Cells (SB1) – Page 1

Name _____

Date _____ Period ____

1. For something to be considered living it must have what 7 characteristics?

2. Which 3 elements are found in all organic molecules? _____

Color the chart below according to the following key:

Carbohydrates = BLUE *Lipids = RED* *Proteins = GREEN* *Nucleic Acids = PURPLE*

DNA and RNA	Store energy for later use by the cell	Help carry certain molecules through the cell membrane
Instant energy for the cell	Enzymes – Help carry out reactions around the cell	Phospholipids, waxes, oils, and steriods
Build water-proof membranes	Store and transmit genetic information	Provide structure and support by building cell walls
Provide structure and support for cells by building up the cytoskeleton	Glucose, starch, chitin, and cellulose	Used for cell recognition (cell name tags)

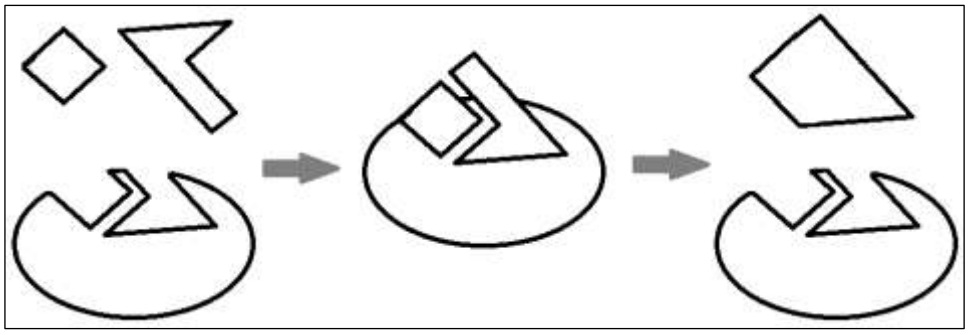
3. Color the biochemical reaction below according to the following key.

Enzyme = red

Substrate(s) = green

Product(s) = blue

Active site = yellow



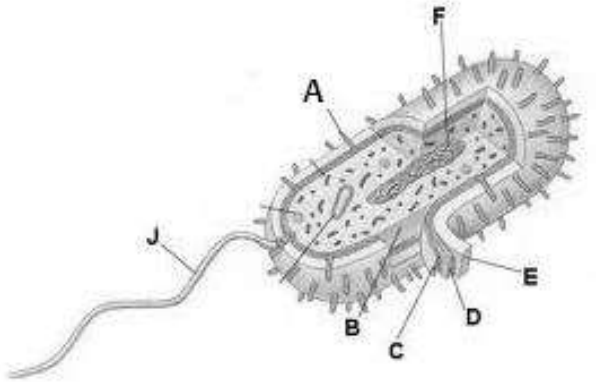
4. The reaction above has _____ substrate(s) and _____ product(s).

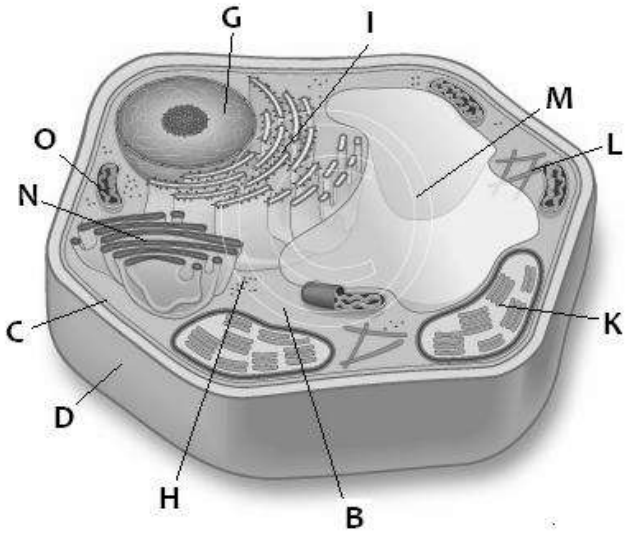
5. Complete the following paragraph using the words below. Each word will only be used once.

activation *amount* *catalyst* *cytoplasm* *lysosomes* *membrane*
mitochondria *pH* *products* *reactions* *substrates* *temperature*

An enzyme is a _____ that speeds up chemical _____. Enzymes lower the _____ energy of reactions by holding _____ together so that they can react to form _____. An enzyme's activity is affected by _____, _____, and the _____ of substrate. Enzymes can be found working on the cell _____, in the _____, or inside cell structures like the _____, chloroplast, _____, or the nucleus.

Read each function and identify the correct cell structure and identify the cell structures in the diagrams below. If the same letter appears in both cells, it is pointing to the same structure.





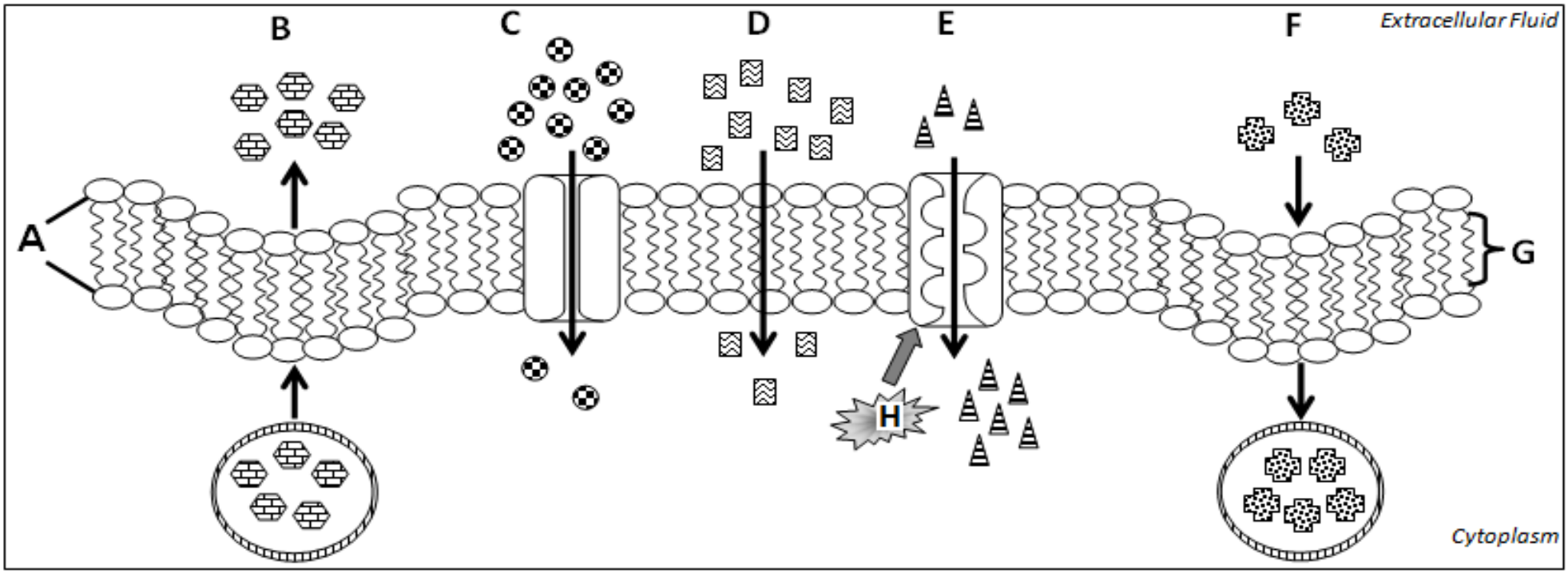
CELL STRUCTURE	FUNCTION	DIAGRAM LABEL
	Protects prokaryotes from being broken down	
	Controls what enters and leaves the cell	
	Provides structure and support	
	Helps coordinate cell division in animal cells	Not in diagram
	Site of photosynthesis	
	The fluid in the cell that holds all the cell structures	
	Helps the cell move, keep its shape, and organize its parts	
	Moves a cell through its environment	
	Modifies, sorts, labels, packages, and ships proteins and other cellular materials	
	Stores food, water, and waste	
	site of aerobic cellular respiration (makes ATP)	
	Stores and protects the DNA	
	Helps prokaryotes stick to surfaces and other cells	
	Site of protein synthesis (translation)	Not labeled
	Packages the proteins made by its ribosomes into vesicles	
	Makes lipids, breaks down toxins, and makes vesicles	Not labeled
	Moves materials throughout the cell	

What 3 structures do plant cells have that animal cells do not have?

Name _____

Date _____ Period ____

Cells (SB1) – Page 2



Color the diagram according to the key below.

1) Active transport ARROWS → blue
2) Hydrophilic → orange
3) Hydrophobic area → Yellow
4) Passive transport ARROWS → green
5) Proteins → red
6) Vesicles → purple

Use the letters in the diagram above to identify the following.

7) ATP _____
8) Endocytosis _____
9) Exocytosis _____
10) Facilitated diffusion _____
11) Fatty acid tails ___
12) Phosphate heads _____
13) Simple diffusion _____

14) If area C shows osmosis, water molecule does the circle represent? _____

15) What is the name of molecule makes up the majority of the cell membrane? _____

16) How does the cell membrane help the cell maintain homeostasis?

Genetics (SB2)

1. Who is considered the "father of genetics" ? _____ What types of plants did he study? _____

Complete the chart below by matching the term and example to the correct definition.

Term		Definition		Example
1) Dominant		The set of alleles for a particular gene (the letters)	3 answers	a) T
2) Recessive		A genotype with two of the same alleles	2 answers	b) t
3) Homozygous		The stronger allele that is always expressed if present		c) Tt
4) Heterozygous		The physical expression of a trait		d) TT
5) Genotype		The weaker allele that may or may not show		e) tt
6) Phenotype		A genotype with two different alleles		f) Tall or short

In Oompah loompas, green eyes (G) are dominant to purple (g) and blue hair (B) is dominant to orange (b).

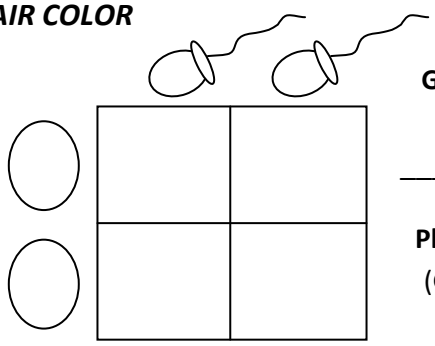
OTIS OOMPAH IS HOMOZYGOUS DOMINANT FOR BLUE HAIR AND HETEROZYGOUS FOR GREEN EYES.

Genotype _____ Phenotype _____ Genotype _____ Phenotype _____

OLIVIA OOMPAH IS HOMOZYGOUS RECESSIVE FOR BOTH EYE COLOR AND HAIR COLOR.

Genotype _____ Phenotype _____ Genotype _____ Phenotype _____

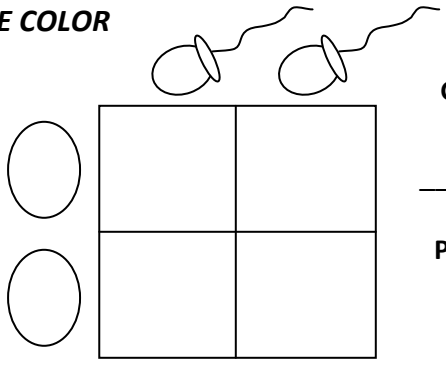
HAIR COLOR



Genotypic Ratio
(GG : Gg : gg)
____ : ____ : ____

Phenotypic Ratio
(Green : purple)
____ : ____

EYE COLOR



Genotypic Ratio
(BB : Bb : bb)
____ : ____ : ____

Phenotypic Ratio
(Blue : orange)
____ : ____

Olivia and Otis have 2 natural children and one adopted child: Opal with green eyes and blue hair, Orville with purple eyes and orange hair, and Orion with purple eyes and blue hair.

Which child is adopted? _____ Why?

Genetics (SB2) – Page 3

Name _____

Date _____ Period ____

In the chart below, decide whether each entry applies DNA, RNA, or both. Check the appropriate column(s).

	DNA	RNA
Deoxyribose		
Nucleic acid		
Guanine		
Made of nucleotides		
Thymine		
Ribose		
Involved in translation		
Replicates during S-phase		
Double-stranded		
Sugar-phosphate backbone		
Involved in transcription		
Can leave the nucleus		
Single-stranded		
Adenine		
Cytosine		
uracil		

Transcribe and translate the gene below into mRNA, tRNA, and amino acids.

DNA → ATG GCC TTG GCT ACT TGA

mRNA →

tRNA →

AA →

DNA MUTATIONS – Use the DNA sequences that follow to answer the following questions.

Original → ATG CAG TTC CTT ACG …

A → ATG CTG TTC CTT ACG …

B → ATG CAG TCC TTA CGT …

C → ATG CAG TTT CCT TAC …

1) Which sequence has an insertion mutation?
2) Which sequence has a deletion mutation?
3) Which sequence has a substitution mutation?
4) Name 2 mutagens that might have caused this to occur.
5) What is the complimentary sequence of the original DNA sequence?

Complete the diagram below to show what the end result will be if the parent cell undergoes mitosis or meiosis.

If an animal has 7 chromosomes in its egg cells, how many chromosomes are in its skin cells? _____

If an animal has 38 chromosomes in its heart cells, how many chromosomes are in its gametes? _____

MITOSIS	MEIOSIS
What types of cells reproduce by this process?	
End Result	
___ (←#) (haploid or diploid) cells	___ (←#) (haploid or diploid) cells
How do the daughter cells compare to the parent cell?	

DNA TECHNOLOGY – Match the term to the correct definition.

1. Cloning _____
2. DNA fingerprinting _____
3. Forensics _____
4. Gel electrophoresis _____
5. Genetic engineering _____
6. Genome _____
7. Human Genome project _____
8. Plasmids _____
9. Recombinant DNA _____
10. Selective breeding _____
11. Stem cells _____
12. Transgenic organisms _____

a) Transferring genes from one organism to another
b) Humans breeding plants and animals to have desired traits (aka – artificial selection)
c) An organism's DNA that has another species genes added to it
d) Organisms with recombinant DNA
e) The structure used to transfer genes from one organism to another
f) Comparing the pieces of DNA to identify individuals
g) The total set of an organisms DNA
h) The branch of law enforcement that uses scientific investigation and evidence to solve a case
i) An international effort to sequence all the genes in human DNA
j) A cell that can continuously divide and specialize into various body tissues
k) An organism (or cell) that is genetically identical to its parent
l) A procedure to separate and analyze DNA fragments from different sources so that they can be compared

ASEXUAL VS. SEXUAL REPRODUCTION – Decide whether each statement describes asexual, sexual, or both types of reproduction. Check the appropriate column(s).

	ASEXUAL	**SEXUAL**
Only one parent is needed		
Produces genetic variation among offspring		
Mitosis		
Offspring are exact copies of parents		
Mutations can occur		
No genetic variation among offspring		
Parent cells are gametes		
Occurs in somatic cells		
Leads to slower population growth		
Prokaryotes reproduce this way		
Produces 2 identical cells		
Requires two parents		
Produces 1 cell		
Requires less time and energy		
Causes populations to grow rapidly		
Parent cells are produced by meiosis		

Organisms (SB3) – Page 4

Name _____

Date _____ Period ____

1. Fill-in the missing levels of classification in the correct order.

Domain → _____ → Phylum → _____ → _____ → Family → _____ → _____

2. If two organisms belong to the same *FAMILY*, what other taxa will they have in common?

3. Which two taxa are used in an organism's scientific name?

4. Using the scientific naming rules, write your name scientifically.

Use the letters for the six kingdoms below to answer the questions that follow.

A) Archaebacteria
B) Eubacteria
C) Protista
D) Fungi
E) Plantae
F) Animalia

5. Which are prokaryotes?

6. Which are eukaryotes?

7. Which are unicellular?

8. Which are multicellular?

9. Which contain DNA?

10. Which have DNA floating in the cytoplasm?

11. Which have DNA in a nucleus?

12. Which have a capsule?

13. Which have cell walls?

14. Which have cell membranes?

15. Which contain <u>only</u> autotrophs?

16. Which contain <u>only</u> heterotrophs?

Viruses (Chapter 20 – Section 2)

17. What two structures do all viruses have? _____ and _____

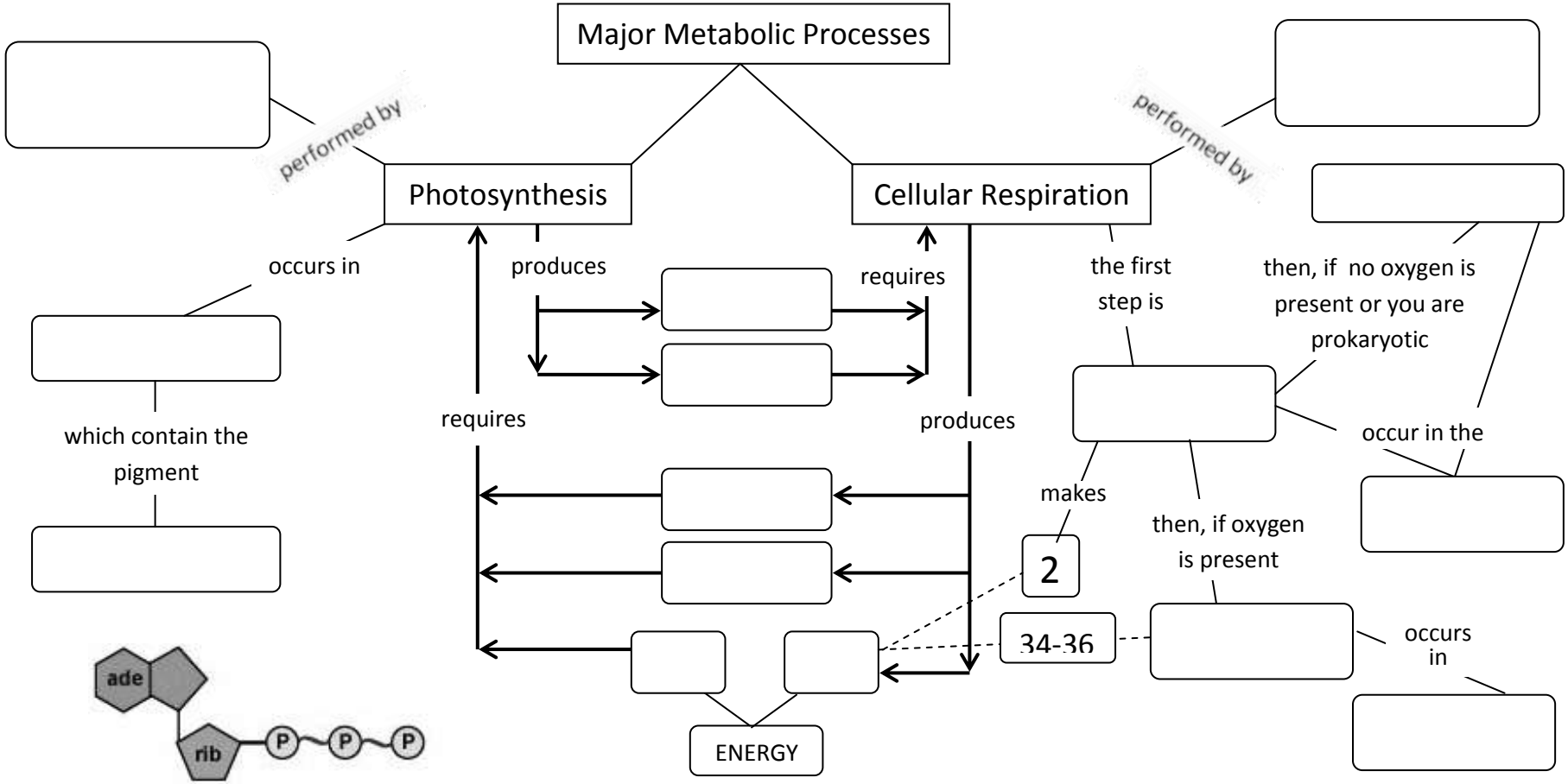
18. Are viruses living? Why or why not?

19. What does a virus need to make new viruses? _____

20. If a virus replicates using the _____ cycle, new virus parts are made using the _____ cell's _____, and the new virus _____ out of the cell, as a result, the cell _____ .

21. If a virus replicates using the _____ cycle, no new virus parts are made, but the viral _____ is inserted into the _____ cell's DNA. The cell _____, but all its daughter cells are infected with the _____.

Organisms (SB3)



15. Above is the diagram for the energy currency of the cell, what is the name of this molecule?

16. Draw an arrow to show where the most energy is stored in the molecule.

17. Why is this a high energy bond? (think magnets)

18. What is the total number of this molecule produced by glycolysis and aerobic respiration?

WORD BANK

Aerobic respiration	All organisms	ATP	Autotrophs
Carbon dioxide (CO_2)	Chlorophyll	Chloroplast	Cytoplasm
Fermentation	Glucose ($C_6H_{12}O_6$)	Glycolysis	Mitochondria
Oxygen (O_2)	Sunlight	Water (H_2O)	

19. Complete the equation for photosynthesis. Circle to reactants.

_____ + _____ + _____ → _____ + _____

20. Complete the equation for cellular respiration. Circle the products.

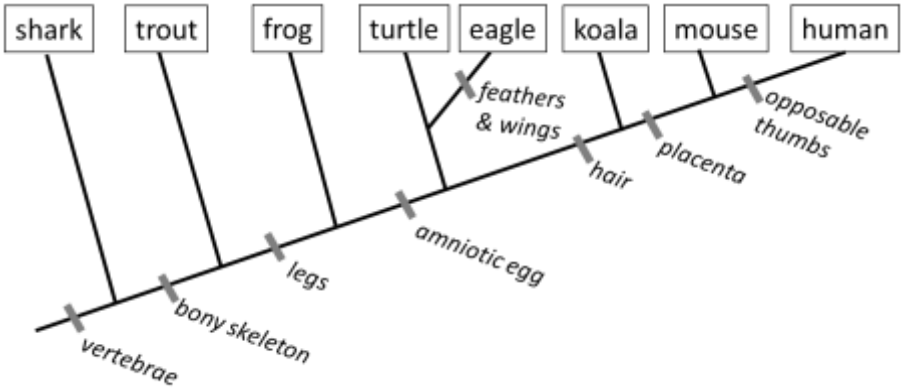
_____ + _____ → _____ + _____ + _____

Name _____

Date _____ Period ____

Evolution (SB5) – Page 5

Use the diagram to answer the questions below.



1. What is the name of this diagram?
2. What trait(s) do all these organisms share?
3. Which organisms have wings?
4. Which organisms have hair?
5. Which organisms lack the trait for amniotic eggs?
6. Which other organisms must be part of the clade that includes turtles and koalas?
7. According to the diagram, what organisms are most closely related to eagles?
8. When comparing trout and frogs, what is a derived trait for frogs?

For each definition below, write the correct vocabulary word in the boxes. Then, match the numbers under the letters to the numbers in the SUPER SECRET STATEMENT at the end of the next page.

1. The type of selection that results from organisms choosing mates based on its his/her characteristics

30	60			42	

2. One of the first scientists to suggest that evolution was occurring, but he was wrong about how it happened

	9		46			

3. Structures that evolve in related species due to a common ancestor

39				12					35

4. Change in a species over time

	10		31		43			

5. A measure of an organisms success at survival and reproduction

				19	28	37

6. The type of selection that occurs when environmental factors cause some individuals to survive and reproduce better than others

		23			45	25

7. A broad explanation that has been scientifically tested and supported

		18			8

8. The study of the locations of living organisms and fossils around the world; an evidence of evolution

59			20			62					

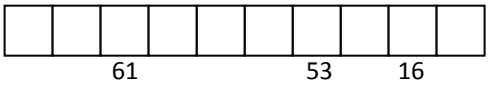
9. The differences in a population that must be present for evolution by natural selection to occur

					7		27	52

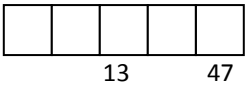
10. Occurs when a species dies out

			48			15			

11. Any trait that allows an organism to survive or reproduce better than others without the trait in a specific environment

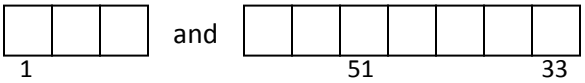


12. A geologist that studied the processes changing the Earth and argued that these processes occur gradually over millions of years

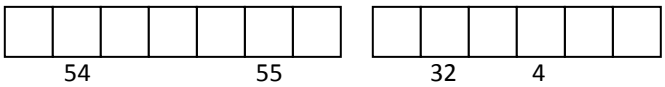


13. Studying and comparing the bones and tissues of different organisms (even fossils); an evidence of evolution

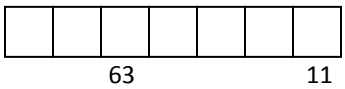
14. Scientists can compare these types of sequences in different species to determine how closely related the species are



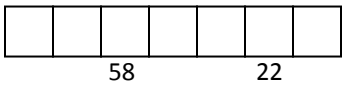
15. The scientist that is credited with the theory of evolution by natural selection because he presented a logical explanation that was supported by lots of evidence



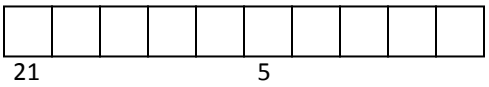
16. A scientists that developed a very similar theory of evolution at the same time as Darwin



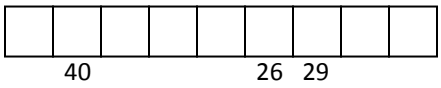
17. Traces of organisms that lived in the past; a major source of evolutionary evidence



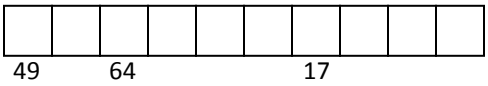
18. The type of selection where humans mate organisms to pass desired traits to the offspring



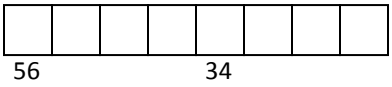
19. Structures that are evolutionary "leftovers" with no apparent purpose or function



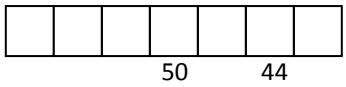
20. The formation of a new species



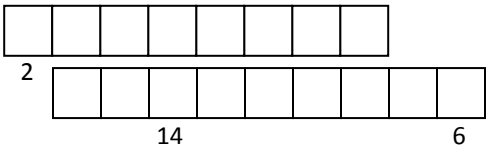
21. The passing of traits from parent to offspring necessary for evolution of species (Darwin did not understand this process)



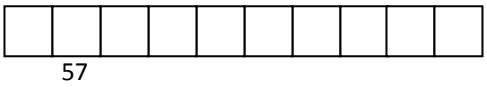
22. This man argued that the human population was growing faster than its food supply; Darwin applied his theory to all populations



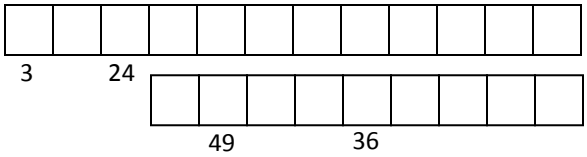
23. The process by which one species evolves into many species to fill available niches

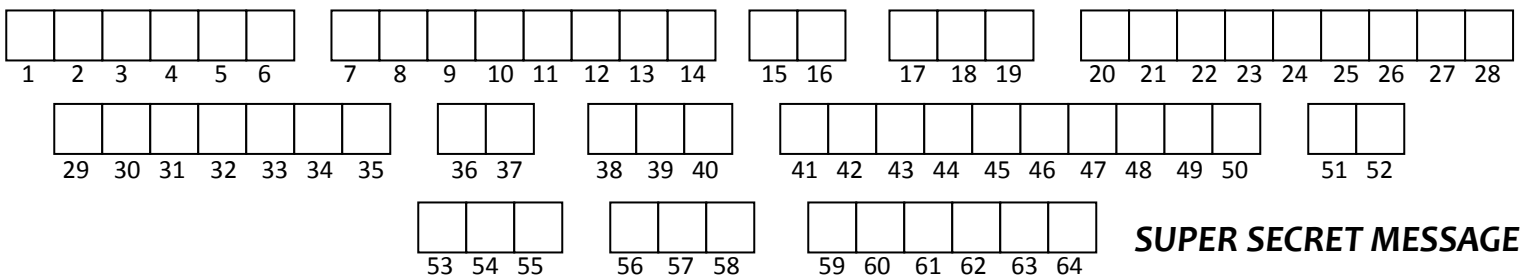


24. The study and comparison of the development of embryos to determine the relatedness of species



25. When two species can no longer interbreed which may lead to speciation





SUPER SECRET MESSAGE

Name _____

Ecology (SB4) – Page 6

Date _____ Period ____

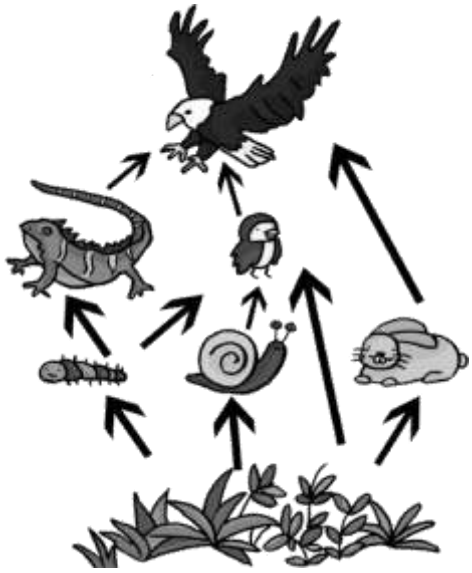
Unscramble the vocabulary words. Then, match them to the correct definition below.

SCRAMBLED	UNSCRAMBLED	MATCH
mytinimuoc		
seepbhior		
ichen		
ebomi		
yecoolg		
mnoimesslmca		
esymtcsoe		
oltnevouioc		
oendrpita		
cboiiat		

SCRAMBLED	UNSCRAMBLED	MATCH
irapamstis		
ulptanoopi		
iebroryhv		
obciit		
tcoiietnmpo		
masumulti		
umapereetrt		
grmsaion		
htbatia		
cinrpaotteipi		

a) The nonliving parts of the ecosystem
b) The place an organism lives
c) A symbiotic relationship where both species benefit
d) The study of living things and their interactions with the environment
e) The 2 things that cause the climate of a biome (2 answers)
f) An organism's role or purpose
g) The symbiotic relationship were one organism benefits and the other remains unaffected
h) All the different populations that live together
i) Occurs when resources like food, habitats, and mates, are limited
j) All the parts of Earth that support life
k) The living parts of the ecosystem
l) Animals eating plants
m) All the organisms and the abiotic environment
n) The symbiotic relationship where one organism harms another
o) Occurs when changes in one species cause changes to occur in another species over time
p) All the organisms of the same species that interbreed
q) An area with a specific climate and certain types of plant and animal species that are well adapted to the environment
r) Anything with all 7 characteristics of life
s) One organism killing another for food

Use the diagram to answer the questions.



1. Which organism is a producer?
2. Which organisms are consumers?
3. Which 3 organisms are herbivores?
4. Which organism is an omnivore?
5. Which organism is a carnivore?
6. Which organism has the least amount of energy available?
7. Complete the food chain. Circle the primary consumer.

   Grass → _____ → Lizard → _____

8. Which organisms break down the remains of dead organisms and recycle the nutrients back into the environment?
9. **CARBON CYCLE**
   a. What two processes give off CO_2 in the environment?
   b. What process gives off O_2 in the environment?
10. **WATER CYCLE**
    a. What process makes the water vapor in the atmosphere available to the organisms on land?
    b. How does water vapor return to the atmosphere? (2 ways)

Complete the chart below by checking the appropriate column for each statement.

	Primary	Secondary
Results in a climax community		
Starts with bare rock or sand		
begins with pioneer species (lichens and mosses)		
Happens in an area where soil remains		
Very slow process that can take hundreds of years		
Can occur after a volcano		
Can occur after flood or forest fire		

11. For each tropism below, what is the plant growing in response to?

    a) Geotropism b) Thigmotropism c) Phototropism