Lesson 1 Characteristics of Life

Skim *Lesson 1 in your book. Read the headings, and look at the photos and illustrations. Identify three things you want to learn more about as you read the lesson. Write your ideas in your Science Journal.*

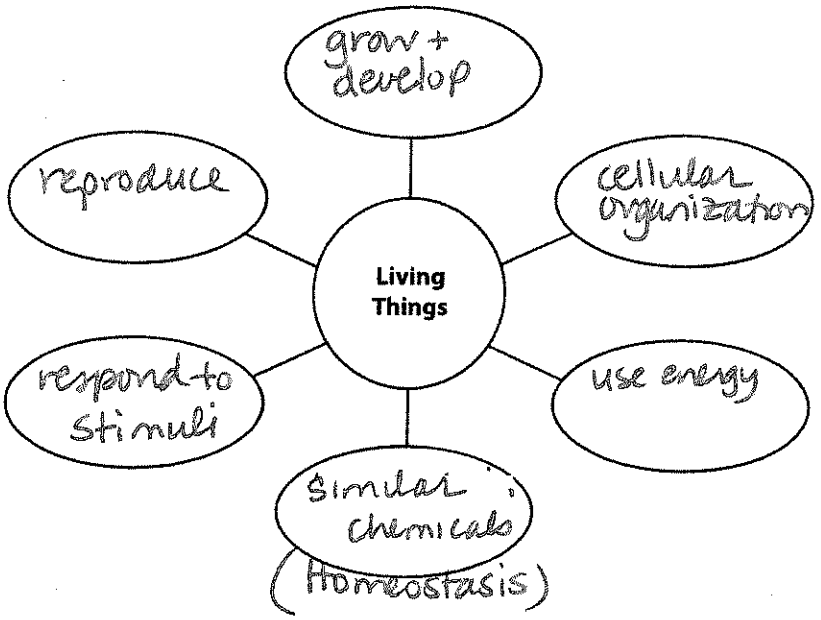
Main Idea

Characteristics of Life

I found this on page 9.

Details

Organize *information about living and nonliving things. Complete the word web with the 6 characteristics of life.*



Organization

I found this on page 10.

Describe *the 2 types of organization in* organisms.

1. Unicellular: with in the one cell the structures have a specific function
2. Multicellular: made of cells organized into groups with specialized functions

Growth and Development

I found this on page 10.

Compare *growth and development of* multicellular *and* unicellular organisms.

	Multicellular Organism	Unicellular Organism
How the organism grows and develops	inc. size and complexity as number of cells increase	grows as the size of the cell increases

Main Idea

Reproduction

I found this on page 11.

Details

Define *reproduction. Then identify 2 ways in which organisms reproduce.*

Reproduction: the process by which one organism makes one or more new organisms

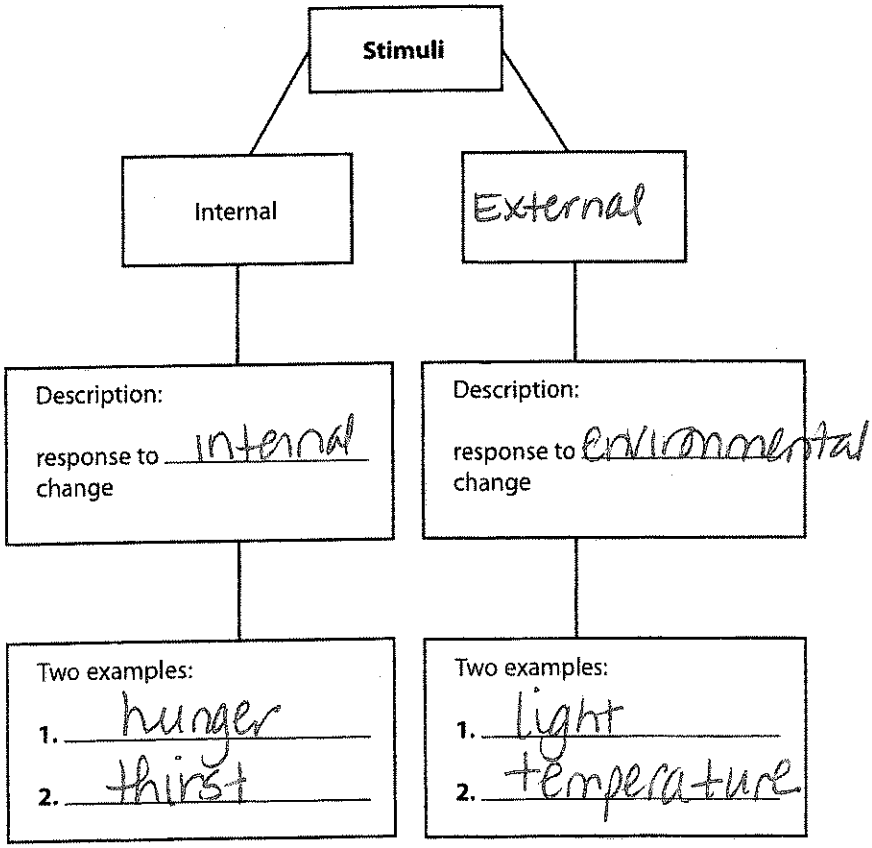
Organisms reproduce by:

1. dividing and becoming new organisms
2. using specialized cells

Responses to Stimuli

I found this on page 12.

Identify *2 types of stimuli, and provide two examples of each.*



Main Idea

Homeostasis

I found this on page 13.

Details

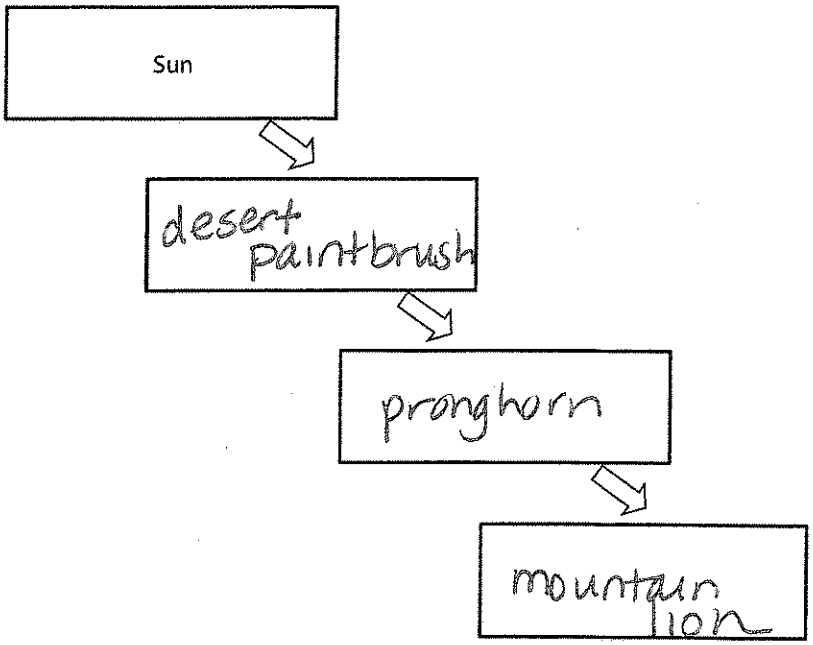
Analyze *the effect of* homeostasis. *Complete the cause-and-effect chart.*

Cause	Effect
Homeostasis maintained	→ cells can function
Homeostasis not maintained	→ organism becomes sick or dies

Energy

I found this on page 14.

Sequence *how energy flows from the Sun to a mountain lion.*



Analyze It Use the characteristics shared by all living things to explain why a clock is not a living thing.

A clock uses energy, has internal conditions, and is organized. However, a clock does not grow and develop, reproduce, or respond to stimuli

Characteristics of Life

A. Characteristics of Life

1. All living things are organized, grow and develop, reproduce, respond, maintain certain internal conditions, and use energy.
2. Things that have all the characteristics of life are called organisms.

B. Organization

1. Whether an organism is made of only one cell—the smallest unit of life—or many cells, all living things have structures that have specific functions.
2. Living things that are made of only one cell are called unicellular organisms.
3. Living things that are made of two or more cells are called multicellular organisms.
4. Living things with more than one cell have a greater level of organization because groups of cells function together.

C. Growth and Development

1. Living things grow by increasing cell size or increasing cell number.
2. The changes that occur in an organism during its lifetime are called development.

D. Reproduction

1. Reproduction is the process by which one organism makes one or more new organisms.
2. Some organisms must have a(n) mate to reproduce, but others can reproduce without one.

E. Responses to Stimuli

1. All living things can respond to changes in the environment. These changes are called stimuli and can be internal or external.
2. Hunger and thirst are examples of internal stimuli.
3. Some examples of external stimuli are light and temperature.

F. Homeostasis

1. An organism's ability to maintain steady internal conditions when outside conditions change is called homeostasis. Maintaining these conditions ensures that cells can function.
2. When your outside environment becomes too hot or too cold, your body responds by sweating, shivering, or changing the flow of blood to maintain a body temperature of 37°C.

G. Energy

1. Cells continuously use energy to transport substances, make new cells, and perform chemical reactions.
2. For most organisms, the energy they use originally came to Earth from the sun.

Name _____ Date _____ Class _____

Key Concept Builder LESSON 1

Characteristics of Life

Key Concept What characteristics do all living things share?

Directions: *On each line, write the term from the word bank that correctly completes each sentence. Some terms may be used more than once.*

A **development**	C **energy**	E **growth**	G **homeostasis**
B **organization**	D **reproduction**	F **stimulus**	

1. Specialized structures in cells are an example of B. organization.
2. When a plant's leaves and stems grow toward light, the plant is responding to an external F. stimulus.
3. A paramecium regulates G. homeostasis by pumping water out of the cell.
4. Multicellular organisms have a greater level of B. organization than unicellular organisms have.
5. Increasing cell size is E growth.
6. Changing from one kind of cell to a specialized cell is A. development.
7. The process that makes more living things is D. reproduction.
8. All activities carried out by living things use C. Energy.
9. Drinking water helps your body maintain G. homeostasis.

B E F G

A C D G

Lesson 2 Classifying Organisms

Scan *Lesson 2 in your book. Record three questions you have about classifying living things in your Science Journal. Try to answer your questions as you read.*

Main Idea

Classifying Living Things

I found this on page 19.

Details

Identify *the ways Aristotle organized, or classified, living things.*

Plants	
according to: a. structure and size b. whether it is tree, herb, or shrub	according to: a. presence of "red blood" b. shape and size c. environment

Determining Kingdoms

I found this on page 20.

Indicate *the 5 kingdoms that Whittaker proposed for classifying organisms.*

1. Monera
2. Protista
3. Fungi
4. Plantae
5. Animalia

Determining Domains

I found this on page 20.

Classify *groups of organisms into domains and kingdoms.*

Domain	Kingdom
Bacteria	Bacteria
Archaea	Archaea
Eukarya	Protista
	Fungi
	Plantae
	Animalia

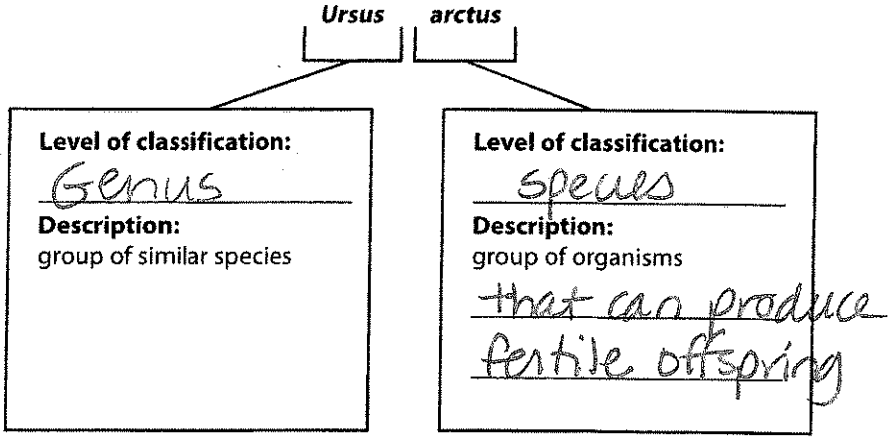
Main Idea

Scientific Names

I found this on page _____.

Details

Organize *information about* binomial nomenclature *by defining each part of a brown bear's scientific name.*



I found this on page _____.

Summarize *why scientific names are important.*

Scientific names make communication about species more effective because several organisms may have the same common name

Classification Tools

I found this on page _____.

Compare *a* dichotomous key *and a* cladogram.

	Dichotomous Key	Cladogram
1.	A series of questions,	branched diagram shows relationship among organisms
2.	each with 2 possible answers	
3.	true answer = where to go next or identify organism	

Connect It Compare your first and last names with a scientific name.

A person usually has a given (first) name and a last name, which identifies the father's family. In binomial nomenclature the genus = family name / species = given (first) name

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Classifying Organisms

A. Classifying Living Things

1. There have been many different ideas about how to classify living things.
2. Aristotle placed all organisms into two large groups—plants and animals ~ based on where the lived/how they moved
   walk/crawl = land
   fly = air
   swim = water

B. Determining Kingdoms

1. Carolus Linnaeus grouped all organisms into two main kingdoms.
2. In 1969 an American biologist proposed a five-kingdom system for classifying organisms that included kingdoms Monera, Protista, Plantae, Fungi, and Animalia.

C. Determining Domains

ex.
1. chemical make-up of cells (molecular)
2. structure of organisms
3. common ancestor
4. Evolutionary history

1. The current system used for classifying organisms is called systematics. Systematics uses all the information that is known about organisms to classify them.
2. Organisms are classified into one of three Domains—Bacteria, Archaea, and Eukarya—and then into one of six Kingdoms.

D. Scientific Names ~ uses Latin = universal language in science

1. When Linnaeus grouped organisms into kingdoms, he also developed a system for naming organisms. His system of Binomial Nomenclature gives each organism a two-word scientific name, such as *Ursus arctos* for a brown bear. (Genus species)
2. A(n) Species is a group of organisms that have similar traits and produce fertile offspring.
3. In a scientific name, the first word is the organism's Genus, such as *Ursus*. (and is capitalized)
4. The second word in a scientific name identifies the species. (and is lower case)
5. Similar species are grouped into one genus. Similar genera are grouped into family and then into orders, classes, phyla, kingdoms, and domains.
6. Each species has its own Scientific name, which is the same all over the world.

Broadest
Domain
Kingdom
Phylum
Class
Order
Family
Genus
Species
most specific

E. Classification Tools → Classification Key/Taxonomic key

1. A(n) Dichotomous Key is a series of descriptions arranged in pairs that can be used to identify an unknown organism. The chosen description leads to another pair of descriptions or to the identification of the organism.
2. A(n) cladogram is a branched diagram that shows the relationships among organisms. New characteristics appear before each branch.

Name _____ Date _____ Class _____

Content Vocabulary LESSON 2

Classifying Organisms

Directions: *Use the clues and the terms listed below to complete the puzzle. Then on each line, write the term from the word bank that correctly completes each sentence.*

A **binomial nomenclature** C **cladogram** E **dichotomous key**

B **genus** D **kingdom** F **species**

1. CLADOGRAM
2. BINOMIALNOMENCLATURE
3. KINGDOM
4. DICHOTOMOUSKEY
5. SPECIES
6. G

1. A diagram called a C Cladogram shows the relationships among organisms.

2. The system of A binomial Nomenclature gives every organism a two-word scientific name.

3. D Kingdom is the classification category above phylum and below domain.

4. A E Dichotomous Key can be used to identify an unknown organism.

5. A F Species is a group of organisms that have similar traits and produce fertile offspring.

6. A B Genus is a group of similar species.

Name _____ Date _____ Class _____

School to Home **LESSON 2**

Scientific Names

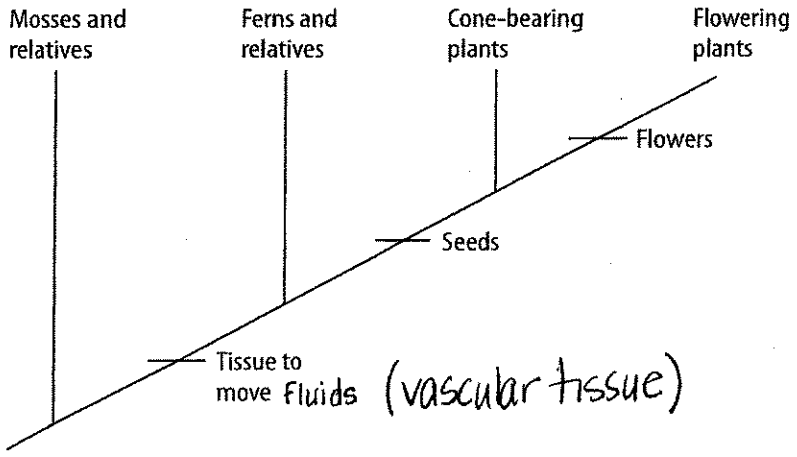
Directions: *Use your textbook to answer each question or respond to each statement.*

1. **Research** to find the scientific name for each of the organisms listed below. Write each name in the table.

Organism	Scientific Name
Galápagos tortoise	a. Geochelone nigra
Labrador retriever	b. Canis lupus familiaris
Giant sequoia	c. Sequoiadendron giganteum

2. Look at the cladogram shown below. According to the cladogram, which plants are flowering plants most closely related to?

cone-bearing plants

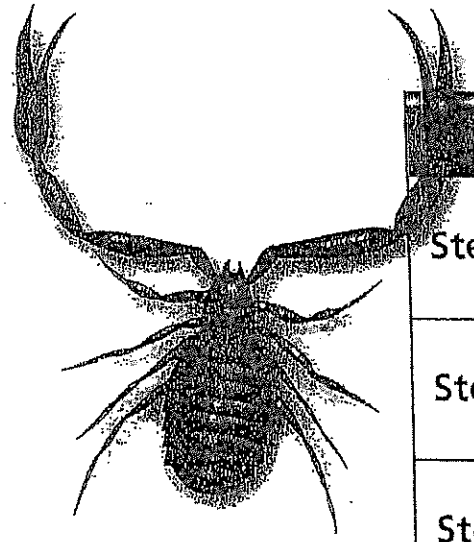


3. **Research** to find the name of the plant divisions represented by the cladogram. What are some common names of plants in each division?

Division names:	Bryophyta	Pterophyta	Gymnosperms	Angiosperm
Common names:	moss + relatives	ferns + relatives	Cone-bearing	flowering plant
ex.	Club moss	marsh fern	Spruce tree	apple tree

Rules 1. clarify terms that might be confusing (ie. legs, body regions, body segment, pincers, stinger)
2. read both statements @ step 1 - Decide which is true + move forward from there until object is named/identified
3. Begin again at step 1 for the next object

A6 A Taxonomic Key



Taxonomic Key

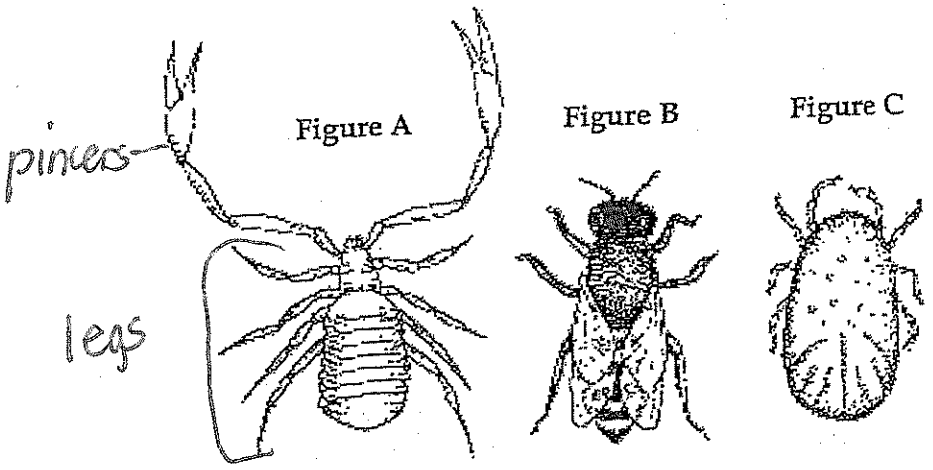
Step 1	1a.	Has 8 legs	Go to Step 2.
	1b.	Has more than 8 legs	Go to Step 3.
Step 2	2a.	Has one oval-shaped body region	Go to Step 4.
	2b.	Has two body regions	Go to Step 5.
Step 3	3a.	Has one pair of legs on each body segment	Centipede
	3b.	Has two pairs of legs on each body segment	Millipede
Step 4	4a.	Is less than 1 millimeter long	Mite
	4b.	Is more than 1 millimeter long	Tick
Step 5	5a.	Has clawlike pincers	Go to Step 6.
	5b.	Has no clawlike pincers	Spider
Step 6	6a.	Has a long tail with a stinger	Scorpion
	6b.	Has no tail or stinger	Pseudoscorpion

Name _____ Date _____ Class _____

Living Things

Using Science Skills

Use the taxonomic key in the textbook and the figures below to answer the following questions. Write your answers on a separate sheet of paper.



1. **Interpreting Diagrams** Can this taxonomic key be used to classify all of the organisms shown? Explain why or why not. NO, B has only 6 legs
2. **Classifying** Name the organism in Figure A. Which key statements helped you identify this organism? A. Pseudo scorpion steps: 1A-2B-5A-6B
3. **Drawing Conclusions** Based on the key, how can you tell the difference between a centipede and a millipede? one pair legs/segment → 2 pairs of legs/segment

Essay

Use space provided, *Write a brief paragraph to answer each of the following questions.*

4. How do organisms differ from nonliving things?
5. A group of scientists is planning a space mission to a new planet with unknown conditions. What basic human needs must the scientists consider before they decide which supplies to take with them?

4. organism = living thing
   1. cellular organization
   2. chemicals Homeostasis
   3. energy (eat, waste)
   4. respond to stimuli
   5. grow and develop
   6. reproduce

5. Basic needs
   1. Food
   2. Water
   3. Space/Shelter
   4. Homeostasis

The Key to Living Things

You may have never thought about it, but all living things are put into different groups. Living things are placed into different groups because it makes them easier to organize and easier to study. There are over 1.4 million kinds of known living things. With this many living things you can see why it is important to develop a system to classify them.

There are many different features scientists use to classify organisms. Living things may be classified based on their outward appearance, structures inside their body, ancestral relationships, genetic characteristics, and behavior.

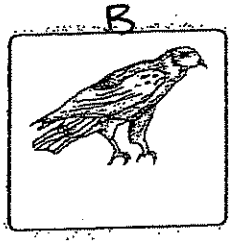
Many times scientists develop keys to help other people identify a living thing. A type of key called a dichotomous key allows the person using it to make decisions on features a living thing has. Generally speaking, the choices in the key start broadly and get more specific. Eventually, the decision is narrowed down to the name of a living thing or group to which a living thing belongs.

Directions: In this activity you will learn how to use a dichotomous key. Start by looking at one of the pictures of living things at the bottom of this page. To classify this living thing, you will work your way down the dichotomous key on the next page. Do this by reading the first question on the key and answering it. Follow the line that connects the question to your answer. Then read the next question and follow the line connected to your next answer. Do this until you reach the end of the lines, where you will write the name of that living thing in the empty box. After you have completed keying out all the living things below, make your own drawings and give them to other students to key out.

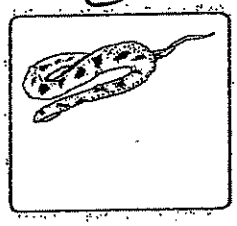
Classify these living things using the dichotomous key on the following page.

A

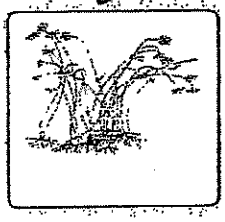
B



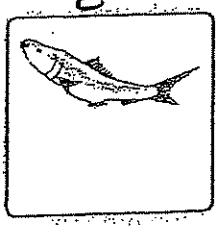
C



D



E



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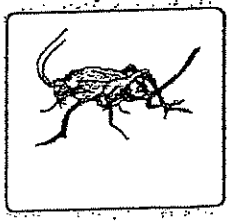
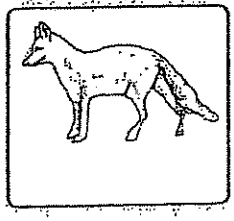
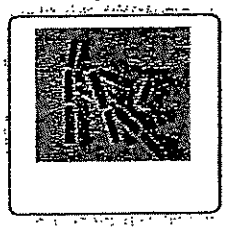


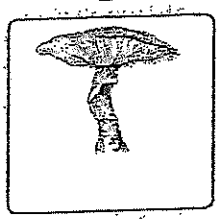
G



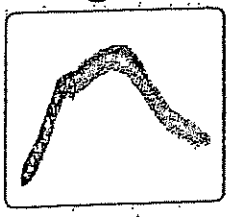
H



I

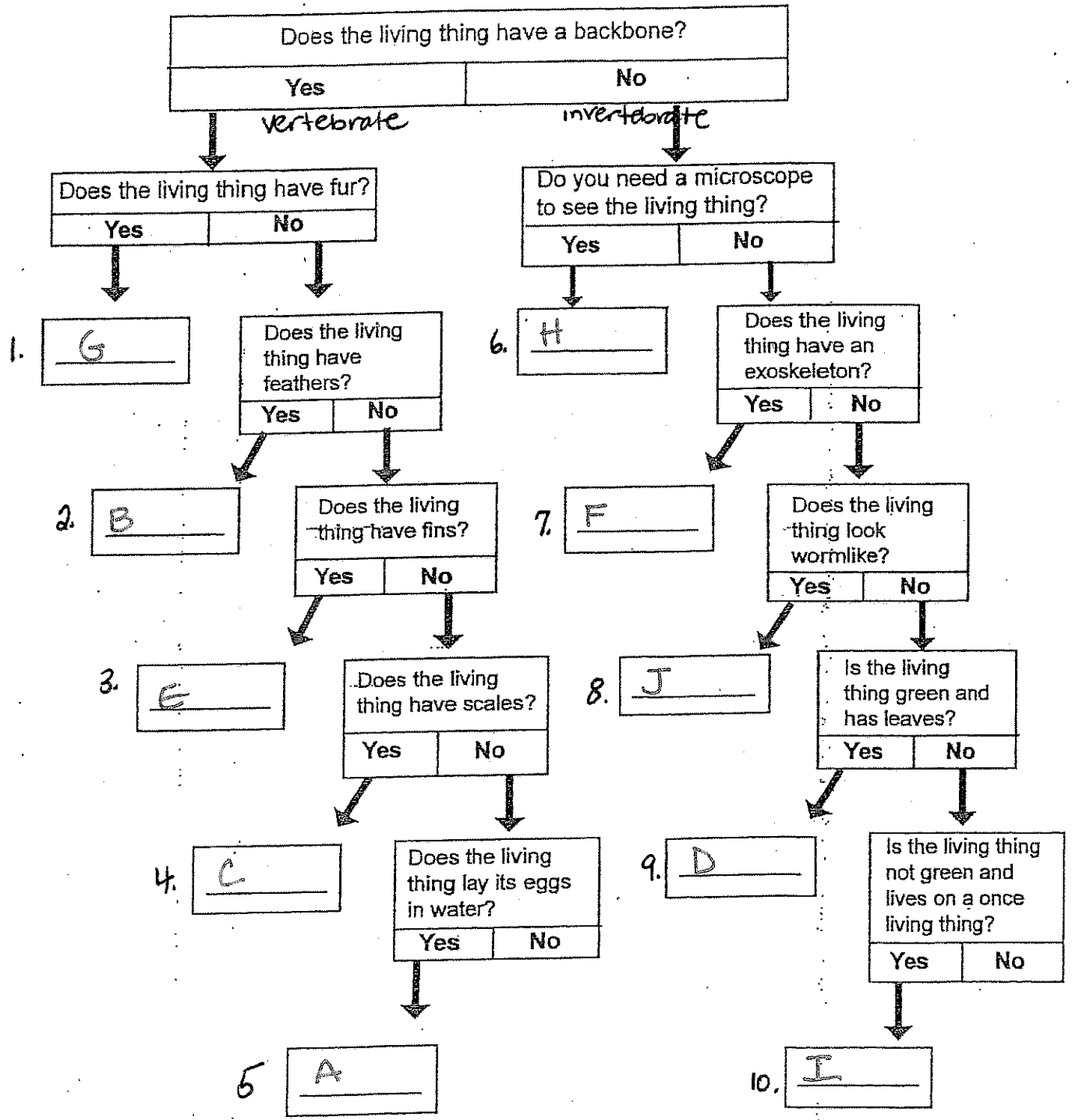


J



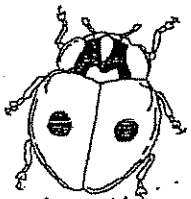
Dichotomous Key

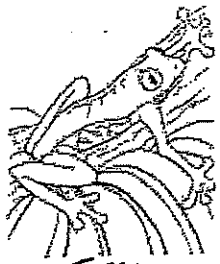
Rules:
1. clarify confusing terms
2. start at step 1 each time
   read both statements - one is correct
   continue until object is identified

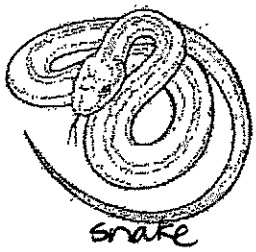


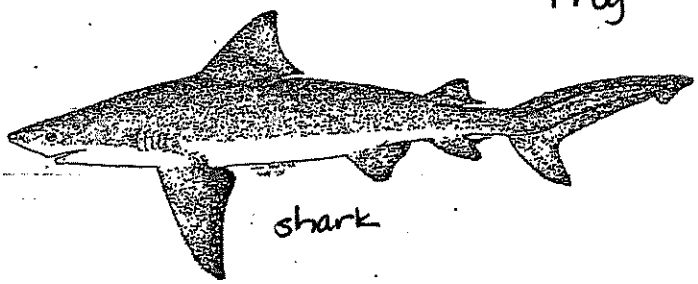
A. Frog (Amphibian)
B. Bird (Aves)
C. Snake (Reptile)
D. Flower/weed (Angiosperm)
E. Fish (osteichthyes)

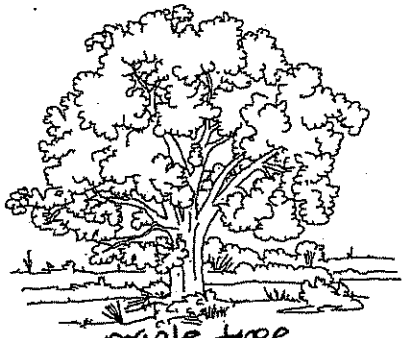
F. Cricket (Arthropod)
G. Fox (mammal
H. Bacteria
I. mushroom (Fungi)
J. Worm (Annelid)

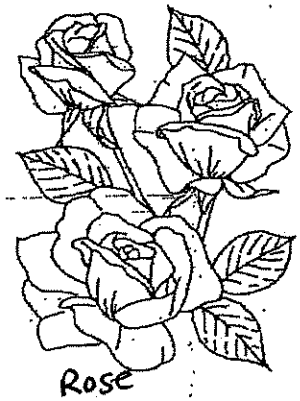

beetle

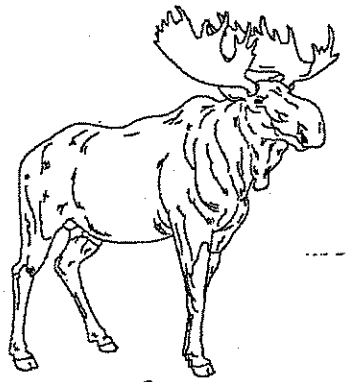

Frog

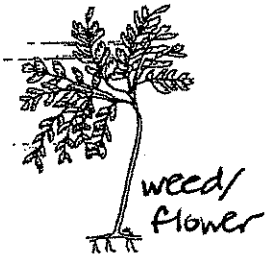

snake

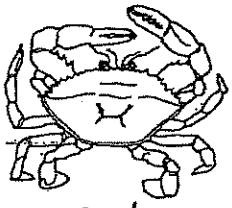

shark


maple tree

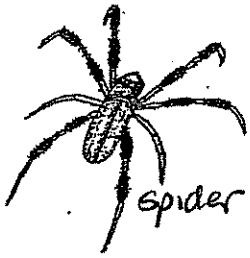

Rose

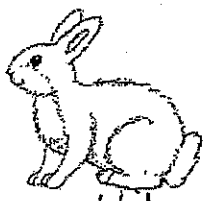

moose

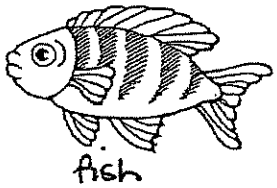

weed/ flower

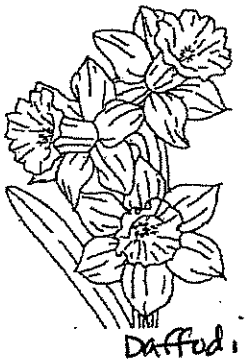

crab

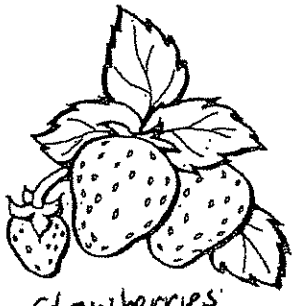

bat


spider


rabbit


fish


Daffodil


Strawberries


owl

Flowers ⇒ Fruit
vein pattern in leaf
parallel vs. branc
stem: wood vs. herbaceou

Think of: backbone / No backbone
bony skeleton / cartilage skeleton
what covers its body

1. Look at object - Come up with clear defined term that can describe some characteristic which will divide the group.

2. move through 1 of your groups - continuing to divide the group until the organism can be identified Name_____

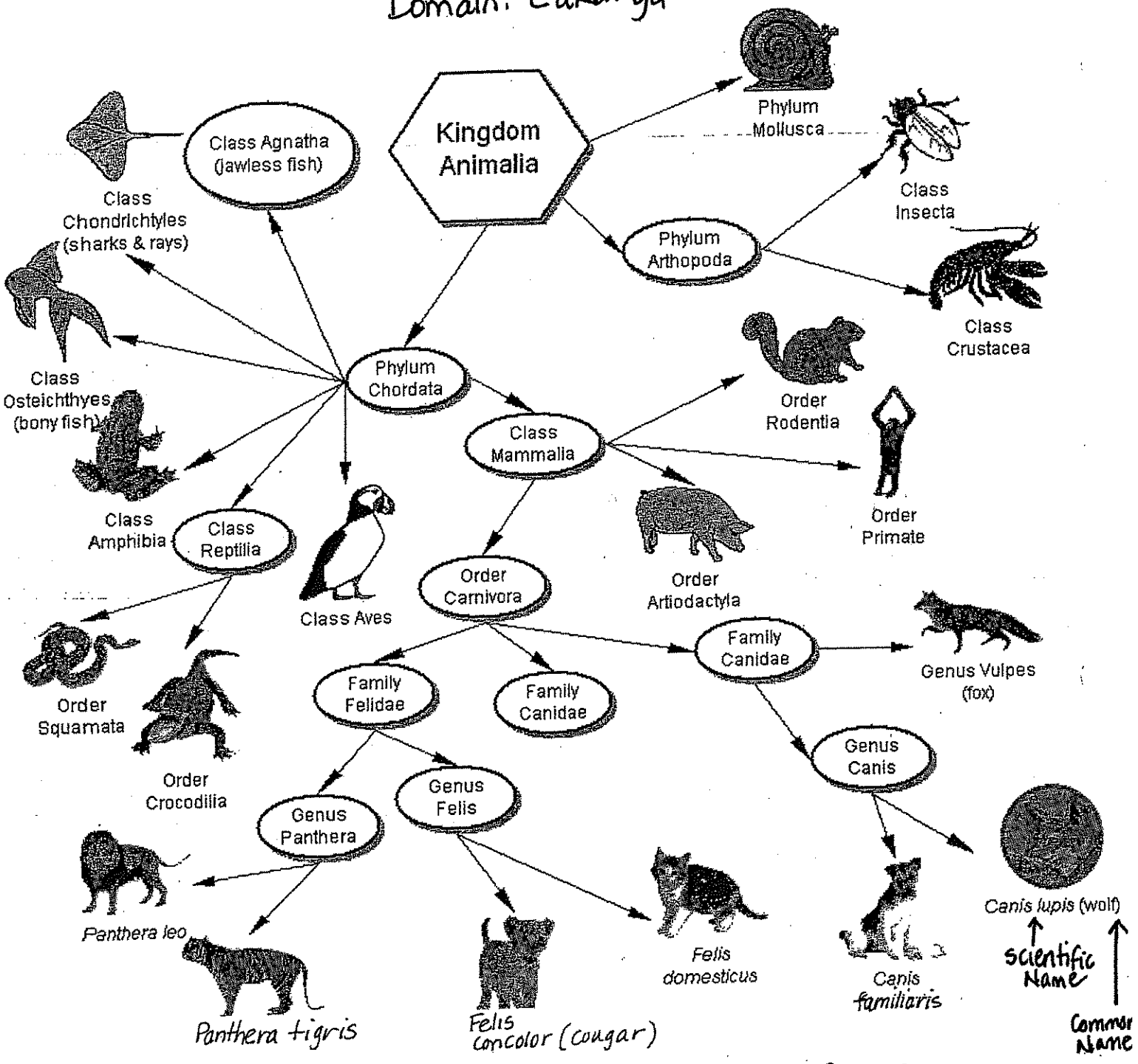
3. label next step # or organisms name

Taxonomic (Dichotomous) Key – Animals

1	A- Is a plant	..... Go to #2
	B- Is not a plant	..... Go to #6
2	A- Visible fruit/flower	..... Go to #3
	B- No visible fruit/flower	..... Go to #5
3	A- parallel leaf veins	..... Daffodil
	B- non-parallel/netted leaf veins	..... Go to #4
--- 4	A- has fruit	..... strawberry
	B- has no fruit	..... rose
5	A- has a woody stem	..... Tree
	B- Doesn't have a woody stem	..... weed
6	A-	.....
	B-	.....
7	A-	.....
	B-	.....
8	A-	.....
	B-	.....

classwork due: 27.

Domain: Eukarya



DKPCOFGS

Scientific Name
1st; Capitalized
2nd; lowercase

Interpreting Graphics - Taxonomy

If false, correct statement by crossing off word(s) to make it a true statement

Answer true or false to the following statements.

1. F Dogs belong to the order ~~Felidae~~ Carnivora.
2. F A fox belongs to the phylum ~~Arthropoda~~ Chordata.
3. F Snakes belong to the ~~phylum~~ class Reptilia.
4. (T) Lions belong to the class mammalia
5. F ~~All~~ Some arthropods belong to the Class Insecta
6. (T) All rodents belong to the phylum chordata.
7. F All amphibians belong to the class ~~reptilia~~ amphibia.
8. (T) All primates are mammals.
9. (T) The class mammalia includes dogs, cats and rats.
10. F A lion belongs to the genus ~~Felis~~ Panthera.
11. F All ~~mammals are primates~~ primates are mammals.
12. (T) Insects and lobsters are arthropods.

In each set, circle the pair that is most closely related, then write in the correct Name.

13. (snakes & crocodiles) | snakes & frogs class: Reptilia
14. rats & cats | (cats & dogs) order: carnivora
15. (insects & lobsters) | insects & birds phylum: Arthropodia
16. (lions & tigers) | lions & cougars genus: panthera
17. foxes & rats | (foxes & dogs) family: Canidae
18. cats & dogs | (cats & lions) family: Felidae

19. List (use species name) all the animals pictured that belong in the Felidae family.
    1. leo
    2. tigrs
    3. concolor
    4. domesticus

20. List all the animals pictured that belong to the Carnivora order. Common name
    1. fox
    2. Dog
    3. Wolf
    4. Cat
    5. Cougar
    6. tiger
    7. Lion

Name _____ Date _____ Class _____

Domains and Kingdoms

This section describes each of the domains and kingdoms into which all living things are grouped.

Use Target Reading Skills

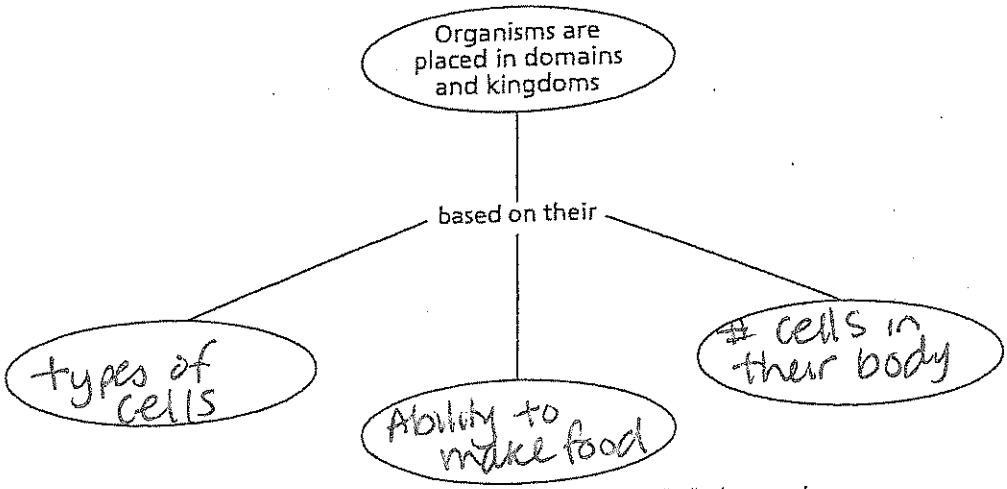
As you read, compare and contrast the characteristics of organisms in domains Bacteria, Archaea, and Eukarya by completing the table below.

P=prokaryote E=Eukaryote U=unicellular M=multicellular

Domain or Kingdom	Cell Type and # P	E	U	M	Able to Make Food? Autotroph	Heterotroph
Domain: Bacteria	P		U		A	H
Archaea	P		U		A	H
Eukarya:		E	U	M	A	H
Kingdom: Protist		E	U	M	A	H
Fungi		E	U	M		H
Plants		E		M	A	
Animals		E		M		H

1. List the three domains of living things.
   a. Bacteria b. Eukarya
   c. Archaea

2. Complete the concept map to show how organisms are placed into domains and kingdoms.



Name _____ Date _____ Class _____

Ch 1 Sec 4 The Origin of Life
Guide for Reading

How was the atmosphere of early Earth different from today's atmosphere?
How do scientists hypothesize that life arose on early Earth?
Scientists think that early Earth had a different atmosphere than it has today.

On ancient Earth, nitrogen, water vapor, carbon dioxide, and methane were probably the most abundant gases in the atmosphere. Although all these gases still make up a small part of the atmosphere today, the major gases are nitrogen and oxygen.

Scientists have formed hypotheses about what the first life forms were like.
First, early life forms did not need oxygen to survive.
Second, they were probably unicellular organisms.
Third, they probably lived in the oceans.

In 1953, Miller and Urey designed an experiment that recreated the conditions of early Earth in their laboratory. They placed water and a mixture of the gases that probably made up early Earth's atmosphere into a flask. Then, they sent an electric current through the mixture to act as lightning. Within a week, the mixture in the flask contained some small chemical units that could form proteins. In similar experiments, other scientists succeeded in producing carbohydrates and nucleic acids.

Scientists hypothesize that the small chemical units of life formed gradually over millions of years in Earth's waters. Some of these chemical units joined to form the large chemical building blocks found in cells. Eventually, some of these large chemicals joined together and became the forerunners of the first cells.

This hypothesis is supported by evidence from fossils. **Fossils** are traces of ancient organisms that have been preserved in rock or other substances. Fossils of bacteria-like organisms have been found that are between 3.4 and 3.5 billion years old. Scientists think that these ancient cells may be evidence of Earth's earliest forms of life.

The first cells were probably heterotrophs that used the chemicals in their surroundings for energy. As they grew and reproduced, their numbers increased. As their numbers increased, the amount of chemicals available to them decreased. At some point, some of the cells may have developed the ability to make their own food. As they made their own food, they produced oxygen as a waste product. Oxygen accumulated in Earth's atmosphere. Over hundreds of millions of years, the amount of oxygen increased to its current level.

First Life forms on earth: archaea-like organisms from fossil evidence.
cells- uni
Autotrophs or (Heterotrophs)
Aerobic or (Anaerobic)

Miller + Urey's experiment:

Designed to: recreate ancient earth conditions

water (ocean) + gases (atmosphere) in flask + electric current (simulated lightning) =
Resulted in small chemical units → protein

Define Fossil- traces of ancient organisms preserved in rock or other substances