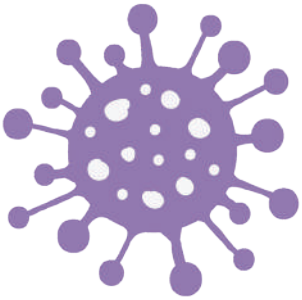
Then God said, "I give you every seed bearing on the face of the whole earth and every tree that has fruit with seed in it. They will be yours yours for food."

LESSON 14: GENESIS 1:29

QUESTION:
What are the male and female portions of the flower called?

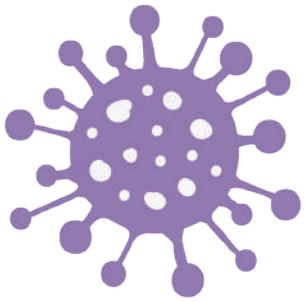
ANSWER:
Stamen and pistil



LESSON 14

QUESTION:
What is the process called when pollen is transferred from the stamen to the pistil?

ANSWER:
Pollination



LESSON 14

The Reason for Flowers

Lesson 14 Quiz

1. There are 3 primary parts of a flower: sepals, petals, and pistil.

True
False

2. The stamen is the male portion of the flower, which has an anther covered in:

A) anther
B) pollen
C) seeds

3. The pistil is the female portion of the flower, and has a stigma that is:

A) sticky to catch pollen
B) brightly colored
C) in the stamen

4. Birds, insects, and the wind can all help pollinate different types of flowers.

True
False

5. Pollination occurs when pollen travels to the:

A) anther
B) stamen
C) pistil

6. Fertilization occurs when the male cell in the pollen reaches the:

A) pistil of the flower
B) anther in the stamen
C) ovary in the pistil

7. Pollination occurs:

A) before fertilization
B) after fertilization

8. Some plants have both male parts or stamen and female parts or pistils, these types of flowers are called:

A) absolute flowers
B) perfect flowers
C) imperfect flowers

15 It Begins with a Seed

Most of us have a favorite kind of fruit. Some of us love bananas or apples or peaches. Some of us love berries or avocados or olives. But why do plants go to all the trouble to make fruit in the first place? It's not just to feed us, but to carry the seed away from the parent plant.

Recommended Reading

- *Seeds and More Seeds,* by Millicent E. Selsam
- *The Tree Book: For Kids and their Grown Ups,* by Gina Ingoglia, p. 14-17
- *A Weed is a Flower: The Life of George Washington Carver,* by Aliki (lower elementary)
- *Who Was George Washington Carver?* by Jim Gigliotti (upper elementary)

ACTIVITY Fruit Dissection

Fruits are the ripened ovaries of the flower. They come in all shapes and sizes, but their function is the same — to protect the seeds housed within them and to help spread the seeds around.

SUPPLY LIST

- Various fruits (tomato, olive, blackberry, apple, oranges, peach, bell pepper,
- Sharp knife
- Hand lens
- Copies of Fruit Observation worksheet
- Pencil

INSTRUCTIONS

1. Examine each piece of fruit on the outside. Sketch the outside of the fruit.
2. With a parent's help, cut each piece of fruit in half and examine the inside. Sketch the inside of the fruit.
3. After you've completed examining each piece of fruit, consider how they are similar and different.

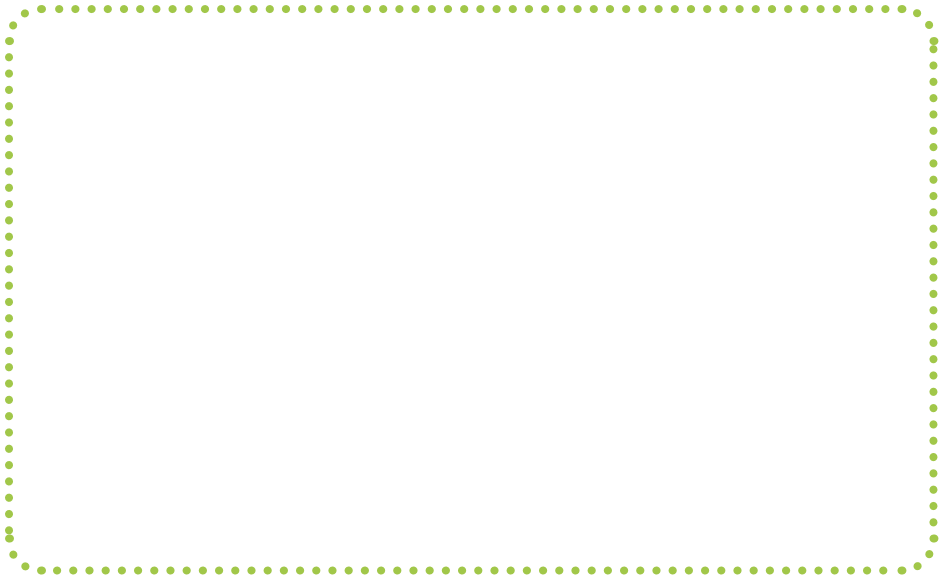
Reminder!
Be sure to continue caring for and monitoring your bean plant. How is it doing? Take the time to sketch what it looks like and record its height.

FRUIT DISSECTION OBESERVATION

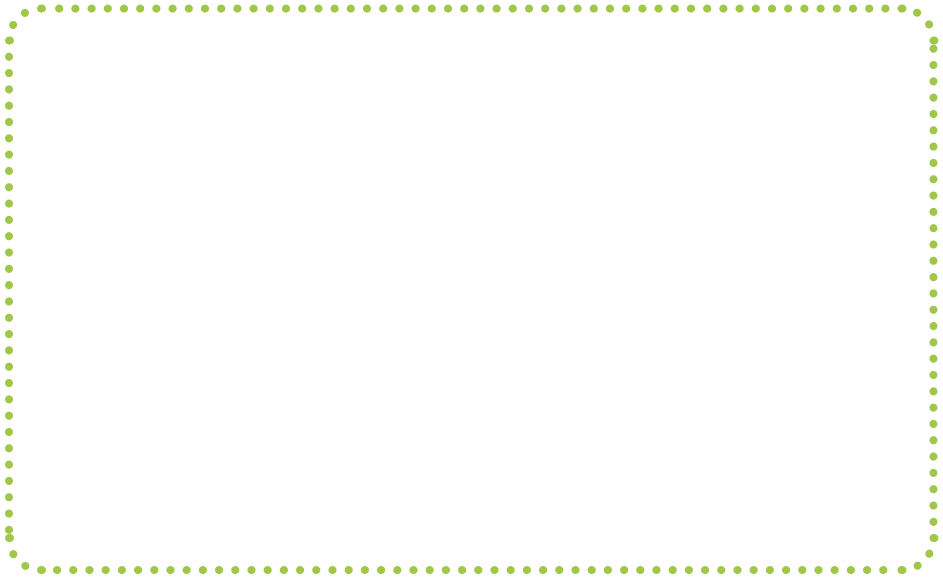
Name of fruit_____

How many seeds are in your fruit? _____

External Structure of Fruit



Internal Structure of Fruit



SKETCH YOUR BEAN PLANT

How many days since your bean was planted? _____

How tall is your bean plant? _____

LESSON 15: MARK 4:26B-27

The kingdom of God is as if a man should scatter seed on the ground. He sleeps and rises night and day, and the seed sprouts and grows; he knows not how.

LESSON 15: MARK 4:26B-27

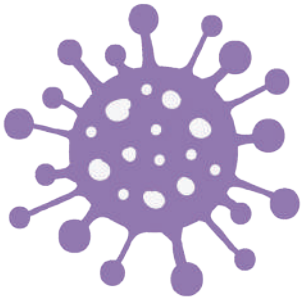
LESSON 15: MARK 4:26B-27

The kingdom of God is as if a man should scatter seed on the ground. He sleeps and rises night and day, and the seed sprouts and he knows not how.

LESSON 15: MARK 4:26B-27

QUESTION:
What is the primary job of fruit?

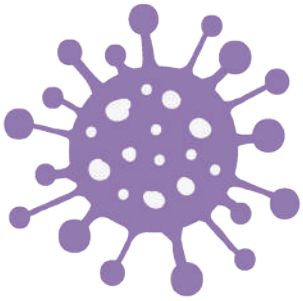
ANSWER:
Disperse seeds



LESSON 15

QUESTION:
What is the process called when a plant sprouts from a seed?

ANSWER:
Germination



LESSON 15

It Begins with a Seed

Lesson 15 Quiz

1. After fertilization, the plant loses its:

A) petals, ovary, stamen
B) petals, stamen, and sepals
C) petals, color and stamen

2. Which of the following is not part of the seed?

A) Plant embryo
B) Outer protective covering
C) Food
D) Petals

3. After the ovary of a plant has been fertilized, it grows into a:

A) fruit
B) flower
C) seed

4. Fruit is designed to:

A) make more seeds
B) attract bees
C) disperse seeds

5. A seed in a dormant state is growing very slowly.

True
False

6. For a seed to begin to grow, it needs the right amount of water, the right amount of oxygen in the air, the right temperature, right amount of sunlight, and the right amount of soil.

True
False

7. Germination is when the seed:

A) begins to sprout
B) grows fruit
C) is fertilized

16 The Amazing Animals

So many different kinds of animals are everywhere! But did you know there are certain characteristics that every single animal shares, no matter how big or small, no matter their shape, their size, or their color?

Recommended Reading

- *Carnivores, Herbivores, Omnivores,* by Nicola Tyrrell
- *Animal Classifications: Invertebrates,* by Angela Royston
- *Bubble Homes and Fish Farts,* by Fiona Bayrock

ACTIVITY Comparing Vertebrates & Invertebrates

Most larger animals, especially those that live on land, have a vertebral column—also known as a backbone. In this activity, we'll have a chance to explore how a backbone might help an animal.

SUPPLY LIST

- Playdough
- Pipe cleaner
- Small wooden blocks

INSTRUCTIONS

1. Use your playdough to create a four-legged animal. Be sure your animal can stand up on its own four legs without your support.
2. Next, create another four-legged animal about the same shape and size as your first one, but this time place a pipe cleaner in the middle of its back. Be sure to trim the pipe cleaner to be the correct size. Be sure this animal can also stand on its own four legs without your support.
3. The animal you created without the pipe cleaner is your "invertebrate" and the animal with your pipe cleaner is your "vertebrate" animal. The pipe cleaner in your animal's back acts as the vertebral column, or backbone.
4. Place one block on the back of each of your animals. Observe what happens.
5. Continue to place blocks on the back of each of your animals, one at a time, until one animal collapses. Answer the questions about this activity below.

ACTIVITY QUESTIONS

Which animal collapsed under the weight of the blocks?

Why do you believe the animal collapsed and the other did not?

What do you think a vertebral column does for an animal?

Why do you think many larger animals, especially those that live on land, have backbones?

LESSON 16: JOB 35:11

Who teaches us more than the beasts of the earth and makes us wiser than the birds of the heavens?

LESSON 16: JOB 35:11

LESSON 16: JOB 35:11

Who teaches us more than the beasts of the earth and makes us wiser than the birds of the heavens?

LESSON 16: JOB 35:11

QUESTION:
What are the three characteristics of organisms in the animal kingdom?

ANSWER:
(1) Heterotrophic (2) Multicellular (3) With a skeleton

LESSON 16

QUESTION:
What types of foods do herbivores, carnivores, and omnivores eat?

ANSWER:
Herbivores eat plants. Carnivores eat animals. Omnivores eat both plants and animals.

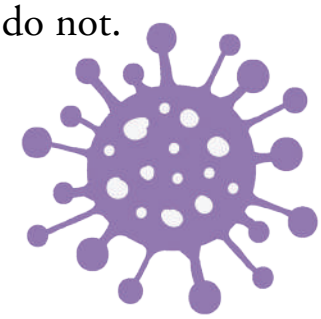
LESSON 16

QUESTION:

What is the difference between vertebrates and invertebrates?

ANSWER:

Vertebrates have a backbone; invertebrates do not.



LESSON 16

The Amazing Animals

Lesson 16 Quiz

1. All animals are heterotrophic, multicellular, and have some form of skeleton.

True
False

2. Herbivores are animals that eat:

A) other animals
B) plants
C) both plants and animals

3. Carnivores are animals that eat:

A) other animals
B) plants
C) both plants and animals

4. Omnivores are animals that eat:

A) other animals
B) plants
C) both plants and animals

5. An endoskeleton is:

A) on the outside of the body
B) on the inside of the body
C) made only of cartilage

6. An exoskeleton is:

A) on the outside of the body
B) on the inside of the body
C) either on the outside or inside of the body

7. Hydroskeletons are bones that are made of water.

True
False

8. Animals with a backbone are called:

A) vertebrates
B) invertebrates
C) heterotrophs
D) autotrophs

9. Invertebrates are animals that sometimes have a backbone.

True
False

17

Silly Sea Sponges

You've probably used a sponge to clean the dishes, but you may not know that sponges are actually animals! These interesting creatures have features that are unique to only them-no other animals on earth have these features.

Recommended Reading

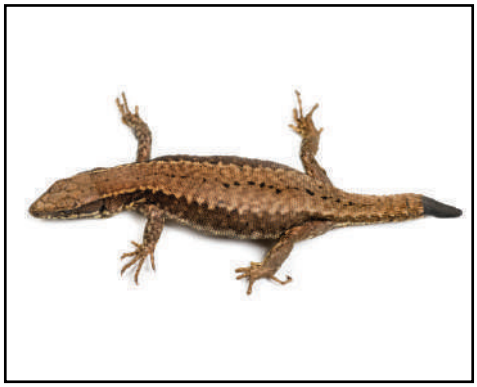
- *Sponges: Spectacular Sea Creatures,* by Laura Sue Perricone
- *Sponges are Skeletons,* by Barbara Juster Esbensen
- *Manfish: A story of Jacques Cousteau,* by Jennifer Berne

ACTIVITY Exploring Symmetry in Living Creatures

All animals have a body shape that can be classified as having bilateral symmetry, radial symmetry, or they can be classified as being asymmetrical. Bilateral symmetry means an organism can be divided into left and right sides to make a mirror image of one another. Radial symmetry means we can divide it in many different ways to form a mirror image. If an organism is asymmetrical, it means it has no symmetry at all.

Part 1:

Look at the following animals. Label each of them as having bilateral symmetry, radial symmetry, or asymmetry.



_____ _____ _____

Part 2:

Now it's your turn! Carefully trace the butterfly, starfish, and sea sponge pictures found on the following pages. If the animal exhibits symmetry be sure to decorate it symmetrically, if it's asymmetrical, you may decorate it any way you'd like.

Exploring Symmetry in Living Creatures

Butterfly:

Trace the butterfly. If the animal exhibits symmetry be sure to decorate it symmetrically, if it's asymmetrical, you may decorate it any way you'd like.

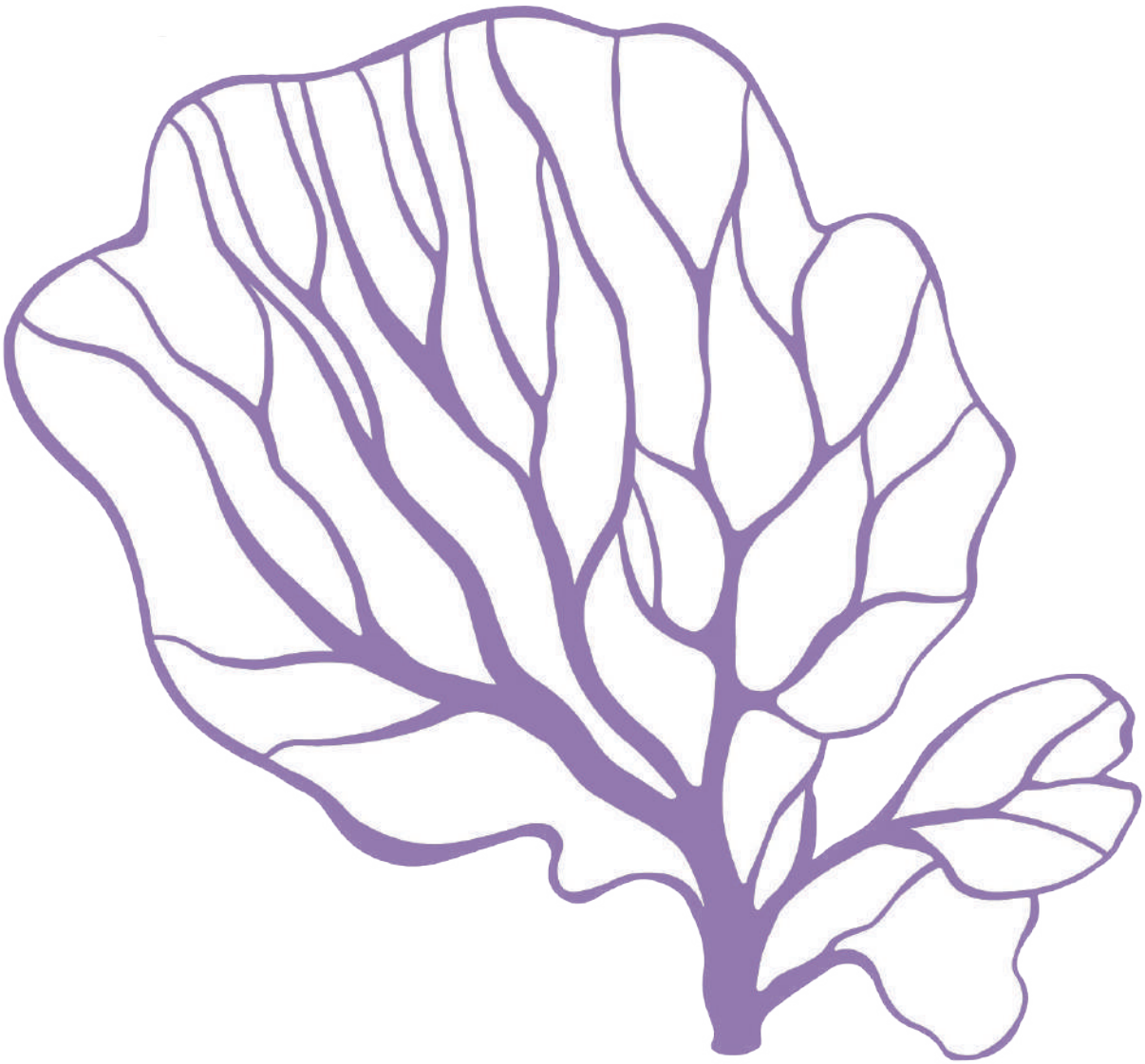
Exploring Symmetry in Living Creatures

Starfish:

Trace the starfish. If the animal exhibits symmetry be sure to decorate it symmetrically, if it's asymmetrical, you may decorate it any way you'd like.

Sea Sponge:

Trace the sea sponge. If the animal exhibits symmetry be sure to decorate it symmetrically, if it's asymmetrical, you may decorate it any way you'd like.



Animal Fact File
Phylum Porifera

Choose an animal in this phylum to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

- ☐ Vertebrate
- ☐ Invertebrate

- ☐ Herbivore
- ☐ Carnivore
- ☐ Omnivore

Fun Facts

Picture

LESSON 17: JOHN STEINBECK

"In strange and beautiful wares. It sells the lovely animals of the sea, the sponges, tunicates, anemones . . the living moving flowers of the sea."

LESSON 17: JOHN STEINBECK

LESSON 17: JOHN STEINBECK

"In strange and beautiful wares. It sells the lovely animals of the sea, the sponges, tunicates, anemones...the living moving flowers of the sea."

LESSON 17: JOHN STEINBECK

QUESTION:

What are four features sea sponges have?

ANSWER:

1) They live in aquatic biomes. 2) They are invertebrates. 3) They're sessile. 4)They are asymmetrical.

LESSON 17

QUESTION:

What is bilateral symmetry?

ANSWER:

Bilateral symmetry is when you can draw a line through an organism, dividing it into left and right sides that look the same.

LESSON 17

QUESTION:

What is radial symmetry?

ANSWER:

Radial symmetry is when you can draw a line through an organism several different ways and it looks the same on both sides.

LESSON 17

QUESTION:

What is asymmetry?

ANSWER:

Asymmetry is when you can't draw a line through an organism where both sides look the same.

LESSON 17

Silly Sea Sponges

Lesson 17 Quiz

1. **Phylum Porifera are pore bearers, meaning:**
   A) they have pores on one side of their body
   B) they have pores all over their bodies
   C) they have pores inside their cells

2. **Sponges are heterotrophic, meaning they:**
   A) filter water for food
   B) eat other sponges
   C) use sunlight to create food

3. **The body of a sponge is:**
   A) solid and contains cartilage
   B) very small and filled with algae
   C) hollow and sac-like

4. **Sponges live:**
   A) in the desert
   B) in the forest
   C) in the water

5. **Sponges are invertebrates, meaning they do not have a backbone.**
   True
   False

6. **Sponges are sessile as adults, meaning:**
   A) there are only male sponges, no females
   B) they don't move, but stay in one place
   C) they must eat other organisms for food

7. **Sponges are asymmetrical, which means you can draw a line through them and one side looks like a mirror image of the other side.**
   True
   False

8. **When you can draw a line through an organism several different ways and it looks the same on both sides, we call this:**
   A) asymmetrical
   B) bilaterally symmetrical
   C) radially symmetrical

18

Wiggly Worms

You might think worms are disgusting, but some of them (believe it or not) are quite beautiful and colorful creatures, and all of them have an important place in God's creation. There are tens of thousands of different kinds of worms in the world.

Recommended Reading

- *Wiggling Worms at Work,* by Wendy Pfeffer
- *The Lifecycle of an Earthworm,* by Bobbie Kalman
- *Yucky Worms,* by Vivian French

ACTIVITY Earthworm Observation and Behavior

We use our eyes, ears, nose, and tastebuds to learn all about the world around us and respond to it. While earthworms don't have complex nervous systems like you and I do, that doesn't mean they're senseless creatures. Earthworms have special cells in their bodies that can detect change in their environment. In this investigation you'll have an opportunity to observe an earthworm's behavior and see how it responds to different types of changes in their environment.

SUPPLY LIST

- Earthworm (purchase at a bait shop or find by digging one up in your backyard)
- Pan with sides (9x13 in. baking pan would work well)
- Ruler
- Foil
- Flashlight
- Paper towels
- Sandpaper
- Paper

INSTRUCTIONS

1. Place your earthworm in a pan with sides and sketch your earthworm on your Observation Journal page.
2. Label the head and tail end along with the clitellum. The clitellum is the smooth, barrel-shaped swelling. The clitellum is closest to the head end of the earthworm.
3. Measure your earthworm with a ruler and record its length.
4. Watch the earthworm for a minute or two without touching or interacting with it. Describe the earthworm's behavior in your Observation Journal.
5. Cover half of the pan with foil and shine a flashlight on the other half. Place the earthworm in the middle of the pan—half of it on the dark side covered with foil and half on the other side with the bright light. Describe how your earthworm responds to the light and dark in your Observation Journal.
6. Uncover the pan and remove the flashlight. Next, place a moist paper towel on half of the pan bottom and a dry paper towel on the other half of the pan bottom. Be sure the two paper towels meet up in the middle. Place your worm in the middle—half on the moist paper towel and half on the dry paper towel. Describe how your earthworm responds to the moist and dry paper towels in your Observation Journal.
7. Remove the paper towels from your pan and be sure your pan is dry. Next, you'll dip one paper towel in cold water and another in hot water. Place the cold paper towel on half of the pan bottom and the hot paper towel on the other half of the pan bottom. Be sure the two paper towels meet up in the middle. Place your worm in the middle—half on the hot paper towel and half on the cold paper towel. Describe how your earthworm responds to the different temperatures in your Observation Journal.
8. Remove the paper towels from your pan and be sure your pan is dry. Cover half of your pan with sandpaper and the other half with regular smooth paper. Be sure the sandpaper and regular paper meet up in the middle. Place your worm in the middle—half on the sandpaper and half on the smooth paper. Describe how your earthworm responds to the different textures of paper in your Observation Journal.

Earthworm Observation & Behavior Journal

Sketch Your Worm

Length_____

Describe the Earthworm's Behavior On the lines below, describe how your earthworm behaves in reaction to the changes in its environment.	
Left Alone	
Light	
Moisture	
Temperature	
Texture	

Animal Fact File
Phylum Annelida

Choose an animal in this phylum to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

- ☐ Vertebrate
- ☐ Invertebrate

- ☐ Herbivore
- ☐ Carnivore
- ☐ Omnivore

Fun Facts

Picture

Animal Fact File
Phylum Nematoda

Choose an animal in this phylum to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

- ☐ Vertebrate
- ☐ Invertebrate

- ☐ Herbivore
- ☐ Carnivore
- ☐ Omnivore

Fun Facts

Picture

Animal Fact File
Phylum
Platyhelminthes

Choose an animal in this phylum to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

- ☐ Vertebrate
- ☐ Invertebrate

- ☐ Herbivore
- ☐ Carnivore
- ☐ Omnivore

Fun Facts

Picture

LESSON 18: WILL CUPPY

"The Earthworm plows the whole world with his tunnels, drains and aerates the earth, fixes the topsoil, and I don't know what all, and he never asks a cent for it."

LESSON 18: WILL CUPPY

LESSON 18: WILL CUPPY

"The Earthworm plows the whole world with his tunnels, drains, and aerates the earth, fixes the topsoil, and I don't know what alt, and he never asks a cent for it."

LESSON 18: WILL CUPPY

QUESTION:
What is Phylum Annelida?

ANSWER:
The segmented worms

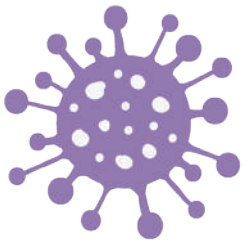
LESSON 18

QUESTION:
What is Phylum Nematoda?

ANSWER:
The roundworms

LESSON 18

QUESTION:
What is Phylum Platyhelminthes?



ANSWER:
The flatworms

LESSON 18

QUESTION:
What is a parasite?

ANSWER:
An organism that lives on or inside of another organism, taking nutrients from and hurting its host.

LESSON 18

Wiggly Worms

Lesson 18 Quiz

1. Which of the following is not true about all worms?

A) They have a head end and tail end.
B) They are asymmetrical.
C) They have no legs.
D) They are invertebrates.

2. There are three different phyla of worms.

True
False

3. Animals with an incomplete digestive system:

A) have just one opening for both eating and waste
B) have two openings: a mouth for eating and an anus for expelling waste
C) are not able to eat, but absorb nutrients through their skin

4. Animals with a complete digestive system:

A) have just one opening for both eating and waste
B) have 2 openings: a mouth for eating and an anus for expelling waste
C) are not able to eat, but absorb nutrients through their skin

5. Worms in the Phylum Platyhelminthes, also known as the flatworms:

A) have a complete digestive system
B) have an incomplete digestive system
C) have rings around their bodies with repeating segments

6. Worms in Phylum Nematoda, also known as the roundworms:

A) have rings around their bodies with repeating segments
B) have an incomplete digestive system
C) have a complete digestive system

7. Annelida, or segmented worms:

A) have rings around their bodies with repeating segments
B) have an incomplete digestive system
C) are all parasitic

8. What is a parasite?

A) An organism that lives on or inside of another organism, taking nutrients from and hurting its host
B) An organism that lives by itself and hunts for its own food
C) An organism that lives in a close relationship with a group of other organisms that work together to find food

9. Some worms are free-living and some are parasites.

True
False

19

Majestic Medusas and Patient Polyps

From coral reefs to glowing jellyfish, cnidarians are some of the most beautiful forms of life in the ocean. They may look tranquil, but don't be fooled—they are vicious predators, ready to kill.

Recommended Reading

- *Jellyfish (A Day in the Life: Sea Animals),* by Louise Spilsbury
- *Life in a Coral Reef,* by Wendy Pfeffer
- *Manfish: A Story of Jacques Cousteau,* by Jennifer Berne
- *Seashells, Crabs, and Sea Stars,* by Christine Kump Tibbitts, p. 38
- *Marvels of Creation: Sensational Sea Creatures,* by Buddy and Kay Davis, p.32

ACTIVITY Exploring Jellyfish Through Art

Jellyfish, with their vibrantly colored sac-like bodies and long stinging tentacles, are the cnidarians that people are most familiar with. In this activity you'll have a chance to get creative and make some jellyfish and bring some underwater beauty to your room!

SUPPLY LIST

- Coffee filters
- Washable markers
- Spray bottle with water
- Paper streamers or ribbon
- Glue
- Stapler
- Toilet paper

INSTRUCTIONS

1. Cover your work surface with newspaper or something that will protect it from getting stained. Color several coffee filters with markers and then place a blank coffee filter underneath each of the colored ones. The coffee filters will serve as the sac-like bodies of your jellyfish.
2. Spritz the coffee filters with water. Leave them laying flat until they're dry.
3. While the coffee filters are drying, cut some streamers and ribbons to serve as the long tentacles of your jellyfish.
4. Once the coffee filters are dry, glue the streamers and ribbon to the center of one pair of the coffee filters.
5. Wad up a few pieces of toilet paper to put between the two coffee filters, then glue or staple the two coffee filters together.
6. Hang your jellyfish from the ceiling, but be sure to watch for the stinging tentacles!

Animal Fact File
Phylum Cnidaria

Choose an animal in this phylum to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

- ☐ Vertebrate
- ☐ Invertebrate

- ☐ Herbivore
- ☐ Carnivore
- ☐ Omnivore

Fun Facts

Picture

LESSON 19: GENESIS 1:20

Then God said, "Let the waters teem with swarms of living creatures, and let birds fly above the earth in the open expanse of the heavens."

LESSON 19: GENESIS 1:20

LESSON 19: GENESIS 1:20

Then God said, "Let the waters teem with swarms of living creatures, and let birds fly above the earth in the open expanse of the heavens."

LESSON 19: GENESIS 1:20

QUESTION:
What do cnidarians get their name from?

ANSWER:
The stinging cells on their tentacles

LESSON 19

QUESTION:
What is the cup-shaped form of cnidarians called?

ANSWER:
Polyp

LESSON 19

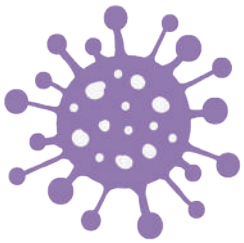
QUESTION:
What is the umbrella-shaped form of cnidarians called?

ANSWER:
Medusa

LESSON 19

QUESTION:
What is an incomplete digestive system?

ANSWER:
Only one opening to eat and expel waste



LESSON 19

Majestic Medusas and Patient Polyps

Lesson 19 Quiz

1. Which of the following is NOT true of animals in Phylum Cnidaria?

A) They exhibit radial symmetry.
B) They are invertebrates.
C) They have tentacles extending from their sac-like body.
D) They ALL live part of their life as a polyp and part of their life as a medusa.

2. Cnidarians use their tentacles to capture prey and have:

A) special cells that launch at their prey
B) cells with toxins that are released into the water
C) stinging cells called cnidocytes that contain toxins

3. Cnidarians have an incomplete digestive system, meaning:

A) they have two openings, one for waste and the other for eating.
B) they have just one opening for both waste and eating.
C) they do not eat their food, but absorb nutrients through their bodies.

4. Cnidarians in polyp form:

A) tend to stay in one place and not move around
B) only swim with the current of other animals
C) are free-swimming

5. Cnidarians in medusa form:

A) tend to stay in one place and not move around
B) only swim with the current of other animals
C) are free-swimming

6. What do cnidarians in the polyp form look like?

A) They have an umbrella-shaped body with the mouth facing downward and tentacles all around the mouth.
B) They are cup-shaped and look like a tube with a mouth and tentacles at one end and a base that attaches to a hard surface on the other end.
C) They are asymmetrical; they do not have a standard body form.

7. What do cnidarians in the medusa form look like?

A) They have an umbrella-shaped body with the mouth facing downward and tentacles all around the mouth.
B) They are cup-shaped and look like a tube with a mouth and tentacles at one end and a base that attaches to a hard surface on the other end.
C) They are asymmetrical; they do not have a standard body form.

20

Spiny-Skinned Savages

How would you like to have five arms instead of two? How about 200 arms? How about spikes all over your body? Welcome to the life of an echinoderm.

Recommended Reading

- *Starfish,* by Edith Thacher Hurd
- *Star of the Sea: A Day in the Life of a Starfish,* by Janet Halfmann
- *Seashells, Crabs, and Sea Stars,* by Christine Kump Tibbitts, p.32-37
- *Marvels of Creation: Sensational Sea Creatures,* by Buddy and Kay Davis, p.61

ACTIVITY Echinoderm Sorting

Echinoderms, or the spiny-skinned animals, are fascinating creatures that all exhibit radial symmetry. We studied five different classes of these animals in our lesson, and today you'll have a chance to check them out a little more closely!

SUPPLY LIST

- Image cards
- Scissors
- Paper

INSTRUCTIONS

1. Take five pieces of blank paper and label each one of them at the top with the following:
    - Class Asteroidea
    - Class Echinoidea
    - Class Ophiuroidea
    - Class Crinoidea
    - Class Holothuroidea
2. Cut out the image cards found on the following pages.
3. Think about what you learned in class about each of the classes of echinoderms. Spend time organizing the images into the correct groups on your labeled pieces of paper.
4. After you've had a chance to organize your echinoderms, check out the key. How did you do? Were you able to organize the echinoderms correctly based on their external appearance?

Note: Consider looking ahead to the lesson 23 activity and ordering your butterfly habitat now.

Echinoderm Sorting

https://en.wikipedia.org/wiki/File:OphiureOphiuraOye-Plage2.jpg

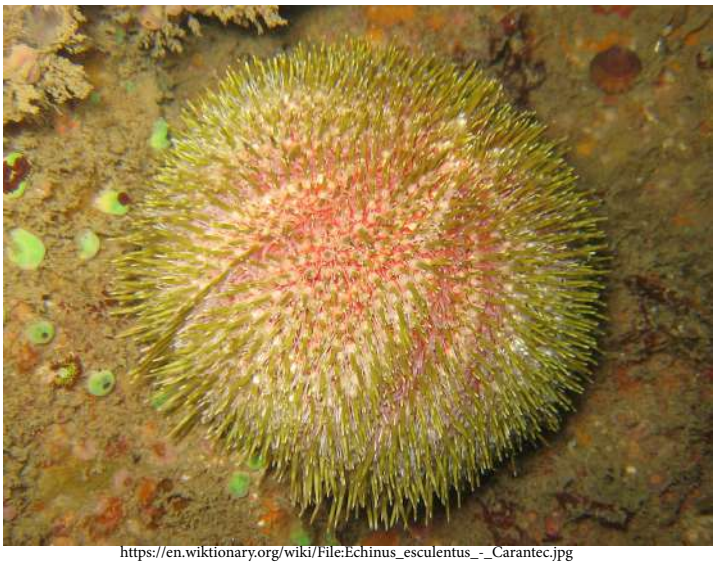
https://en.wikipedia.org/wiki/File:Bat_Star_(Asterina_miniata)002.jpg

https://en.wikipedia.org/wiki/File:Live_Sand_Dollar_trying_to_bury_itself_in_beach_sand.jpg

https://en.wikipedia.org/wiki/File:Aporometra_wilsoni_(F_84857)_02.jpg

https://en.wikipedia.org/wiki/File:Choriaster_granulatus.jpg

Echinoderm Sorting

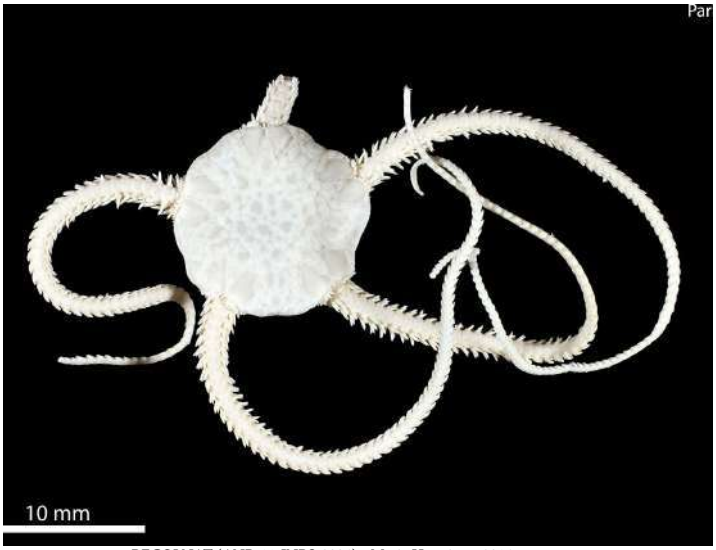


https://en.wiktionary.org/wiki/File:Echinus_esculentus_-_Carantec.jpg

https://en.wikipedia.org/wiki/File:Clarkcoma_canaliculata.jpg

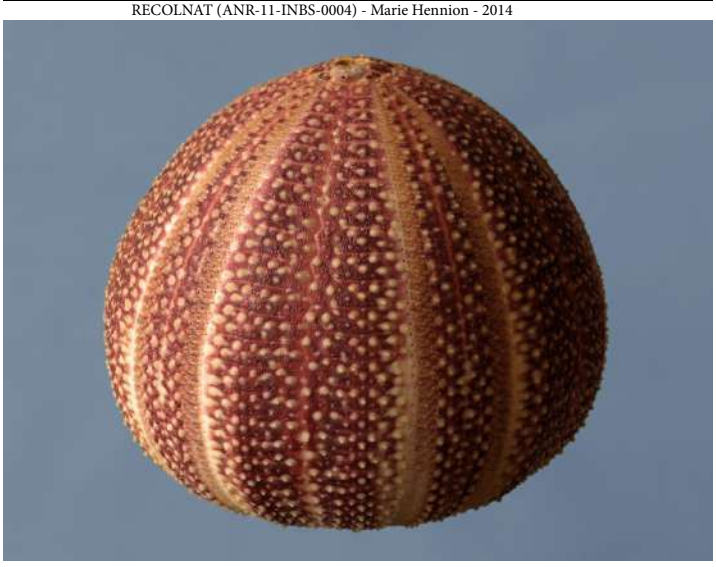
Echinoderm Sorting

https://en.wikipedia.org/wiki/File:Eupentacta_quinquesemita,_Explored._Stiff-footed_Sea_Cucumber.jpg



RECOLNAT (ANR-11-INBS-0004) - Marie Hennion - 2014

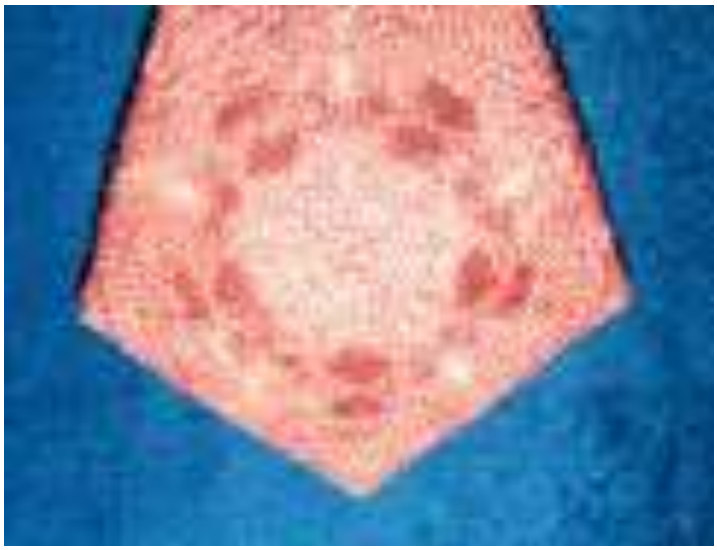
https://en.wikipedia.org/wiki/File:Olympic_Coast_National_Marine_Sanctuary_2010_Solaster_dawsoni_attacking_Hippasteria_spinosa.jpg

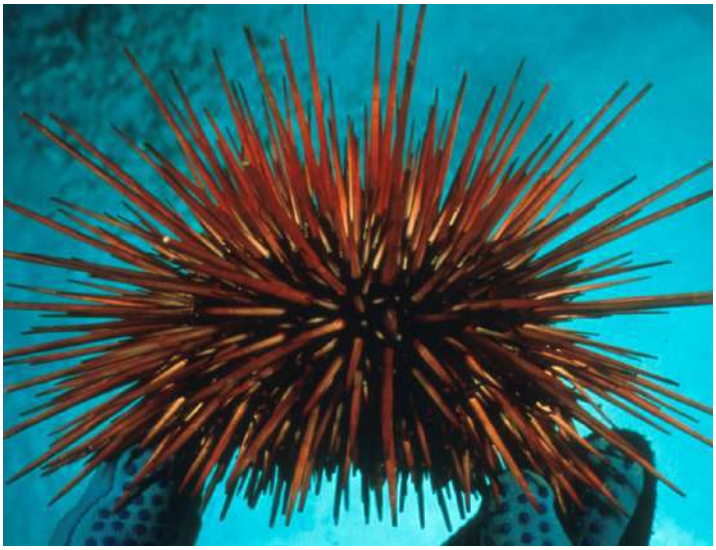


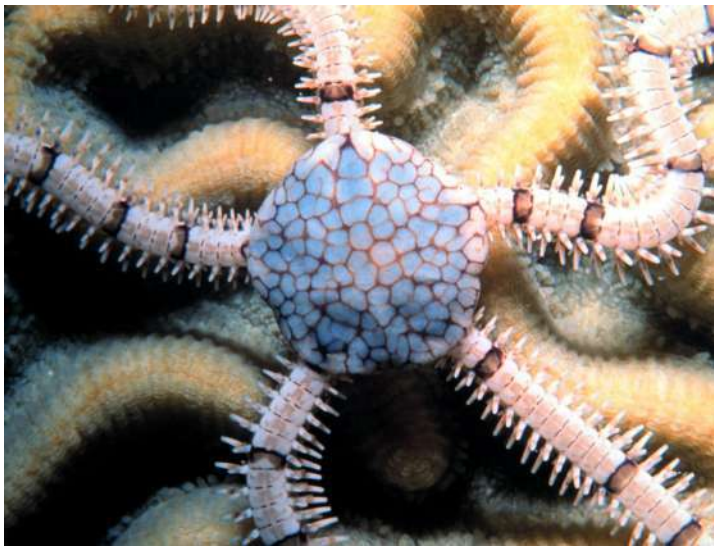
Echinoderm Sorting

https://en.wikipedia.org/wiki/File:Expl5494.jpg

Echinoderm Sorting







https://en.wikipedia.org/wiki/File:Thelenota_ananas.jpg

Echinoderm Sorting Answer Key

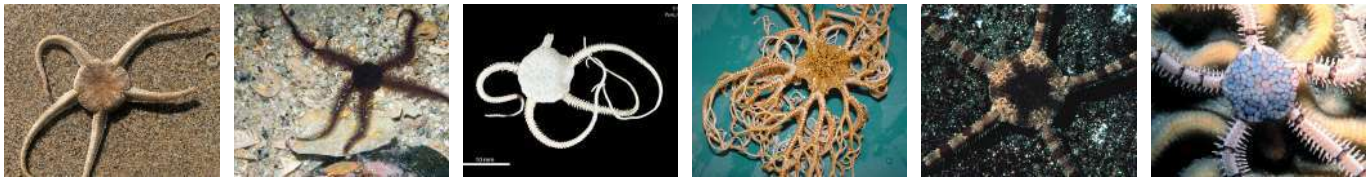
Class Asteroidea

Class Echinoidea

Class Crinoidea

Class Holothuroidea

Class Ophiuroidea



Animal Fact File
Phylum Echinodermata

Choose an animal in this phylum to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

☐ Vertebrate

☐ Invertebrate

☐ Herbivore

☐ Carnivore

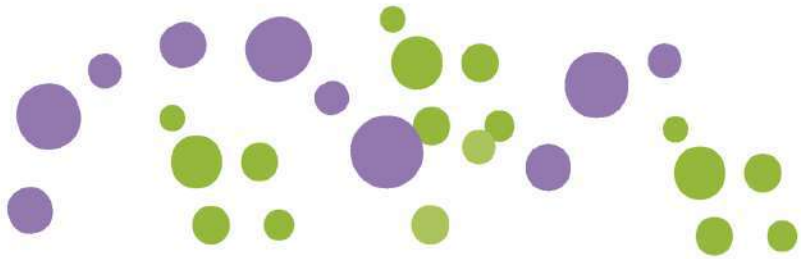
☐ Omnivore

Fun Facts

Picture

LESSON 20: PSALM 148:7-8

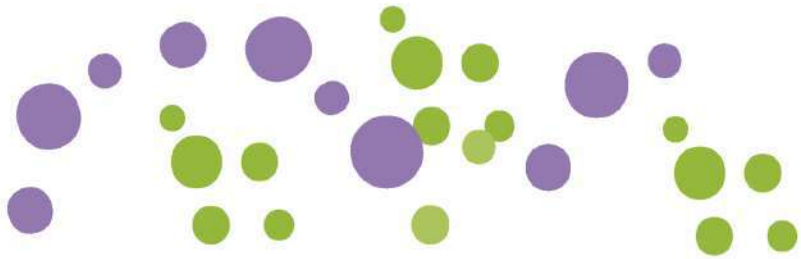
Praise the Lord from the earth, you great sea creatures and all deeps, fire and hail, snow and mist, stormy wind fulfilling his word!



LESSON 20: PSALM 148:7-8

LESSON 20: PSALM 148:7-8

Praise the Lord from the earth, you great sea creatures and all deeps, fire and hail, snow and mist, stormy wind fulfilling his word!



LESSON 20: PSALM 148:7-8

QUESTION:
What do echinoderms get their name from?

ANSWER:
Echinoderm means spiny-skinned.

QUESTION:
What kind of symmetry do echinoderms have?

ANSWER:
Radial symmetry

QUESTION:
What is the umbrella-shaped form of cnidarians called?

ANSWER:
Medusa

QUESTION:
What is an open circulatory system?

ANSWER:
Blood is pumped into the body cavity of the organism, not in blood vessels.

Spiny-Skinned Savages

Lesson 20 Quiz

1. Which of the following is NOT true of animals in the Phylum Echinodermata?

A) They have spiny skin.
B) They are vertebrates.
C) They have a complete digestive system.
D) They have a water vascular system.

2. A water vascular system is:

A) a system that uses water to pump blood throughout the body
B) a system of tubes filled with water that extend throughout the animal's entire body
C) a system of small tubes used to push air out of the animal into the water

3. An open circulatory system means:

A) an animal has a heart that pumps blood through blood vessels.
B) blood is pumped into the body cavity of the organism.
C) the circulatory system is open to the outside environment.

4. Class asteroidea, or sea stars:

A) are very hard and rigid, and have long sharp spines
B) have long thin arms that extend from a central disk
C) have thick arms that extend from a central disk

5. Class ophiuroidea, or brittle stars:

A) have many arms, and may look like a plant
B) have long thin arms that extend from a central disk
C) have thick arms that extend from a central disk

6. Class echinoidea, or sea urchins:

A) are very hard and rigid, and have long sharp spines
B) have long thin arms that extend from a central disk
C) look like a long tube when seen on the ocean floor

7. Class crinoidea, or sea lilies and feather stars:

A) have many arms, and may look like a plant
B) are very hard and rigid, and have long sharp spines
C) have thick arms that extend from a central disk

8. Class holothuroidea, or sea cucumbers:

A) have many arms, and may look like a plant
B) have long thin arms that extend from a central disk
C) look like a long tube when seen on the ocean floor

21 Meddlesome Mollusks

From the tiny Borneo snail to the enormous Colossal Squid, mollusks come in all shapes and sizes, but with their powerful muscular feet and beautiful shells, they are the largest group of aquatic animals on earth!

Recommended Reading

- *Next Time You See a Seashell,* by Emily Morgan
- *Giant Squid: Mystery of the Deep,* by Jennifer Dussling
- *Gentle Giant Octopus,* by Karen Wallace
- *Seashells, Crabs, and Sea Stars,* by Christine Kump Tibbitts, p.6-21
- *Marvels of Creation: Sensational Sea Creatures,* by Buddy and Kay Davis, p.41, 43, 59

ACTIVITY Garden Snail Observation

Snails are a mollusk in the class gastropoda. They're relatively easy to find mollusks that live on land, so we have a chance to observe and learn more about this magnificent class of animals!

SUPPLY LIST

- Garden snail*
- Large jar or aquarium with lid
- Ruler
- Small kitchen scale (optional)
- Magnifying glass
- Various types of food

INSTRUCTIONS

1. After you've found your snail, create a home for it. This can be a large jar or a small aquarium. Snails are able to climb well, so be sure whatever you use has a lid you can attach securely with plenty of holes to allow air in so your snail can breathe.
2. Collect some soil and leaves from where you found your snail to place on the bottom of your snail's home. Snails like plenty of moisture, so be sure to keep the soil moist each day by spraying it or adding a bit of water.
3. On your Snail Observation Journal page, draw a picture of your snail and be sure to label the parts listed below that you're able to find. Use a magnifying glass to look more closely at different parts of your snail.
   - **Shell:** The shell is used to protect the soft body of the snail.
   - **Mouth:** Snails have a special type of tongue in their mouth called a radula that has a sandpaper-like texture they use to grind up the food they eat.
   - **Foot:** The large soft foot on the bottom of the snail is used for movement.
   - **Top tentacles:** The top tentacles have eyespots, allowing snails to see light and dark shapes.
   - **Bottom tentacles:** The bottom tentacles are used by the snail for feeling around its environment and smelling for food.
4. Use a ruler to measure different parts of your snail and a small kitchen scale to weigh your snail. Add the measurements to your Observation Journal page.

***Note:** You can often find snails in gardens or wooded areas after it's rained. They often come out at night. If you can't find any in your own yard, see if you can visit a local nursery where they might be able to help you find one!

GARDEN SNAIL OBSERVATION JOURNAL

Measurements

Shell length (front to back) _____

Body length (front to back) _____

Top tentacles length (top to bottom) _____

Bottom tentacles length (top to bottom) _____

Weight _____

Animal Fact File
Phylum Mollusca

Choose an animal in this phylum to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

- ☐ Vertebrate
- ☐ Invertebrate

- ☐ Herbivore
- ☐ Carnivore
- ☐ Omnivore

Fun Facts

Picture

LESSON 21: CHARLES SPURGEON

"By perseverance the snail reached the ark. A mouse may find a hole, be the room ever so full of cats."

LESSON 21: CHARLES SPURGEON

LESSON 21: CHARLES SPURGEON

"By perseverance the snail reached the ark. A mouse may find a hole, be the room ever so full of cats."

LESSON 21: CHARLES SPURGEON

QUESTION:
What does the word “bivalve” mean?

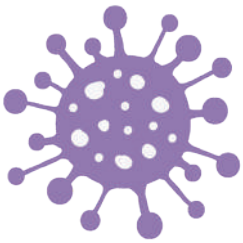
ANSWER:
“Two doors”: bivalves are animals with two shells.

LESSON 21

QUESTION:
What does the word “gastropod” mean?

ANSWER:
“Stomach foot”: gastropods are animals that move using a muscular foot on their bellies.

LESSON 21



QUESTION:

What does the word “cephalopod” mean?

ANSWER:

“Head foot”: cephalopods are animals with many muscular arms attached to their heads.

Meddlesome Mollusks

Lesson 21 Quiz

1. **All mollusks have bilateral symmetry, are invertebrates, have a muscular foot, and have a soft body with a visceral mass.**
   - True
   - False

2. **A visceral mass:**
   - A) contains many vital organs
   - B) helps the animal move and anchors it in one place
   - C) is how much the entire body of the animal weighs

3. **Most mollusks have:**
   - A) a backbone
   - B) a shell
   - C) tentacles

4. **Class Bivalvia, which includes clams, oysters, mussels, scallops, and geoducks, are animals with:**
   - A) two shells
   - B) coiled shells
   - C) multiple muscular feet

5. **Class Gastropoda, which includes snails, slugs, conchs, abalones, nudibranchs, whelks, dowries, and murexes, have a foot located:**
   - A) on the shell
   - B) on the visceral mass
   - C) on the underside or belly of the animal

6. **Gastropods usually have:**
   - A) two shells
   - B) coiled shells
   - C) multiple muscular feet

7. **Class Cephalopoda, which includes squid, octopus, nautilus, and cuttlefish, are animals with:**
   - A) two shells
   - B) coiled shells
   - C) multiple muscular feet

8. **A mollusk's muscular foot:**
   - A) contains many vital organs
   - B) helps the animal move and anchors it in one place
   - C) are always found in pairs

22 Armored Arthropods and the Crabby Crustaceans

Wouldn't it be cool to have your own built-in armor? That's what arthropods have —hard skeletons outside their bodies to keep them safe and give them structure. These creatures are some of the most plentiful animals on the earth.

Recommended Reading

- *High Tides for Horseshoe Crabs,* by Lisa Kahn Schnell
- *Seashells, Crabs, and Sea Stars,* by Christine Kump Tibbitts, p.24-29

ACTIVITY Backyard Bugs Observation

Arthropods are all of those jointed leg creatures that have an exoskeleton to protect them. This week, take time to explore the arthropods in your own backyard!

SUPPLY LIST

- Pen or pencil
- 2 -liter bottle (optional)

INSTRUCTIONS

1. Make several copies of your Backyard Bugs Observation Journal page.
2. Go on a nature walk outside in your own backyard, or spend some time at a park looking for arthropods. Look under rocks, in flower bends, or anywhere else you think bugs might be hiding.
3. Draw the creatures you find and fill out the journal page for each one.
4. After you've had a chance to watch lessons 22 and 23, see if you can identify the different bugs you find. Are they crustaceans, insects, or arachnids?
5. If you'd like to try to find some different types of arthropods, consider making a pitfall trap using a 2-liter bottle. Check out the short video in the online classroom for instructions!

Backyard Bug Observatons

TYPE OF INSECT

DATE:

TIME:

LOCATION:

☐GROUND ☐PLANT ☐OTHER

TYPE OF ARTHROPOD:

☐CRUSTACEAN ☐INSECT ☐ARACHNID ☐UNKNOWN

NOTES:

SKETCH:

Animal Fact File
Phylum Arthropoda: Class Crustacea

Choose an animal in this class to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

☐ Vertebrate

☐ Invertebrate

☐ Herbivore

☐ Carnivore

☐ Omnivore

Fun Facts

Picture

LESSON 22: JOB 8:13-15

The hope of the godless shall perish. His confidence is severed, and his trust is a spider's web. He leans against his house, but it does not stand.

LESSON 22: JOB 8:13-15

LESSON 22: JOB 8:13-15

The hope of the godless shall perish. His confidence is severed, and his trust in a spider's web. He leans against his house, but it does not stand.

LESSON 22: JOB 8:13-15

QUESTION:
What does the word arthropod mean?

ANSWER:
Jointed leg

LESSON 22

QUESTION:
What kind of skeleton does an arthropod have?

ANSWER:
Exoskeleton, a skeleton on the outside of the body

LESSON 22

QUESTION:

What are the three segments of many arthropods?

ANSWER:

1) Head 2) Thorax 3) Abdomen

LESSON 22

Armored Arthropods and the Crabby Crustaceans

Lesson 22 Quiz

1. Which of the following is not true of arthropods?

A) They have endoskeletons.
B) They have jointed legs.
C) Their bodies are divided into segments.

2. An exoskeleton is a skeleton found:

A) on the outside of an animal's body
B) on the inside of an animal's body
C) only in fish

3. Exoskeletons are not living and need:

A) to be shed by molting
B) to grow
C) to be inside the body

4. Arthropods typically have 3 body segments: head, thorax, and abdomen.

True
False

5. A fused head and thorax body segment is called:

A) a thorax
B) a cephalothorax
C) an exoskeleton

6. Crustaceans, including barnacles, crabs, lobsters, crayfish, shrimp, woodlice, and beach fleas, have jointed legs that divide into:

A) segments
B) pinchers
C) branches

7. Crustaceans use appendages called pincers to:

A) swim
B) walk
C) capture prey

8. Crustaceans use appendages called swimmerets in their telson to help them:

A) swim
B) walk
C) capture prey

23

Intrepid Insects & Spindly Spiders

Insects and arachnids are some of the most abundant creatures on the planet, with millions of species just waiting to be discovered. These creatures can be found in every continent on Earth.

Recommended Reading

- *Animal Scavengers: Army Ants,* by Sandra Markle
- *Chirping Crickets,* by Melvin Berger
- *Summer Birds,* by Margarita Engle
- *Small Wonders: Jean-Henri Fabre & His World of Insects,* by Matthew Clark Smith
- *Spiders: All About Their Web-Building Skills, Bodies, Diets, and More!* by Seymour Simo
- *Scorpion Man: Exploring the World of Scorpions,* by Laurence Pringle

ACTIVITY Insect Life Cycle Investigation

Insects all go through one of two different types of metamorphosis during their lives: complete or incomplete. Complete metamorphosis shows the most dramatic changes. Insects who undergo complete metamorphosis have 4 distinct stages in their life cycle: egg, larva, pupa, and adult. In this investigation that will last at least two weeks, you'll have the opportunity to watch the life cycle of a butterfly, an insect that goes through complete metamorphosis.

SUPPLY LIST

- Butterfly habitat with larvae (order ahead as you must order larvae separately)
- Ruler
- Magnifying glass

INSTRUCTIONS

NOTE: Days listed are approximate. Be sure to check on your insects each day so you can closely follow their life cycle.

Day 1: When your larvae arrive, spend time observing the insect. Use a magnifying glass to help you get a better look at it. Be sure to keep track of how long your insect stays in the larva stage (add about 3 days to this number for the time it took to mail the larvae to you).

Day 5: When your larvae has increased enough in size to see him clearly, sketch and measure the larvae. Add this to your Life Cycle Investigation Journal page. Be sure to identify and label as many parts as you're able to on your sketch:

- Head: located at the front of the insect
- Thorax: insect's second segment where 6 true legs are located
- Abdomen: the back segment, where 10 false legs are located
- 2 antennae: found on the head
- 6 legs: found on the thorax
- 10 false legs: found on the abdomen
- Spiracles: tiny holes along their bodies used for breathing

Day 8: This is about when your larvae will become a pupa. When this occurs, be sure to begin tracking how long your insect stays in pupa stage. Sketch and measure the pupa and add to your Life Cycle Investigation Journal page. Be sure to keep track of how long your insect stays in the pupa stage.

Day 18: Around this time your butterfly will emerge from the pupa. On this day, be sure to sketch and measure your butterfly and add this information to your Life Cycle Investigation Journal page. Be sure to identify and label as many parts as you're able to on your sketch.

- Head: located at the top of your butterfly
- Thorax: the segment the legs and wings are attached to
- Abdomen: the segment with spiracles
- 2 antennae: found on the head
- 6 legs: found on the thorax (the first 2 legs will be very small and folded up near the head)
- 4 wings: found on the thorax
- Spiracles: tiny holes along their abdomen used for breathing

Be sure to keep track of how long your insect stays in the adult stage. Most butterflies will live for about two weeks after they've entered this last stage of their life.

Day 23: Continue to watch your butterflies. Often, five days after they've emerged from their cocoon, they'll lay eggs. However, sometimes they will not lay eggs. If they lay eggs, be sure to sketch the eggs and fill out the information on your Life Cycle Investigation Journal page.

Life Cycle Investigation Journal

LARVAE

Width: _____

Length: _____

How many days did your insect stay in the larva stage? _____

PUPA

Width: _____

Length: _____

How many days did your insect stay in the pupa stage? _____

Life Cycle Investigation Journal

ADULT

Width: _____

Length: _____

How many days did your insect stay in the adult stage? _____

EGG

Width: _____

Length: _____

How many days did your insect stay in the egg stage? _____

Animal Fact File
Phylum Arthropoda:
Class Insecta

Choose an animal in this class to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

☐ Vertebrate

☐ Invertebrate

☐ Herbivore

☐ Carnivore

☐ Omnivore

Fun Facts

Picture

LESSON 23: PROVERBS 6:6-8

Go to the ant, O sluggard;
consider her ways, and be wise.
Without having any chief,
officer, or ruler, she prepares
her bread in summer and
gathers her food in harvest.

LESSON 23: PROVERBS 6:6-8

LESSON 23: PROVERBS 6:6-8

Go to the ant, O sluggard, consider her ways, and be wise. Without having any chief, officer, or ruler, she prepares her bread in summer and gathers her food in harvest.

LESSON 23: PROVERBS 6:6-8

QUESTION:

What are the 4 stages of complete metamorphosis an insect goes through?

ANSWER:

1) Egg 2) Larva 3) Pupa 4) Adult

LESSON 23

QUESTION:

What are the 3 stages of incomplete metamorphosis an insect goes through?

ANSWER:

1) Egg 2) Nymph 3) Adult

LESSON 23

QUESTION:

How many legs do crustaceans, insects, and arachnids have?

ANSWER:

Crustaceans have 10, insects have 6, and arachnids have 8.

LESSON 23

Intrepid Insects & Spindly Spiders

Lesson 23 Quiz

1. Which of the following is not true of insects?

A) They have 2 body segments: a head and thorax.
B) They have 6 legs.
C) They have antennae, eyes, and mandibles on their head.

2. All insects go through a life cycle called metamorphosis and look completely different when they're young from their adult form.

True
False

3. Incomplete metamorphosis has:

A) 3 stages: egg, nymph, and adult
B) 3 stages: egg, pupa, adult
C) 4 stages: egg, larva, pupa, and adult

4. Complete metamorphosis has:

A) 3 stages: egg, nymph, and adult
B) 3 stages: egg, pupa, adult
C) 4 stages: egg, larva, pupa, and adult

5. A larvae looks:

A) similar to an egg
B) like a smaller adult insect without wings
C) completely different than the adult insect

6. A nymph looks:

A) similar to an egg
B) like a smaller adult insect without wings
C) completely different than the adult insect

7. Arachnids, including spiders, mites, ticks, and scorpions have:

A) 2 body segments: a head and thorax
B) 2 body segments: a cephalothorax and an abdomen
C) 3 body segments: a head, thorax, and abdomen

Intrepid Insects & Spindly Spiders

Lesson 23 Quiz

8. What do arachnids use chelicerae for?

A) Feeding and sensing their environment
B) Capturing and crushing their prey
C) Grooming themselves

9. What do arachnids use pedipalps for?

A) Feeding and sensing their environment
B) Capturing and crushing their prey
C) Grooming themselves

10. Arachnids have:

A) 4 pairs of jointed legs
B) 2 pairs of jointed legs
C) 3 pairs of jointed legs

24

The Vast World of Vertebrates

Vertebrates are creatures with a backbone—and what an important trait it is. No matter what kind of vertebrate we're talking about, whether we're talking about birds, fish, amphibians, reptiles, or mammals, that backbone gives the animal support and protects its powerful nervous system.

Recommended Reading

- *Bone by Bone: Comparing Animal Skeletons,* by Sara Levine
- *What is a Vertebrate?* By: Bobbie Kalman

ACTIVITY Vertebrate Collage

The vertebrates are a large, diverse group of animals. In this activity, you'll have the opportunity to show off the defining features and diverse classes that make up the animals with vertebral columns.

SUPPLY LIST

- Poster board
- Pens, markers, or other writing instruments
- Scissors
- Magazines or pictures from other sources

INSTRUCTIONS

1. Begin by making a list of the defining features all vertebrates share.
2. Find and cut out pictures of animals from each class of vertebrates:
   - Mammals
   - Reptiles
   - Amphibians
   - Birds
   - Bony Fish
   - Cartilaginous Fish
   - Hagfish
3. Determine how to decorate your poster board to display the characteristics vertebrates share along with each of the seven classes of animals.
4. Show off your poster and use it to teach someone else about this group of animals we call the vertebrates!

Note: Consider looking ahead to the lesson 26 activity and ordering a Grow-a-Frog Kit.

LESSON 24: JAMES 3:7-8A

For every kind of beast and bird, of reptile and sea creature, can be tamed and has been tamed by mankind, but no human being can tame the tongue.

LESSON 24: JAMES 3:7-8A

LESSON 24: JAMES 3:7-8A

For every kind of beast and bird, of reptile and sea creature, can be tamed and has been tamed by mankind, but no human being can tame the tongue.

LESSON 24: JAMES 3:7-8A

QUESTION:
What kind of skeleton does a chordate have?

ANSWER:
Endoskeleton made of bone or cartilage found inside the body

LESSON 24

QUESTION:
What is a nervous system?

ANSWER:
A network of nerves that sends messages throughout the body

LESSON 24

The Vast World of Vertebrates

Lesson 24 Quiz

1. Nearly all animals in Phylum Chordata are vertebrates, animals that have:

A) a backbone
B) an exoskeleton
C) legs

2. The vertebrata of an animal:

A) is made of soft cartilage
B) protects the spinal cord
C) is part of an exoskeleton

3. An endoskeleton is found outside the body and gives the body structure, support, and shape, and helps with movement.

True
False

4. The body plan of chordates includes a head end and a tail end.

True
False

5. Chordates have a complete digestive system with a digestive tract that goes from the head to the tail.

True
False

6. A complete digestive system has:

A) 1 opening for food and waste
B) 2 openings for food and 1 opening for waste
C) 1 opening for food and 1 opening for waste

7. Chordates have a closed circulatory system where blood cells are:

A) contained inside of blood vessels
B) free-flowing in the body
C) found only in the spinal cord

8. Chordates have a complex nervous system that includes:

A) the brain and spinal cord
B) the brain, spinal cord, and many nerves
C) the brain, tail, and nerves

25

Funky Fish

From the fearsome shark to the slippery hagfish, fish are some of the most abundant creatures in the water. There are many different kinds of fish in both the freshwater lakes and rivers and the salty waters of the ocean.

Recommended Reading

- *Marvels of Creation: Sensational Sea Creatures,* by Buddy and Kay Davis, p. 9-11, 15-23, 27-31, 37, 45-51, 63-65, 69
- *Animal Classifications: Fish*, by Angela Royston
- *The Best Book of Sharks,* by Claire Llewellyn
- *Sea Horse: The shyest fish in the sea,* by Chris Butterworth

ACTIVITY How Do Fish Breathe?

You already probably know that when you breathe you inhale air (with oxygen in it) through either your mouth or nose, and you then exhale air back through your mouth or nose. When the air enters your body it travels to your lungs where the oxygen is then taken out of the air and sent to all the cells in your body. All animals need oxygen to survive. But fish live in the water, so how do they breathe? In this activity, you'll be creating a fish to demonstrate how they breathe..

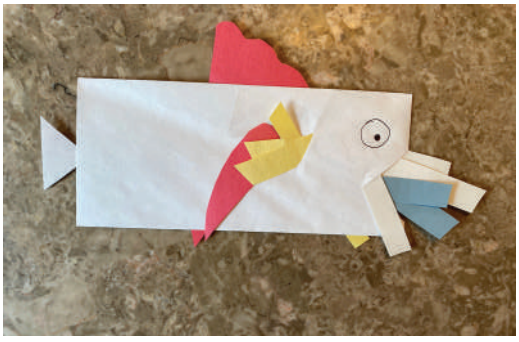
SUPPLY LIST

- Envelope
- Scissors
- Tape or glue
- Construction paper
- Crayons, markers, or colored pencils

NOTE: While it's difficult to show a true representation of this on a paper model, it's important to understand that fish have many, many gills which act like filters behind their gill slits, allowing them to trap a lot of oxygen to be delivered to their bodies while at the same time allowing the water to escape.

INSTRUCTIONS

1. Begin by sealing your envelope. Then, cut a triangle on one of the short sides of the envelope; this is your fish's mouth.
2. Tape or glue the triangle on the other short side of the envelope to create a tail fin.
3. Draw eyes on your fish and gill slits behind the eyes.
4. Use scissors and cut the gill slits open.
5. Cut out two side fins, also known as pectoral fins, and tape or glue them to the bottom side of your fish below the gill slits.
6. Cut out a top fin, also known as a dorsal fin, and tape or glue it to the top of your fish.
7. Spend some time decorating your fish with beautifully colored scales using crayons, markers, or colored pencils.
8. Cut several thin strips of yellow, white, and blue paper. The blue represents the water, the white represents oxygen which is what fish must have to breathe, and the yellow represents carbon dioxide which is the waste product the fish must get rid of.
9. Insert blue and white strips into the mouth. This represents the water and oxygen the fish gulps through its mouth which it then pumps out of its gills. In a real fish, as the water flows across the gills, the gills trap the oxygen so it can be delivered all over the fish's body. Pull the blue strip through the gill slits.
10. Insert a yellow strip through the gill slits. This shows that as the water flows through the gills, carbon dioxide is released and leaves the fish along with the water.



Animal Fact File

Phylum Chordata:
Class Osteichthyes
The Bony Fish

Choose an animal in this class to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

Picture

☐ Vertebrate

☐ Invertebrate

☐ Herbivore

☐ Carnivore

☐ Omnivore

Fun Facts

Animal Fact File

Phylum Chordata:
Class Agnatha
The Jawless Fish

Choose an animal in this class to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

☐ Vertebrate

☐ Invertebrate

☐ Herbivore

☐ Carnivore

☐ Omnivore

Picture

Fun Facts

Animal Fact File
Phylum Chordata:
Class Chondrichthyes
The Cartilaginous Fish

Choose an animal in this class to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

☐ Vertebrate

☐ Invertebrate

☐ Herbivore

☐ Carnivore

☐ Omnivore

Fun Facts

Picture

LESSON 25: MATTHEW 13:47

Again, the kingdom of heaven is like a net that was thrown into the sea and gathered fish of every kind.

LESSON 25: MATTHEW 13:47

LESSON 25: MATTHEW 13:47

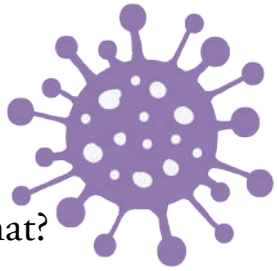
Again, the kingdom of heaven is like a net that was thrown into the sea and gathered fish of every kind.

LESSON 25: MATTHEW 13:47

QUESTION:
Jawless fish lack what 3 features?

ANSWER:
1) Jaw 2) Appendages 3) Scales

LESSON 25



QUESTION:
Cartilaginous fish have a skeleton made of what?

ANSWER:
Their skeleton is made of cartilage, and they have a bony jaw.

LESSON 25

QUESTION:

Most bony fish have what two features on their bodies?

ANSWER:

Bony fish have fins and scales.

LESSON 25

Funky Fish

Lesson 25 Quiz

1. All fish, no matter what class they are in:

A) have fins
B) have scales
C) live in water

2. Class Agnatha, or jawless fish, such as hagfish and lampreys, do not have:

A) jaws or teeth
B) jaws, fins, or scales
C) jaws, teeth, or scales

3. Class Chondrichthyes, or cartilaginous fish, such as sharks, rays, and skates, have endoskeletons made of:

A) bone
B) cartilage
C) soft, flexible bone

4. Skates and rays have flat, thin bodies and:

A) small matching side fins
B) large pectoral fins on the side of their head
C) a fin found on the top of their body

5. Class Osteichthyes, or bony fish, have a skull and vertebral column made of:

A) bone
B) cartilage
C) soft, flexible bone

6. All bony fish have fins that include a tail fin, matching side fins, dorsal fins, pelvic fins, and an anal fin.

True
False

7. Most bony fish also have scales, which are made of:

A) cartilage
B) a special material
C) small, bony plates

26 Amazing Amphibians

Frogs, toads, salamanders—what do they all have in common? They all spend part of their life in the water and part on the land, a cross between a water creature and a land creature. These animals appreciate both sides of life.

Recommended Reading

- *Big Night for Salamanders,* by Sarah Marwil Lamstein
- *From Tadpole to Frog,* by Wendy Pfeffer
- *Animal Classifications: Amphibians,* by Angela Royston

ACTIVITY Amphibian Life Cycle Observation

In this activity you'll have the unique opportunity to watch the life cycle of an amphibian. You'll see a tadpole undergo metamorphosis and develop into a frog!

SUPPLY LIST #1

- Frog eggs or young tadpoles
- A small tank or large glass bowl (covered with ventilation)
- Water conditioner
- Frog and tadpole food

SUPPLY LIST #2

- Grow-A-Frog Kit (purchase from Home Science Tools)

INSTRUCTIONS

1. Tadpoles or frog eggs can often be found in ponds in the spring when it begins to warm up. If you catch your tadpoles in a pond, be sure to collect some water from the pond for their container. If you've purchased the kit, be sure to order your tadpoles a couple of weeks before you'd like to begin.
2. Place tadpoles, along with the water you collected, in their container and be sure to set the container someplace with shade. If you purchased a kit, follow the directions for ensuring the water is properly treated.
3. Feed your tadpoles a small pinch of food each day.
4. Sketch your tadpoles every week, and note the changes you see happening on your Amphibian Life Cycle Observation Journal page. It may take a few weeks, or several months, for your tadpole to mature, depending on the type of frog you've acquired. Make copies of the Amphibian Life Cycle Observation Journal page as needed.

AMPHIBIAN LIFE CYCLE OBSERVATION

Sketch your tadpole and make note of the changes you're seeing happen each week.

Date_____

Notes:

_____

_____

_____

_____

_____

_____

Date_____

Notes:

_____

_____

_____

_____

_____

_____

AMPHIBIAN LIFE CYCLE OBSERVATION

Sketch your tadpole and make note of the changes you're seeing happen each week.

Date_____

Notes:

_____

_____

_____

_____

_____

_____

Date_____

Notes:

_____

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Animal Fact File
Phylum Chordata: Class Amphibia

Choose an animal in this class to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

- ☐ Vertebrate
- ☐ Invertebrate

- ☐ Herbivore
- ☐ Carnivore
- ☐ Omnivore

Fun Facts

Picture

LESSON 26: C.S. LEWIS

"Humans are amphibians—half spirit and half animal. As spirits they belong to the eternal world, but as animals they inhabit time."

LESSON 26: C.S. LEWIS

LESSON 26: C.S. LEWIS

"Humans are amphibians—half spirit and half animal. As spirits they belong to the eternal world, but as animals they inhabit time."

LESSON 26: C.S. LEWIS

QUESTION:

What is the difference between endothermic and ectothermic animals?

ANSWER:

Endothermic animals are able to control their own internal temperature. Ectothermic animals are not able to control their own internal temperature, and instead depend on the environment.

LESSON 26

QUESTION:

What does the name “amphibian” mean?

ANSWER:

“Both sides of life”: amphibians spend the early part of their life in the water and their adult life on land.

LESSON 26

Amazing Amphibians

Lesson 26 Quiz

1. Amphibians live:

A) in water
B) on land
C) in water and on land

2. Amphibians have an endoskeleton made of:

A) bone
B) cartilage
C) plasma

3. Amphibian larvae are:

A) carnivores
B) herbivores
C) omnivores

4. Amphibians are:

A) endothermic: they are able to regulate their own body temperature
B) ectothermic: they are not able to regulate their body temperature, and instead depend on the environment
C) endothermic for the first part of their life and ectothermic for the second part of their life

5. Amphibians undergo metamorphosis.

True
False

6. Frogs and toads are included in Order Anura, meaning:

A) tailed ones
B) legged ones
C) tailless ones

7. Order Urondela, meaning "tailed ones," includes:

A) frogs and toads
B) caecilians
C) salamanders and newts

8. Caecilians are included in Order Apoda, meaning:

A) legged ones
B) legless ones
C) tailless ones

27 Resplendent Reptiles

The reptiles can be small lizards that crawl on the walls or terrifying monsters of the deep, but these cold-blooded carnivores have fascinated human beings for thousands of years.

Recommended Reading

- *One Tiny Turtle,* by Nicola Davies
- *Snakes are Hunters,* by Patricia Lauber
- *Turtles in My Sandbox,* by Jennifer Keates Curtis
- *Python,* by Christopher Cheng and Mark Jackson
- *Marvels of Creation: Sensational Sea Creatures,* by Buddy and Kay Davis, p.39, 55, 57

ACTIVITY Venomous Snakes Identification

Whether snakes fascinate or scare you, in this activity you'll have the opportunity to find out more about these slithering reptiles found in your local region.

SUPPLY LIST

- Poster board
- Pens, markers, or colored pencils

INSTRUCTIONS

1. With a parent's help, spend some time researching online what venomous snakes are in your area.
   - Learn where the snakes are found.
   - Find out what they look like and print or draw pictures of them with their identifying marks.
   - Learn if they have any other identifying characteristics.

2. Create a poster with pictures of different venomous snakes in your region, list their identifying features, and place a map on your poster board showing where they're found.

Animal Fact File
Phylum Chordata: Class Reptilia

Choose an animal in this class to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

☐ Vertebrate

☐ Invertebrate

☐ Herbivore

☐ Carnivore

☐ Omnivore

Picture

Fun Facts

LESSON 27: LUKE 10:19

Behold, I have given you authority to on serpents and scorpions, and over all the power of the enemy, and nothing shall hurt you.

LESSON 27: LUKE 10:19

LESSON 27: LUKE 10:19

Behold, I have given you authority to tread on serpents and scorpions, and over all the power of the enemy, and nothing shall hurt you.

LESSON 27: LUKE 10:19

QUESTION:
What reptiles have a hard shell that's used for protecting their body?

ANSWER:
Order Testudines: the turtles

LESSON 27

QUESTION:
What reptiles have a large powerful jaw, enabling them to eat prey that can be larger around than they are?

ANSWER:
Order Squamata: the snakes and lizards

LESSON 27

QUESTION:
What reptiles are semi-aquatic apex predators?

ANSWER:
Order Crocodilia: the alligators and crocodiles

LESSON 27

QUESTION:
What group of reptiles has just one living species which has a third eye on the top of its head?

ANSWER:
Order Sphenodontia: the tuataras

LESSON 27

Resplendent Reptiles

Lesson 27 Quiz

1. Reptiles' skin is:

A) dry and scaly
B) waterproof
C) not a living tissue
D) all of the above

2. Reptiles are:

A) endothermic
B) ectothermic
C) autotrophs
D) producers

3. Reptiles are able to survive very cold weather by slowing down all of the body systems including their heart rate and breathing. We call this:

A) hibernation
B) migration
C) slow down pattern

4. Reptile eggs have a shell that is:

A) hard
B) leathery
C) similar to chicken eggs

5. Baby reptiles go through a type of metamorphosis.

True
False

6. The order of reptiles which includes many extinct species but now only the tuataras, has no external ears, and has a third light-sensing eye on the top of their head is called:

A) Order Crocodilia
B) Order Squamata
C) Order Testudines
D) Order Sphenodontia

Resplendent Reptiles

Lesson 27 Quiz

7. The order of reptiles that includes animals that are semi-aquatic apex predators with elongated snouts, powerful jaws, and muscular tails is called:

A) Order Crocodilia
B) Order Squamata
C) Order Testudines
D) Order Sphenodontia

8. This order, including lizards and snakes, is the largest group of reptiles:

A) Order Crocodilia
B) Order Squamata
C) Order Testudines
D) Order Sphenodontia

9. The order that includes the reptiles with hard shells is called:

A) Order Crocodilia
B) Order Squamata
C) Order Testudines
D) Order Sphenodontia

28

Blissful Birds

The group of animals in Class Aves is better known as birds—the great flying creatures of the world. Not that all birds fly, or that all flying creatures are birds, but birds are known for being the creatures that rule the sky.

Recommended Reading

- *How do Birds Find Their Way?,* by Roma Gans
- *Feathers: Not Just for Flying,* by Melissa Stewart
- *Take Along Guide: Birds, Nests, and Eggs,* by Mel Boring
- *The Boy Who Drew Birds: A Story of James Audubon,* by Jaqueline Davies

ACTIVITY Feed the Birds!

This week you'll create a bird feeder and spend time watching the feeder each day for new birds you can identify!

SUPPLY LIST

- Orange
- Sharp pencil
- Twine
- Lard
- Seeds
- Nuts
- Raisins
- Cheese

INSTRUCTIONS

1. Begin by cutting an orange in half across the middle and scoop out the flesh. This will be the cup to hold your bird food.
2. Poke a hole in the base of the orange with a sharp pencil, then poke another hole about 2 inches away from the first hole.
3. Thread twine through each of the holes so one side comes up through the center of one side of the orange cup and the other side of twine comes up through the other side of the orange cup.
4. Chop lard into cubes and put them in a mixing bowl.
5. Add seeds, nuts, raisins, and cheese to the mixing bowl and use your hands to mix it into the lard.
6. Spread the twine so that it's on the sides of the orange cup and pack the seed and lard mixture into the cup. Put your orange cup bird feeder in the refrigerator for 30 minutes until it's hardened.
7. Tie your bird feeder somewhere outside where you can watch it.
8. Spend time each day watching the feeder for new birds. Make copies of the Observation Journal page on the next page and fill one out for each bird you see. Ask your parents for help using resources on the Internet to help with bird identification.

BIRD OBSERVATION & IDENTIFICATION

DATE:	TIME OF DAY:
BEAK COLOR:	FEET COLOR:

IDENTIFYING MARKS:

NAME OF BIRD:

SKETCH: *(Take a picture with a camera and paste it below, or draw a picture.)*

Animal Fact File
Phylum Chordata: Class Aves

Choose an animal in this class to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

- ☐ Vertebrate
- ☐ Invertebrate

- ☐ Herbivore
- ☐ Carnivore
- ☐ Omnivore

Fun Facts

Picture

LESSON 28: MATTHEW 6:26

Look at the birds of the air; they neither sow nor reap nor gather into barns and yet your heavenly Father feeds them. Are you not of more value than they?

LESSON 28: MATTHEW 6:26

LESSON 28: MATTHEW 6:26

Look at the birds of the air: they neither sow nor reap nor gather into barns, and yet your heavenly Father feeds them. Are you not of more value than they?

LESSON 28: MATTHEW 6:26

QUESTION:

What are three external characteristics that all birds share?

ANSWER:

All birds have wings, feathers, and a beak.

LESSON 28

QUESTION:

How do bird egg shells and reptile egg shells differ?

ANSWER:

Bird eggs have a hard shell; reptile eggs have a leathery shell.

LESSON 28

BLISSFUL BIRDS

Lesson 28 Quiz

1. Since birds can produce their own energy and regulate their own body temperature, we call them:

A) endotherms
B) ectotherms
C) autotrophs
D) producers

2. Which of the following is not a feature that ALL birds share?

A) The ability to fly
B) Feathers
C) Wings
D) Beaks

3. Birds are the only group of animals that:

A) lay eggs
B) have feathers
C) have beaks

4. Feathers are living tissue that grow with the bird.

True
False

5. Beaks are found in many shapes and sizes, designed for the type of food the birds eat.

True
False

6. When a bird moves from one region of the world to another in order to stay warm and find adequate food, we call this:

A) regional flight
B) migration
C) food movement

7. When looking at bird and reptile shells, we see:

A) they look very similar
B) bird eggs have a hard shell while reptile eggs have a leathery shell
C) bird eggs are always much smaller than reptile eggs

8. Birds reproduce:

A) sexually: there needs to be both a mother and father
B) asexually: there only needs to be a mother
C) both: usually they reproduce sexually, but sometimes they reproduce asexually

29 Marvelous Mammals

Mammals are the only creatures on the planet with hair—some have a little, some have a lot. But it's this, plus a handful of other special traits, that make mammals among the most powerful and robust creatures on Earth.

Recommended Reading

- *Marvels of Creation: Sensational Sea Creatures,* by Buddy and Kay Davis, p. 13, 25, 35, 53, 67
- *The Story of Jane Goodall,* by Susan Katz
- *The World of Mammals,* by Memoria Press

ACTIVITY Blubber Glove

Mammals are endothermic—they are able to regulate their own body temperature. In order to survive frigid temperatures, many mammals have bodies that have a thick layer of fat, just under the skin, called blubber. Polar bears can be padded with blubber that can be up to 4 ½ inches thick. Whales' blubber can be up to 16 inches thick! In this activity, we'll have the opportunity to explore how blubber helps some animals survive extremely cold temperatures.

SUPPLY LIST

- 2 large mixing bowls
- Ice water
- 3 Ziplock bags (1-gallon size)
- Duct tape
- Lard or shortening

INSTRUCTIONS

1. Begin by filling a gallon-sized Ziplock bag ½ - ⅔ full with shortening or lard.
2. Push a second gallon-sized Ziplock bag into the one with shortening.
3. Hold the top edges of both bags. Fold them down about 1 inch and tape the fold to seal them together. This will serve as your "blubber glove."
4. Put your hand in the glove and press the shortening to distribute it as evenly as possible around the glove. The entire inner portion of the glove should be surrounded by shortening.
5. Fill up two medium-sized mixing bowls with ice and water. Wait until the water is very cold.
6. Ask a parent to time you. Place one hand inside a Ziplock bag and plunge it into a mixing bowl filled with ice water. At the same time, place your hand in the blubber glove and then into the other mixing bowl filled with ice water.
7. Compare how long you are able to keep your hand without blubber in the ice water to the hand with your blubber glove in the ice water.

QUESTIONS

How long were you able to keep your hand without the blubber glove in the cold water?

_____

_____

_____

How long were you able to keep your hand with the blubber glove in the cold water?

_____

_____

_____

Compare how your hands felt with and without the blubber glove.

_____

_____

_____

Bonus!

Can you think of something else you can use to put inside our glove besides lard or shortening to try to keep your body warm in cold water? Try it out and report if your blubber glove works better or the other glove you've designed works better!

_____

_____

_____

Animal Fact File
Phylum Chordata: Class Mammalia

Choose an animal in this class to research, and then compile all you've learned on this page!

Common Name

Scientific Name

Habitat

Diet

☐ Vertebrate

☐ Invertebrate

☐ Herbivore

☐ Carnivore

☐ Omnivore

Picture

Fun Facts

LESSON 29: JOB 12:7-8

But ask the beasts, and they will teach you; the birds of the heavens, and they will tell you; or the bushes of the earth, and they will teach you; and the fish of the sea will declare to you.

LESSON 29: JOB 12:7-8

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But ask the beasts, and they will teach you; the birds of the heavens, and they will tell you; or the bushes of the earth, and they will teach you; and the fish of the sea will declare to you.

LESSON 29: JOB 12:7-8

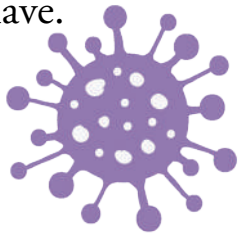
QUESTION:
What animals are endothermic?

ANSWER:
Birds and mammals are endothermic.

LESSON 29

QUESTION:
Where does the name “mammal” come from?

ANSWER:
The mammary glands which all mammals have.



LESSON 29

QUESTION:

What do mammary glands do?

ANSWER:

Mammary glands of a mammal produce milk to feed its young.

LESSON 29

Marvelous Mammals

Lesson 29 Quiz

1. Which of the following is NOT true about mammals?

A) All have hair
B) All have mammary glands
C) All have gills
D) All are endothermic
E) All of the above are true

2. Mammals are one of only two classes of animals that have hair.

True
False

3. Hair has many different functions depending on the mammal. Hair can:

A) protect the skin
B) act as camouflage
C) help the animal sense their environment
D) all of the above

4. Endotherms use different strategies to help regulate body temperature.

True
False

5. All mammals breathe using bag-like organs called lungs to inhale oxygen and exhale carbon dioxide.

True
False

6. Mammary glands are unique to mammals. They are special glands that:

A) produce energy to regulate body temperature
B) produce milk to feed young
C) produce hair

7. Mammals are found:

A) on land
B) in water
C) in the air
D) all of the above are true

30

Mini Mammals

Mammals don't all grow the same way when they are just formed. Some of them grow inside their mothers. Some grow in a pouch. And some, but not many, even grow inside eggs.

Recommended Reading

- *Animals Born Alive and Well,* by Ruth Heller
- *A Mammal is an Animal,* by Lizzy Rockwell

ACTIVITY Comparing the Vertebrates

In your final activity, you'll be reviewing the information you've learned during the last seven weeks of the course and creating a poster with information about each group of vertebrates you've learned about this year!

SUPPLY LIST

- Poster board
- Drawing and coloring supplies
- Magazines pictures of animals online to print

INSTRUCTIONS

1. Collect information about each vertebrate class you've studied this year. What characteristics do the animals in each class share? Are they endothermic or ectothermic? Do they live on land or in the water? What unique features do they have? Be sure to look at each of the following classes:
    - Class Chondrichthyes — the cartilaginous fish
    - Class Agnatha — the jawless fish
    - Class Osteichthyes — the bony fish
    - Class Amphibia — the frogs, toads, and salamanders
    - Class Reptilia — the snakes, lizards, turtles, and alligators
    - Class Aves — the birds
    - Class Mammalia — the mammals
2. Find pictures of different animals in each of the classes. Cut them out of magazines or find pictures online you can print out.
3. Design a poster board with the information about each of the classes of vertebrates along with the images you've collected.
4. Decorate your poster and make it fun. Show it off to friends and family and teach them about the different classes of vertebrates you've studied this year!

LESSON 30: GENESIS 1:31

And God saw everything that he had made, and behold, it was very good. And there was evening and there was morning, the sixth day.

LESSON 30: GENESIS 1:31

LESSON 30: GENESIS 1:31

And God saw everything that he had made,

and behold, it was very good. And there was

evening and there was morning, the sixth day.

LESSON 30: GENESIS 1:31

QUESTION:

What are the 3 types of mammals?

ANSWER:

1) Placental mammals 2) Marsupials 3) Monotremes

LESSON 30

QUESTION:

What is a placenta?

ANSWER:

A placenta is an organ that attaches the baby and the mother together which brings nourishment to the baby and removes waste.

LESSON 30

QUESTION:

What makes humans different from all the other created creatures?

ANSWER:

Humans are created in the image of God.

LESSON 30

Mini Mammals

Lesson 30 Quiz

1. Mammals can be divided into three different groups based on how they begin their lives.

True
False

2. What type of mammals have young that develop inside of the mother, nourished by a placenta, and are developed enough to function in the world after being born?

A) Placental mammals
B) Marsupials
C) Monotremes

3. What type of mammals develop inside an egg?

A) Placental mammals
B) Marsupials
C) Monotremes

4. What type of mammals develop just a few days inside a mother and after they're born climb inside their mother's pouch and attach themselves to their mother until they're developed enough to function in the world?

A) Placental mammals
B) Marsupials
C) Monotremes

5. A placenta is what attaches the mother to the baby and:

A) provides nourishment
B) removes wastes
C) both

6. How are humans different from all other creatures?

A) They are not part of animal classification.
B) They only have hair on their head.
C) Their development is different from all other mammals.
D) They are created in the image of God.