

Biology SB1 EOC Review

Georgia Performance Standards: SB1 Students will analyze the nature of the relationships between structures and functions in living cells. A. Explain the role of cell organelles for both prokaryotic and eukaryotic cells, including the cell membrane in maintaining homeostasis and cell reproduction. B. Explain how enzymes function as catalysts. C. Identify the function of the four major macromolecules – carbohydrates, proteins, lipids, nucleic acids. D. Explain the impact of water on life processes (i.e. osmosis, diffusion).

1. Independent and Dependent Variables.

Description: John's biology class was studying various ways to recycle materials, including the use of compost as fertilizer. Members of John's class investigated the effectiveness of various recycled materials in promoting plant growth. John and three members of his lab group decided to compare the effect of compost and commercial fertilizer on plant growth. Three flats of bean plants (25 plants per flat) were grown for five days. The plants were then fertilized as follows: Flat A received 10 grams of commercial fertilizer; Flat B received 10 grams of aged compost; and Flat C received no fertilizer. The plants received the same amount of sunlight and water each day. At the end of 20 days, the students recorded the height of the plants in centimeters.

- Identify the Independent Variable: **type of food**
- Identify the Dependent variable: **height in cm**

2. Macromolecules.

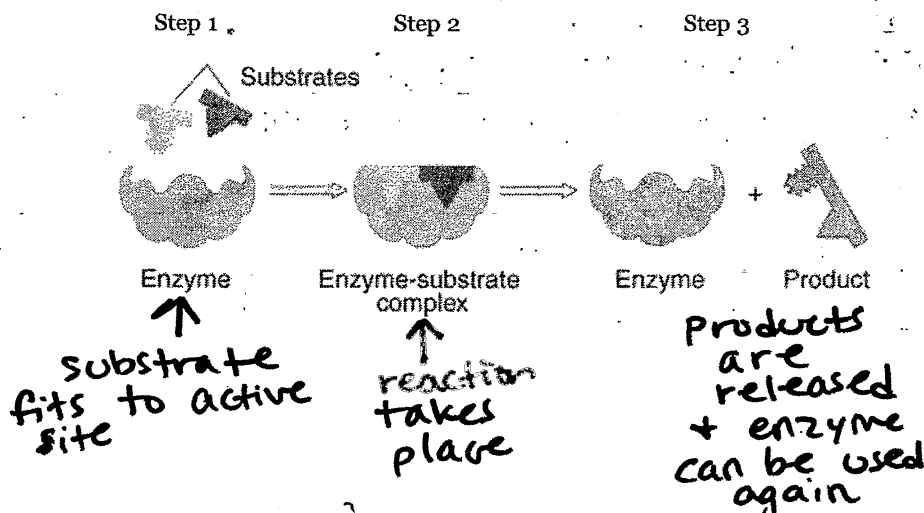
Polymer	Monomer Subunit	Function of Polymer	Example
Carbohydrate	monosaccharide disaccharide monosaccharide	energy source	sugars starches
Protein	amino acid	control reactions, form bones + muscle, involved in transport	transport proteins, enzyme
Nucleic acid	nucleotide	store + transmit genetic info	DNA or RNA
Lipids	fatty acids	store energy	fat

3. Enzymes as Catalysts

- What are the two most important ways enzymes function as catalysts for chemical reactions?
 - 1) **speed up reaction**
 - 2) **lower activation energy**

4. Enzyme Lock and Key Model

- What is another name for a reactant in a chemical reaction?
substrate
- Describe the three steps in the Lock and Key Model shown below:



5. Enzymes and Controlled Conditions

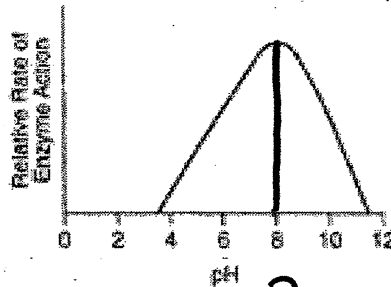
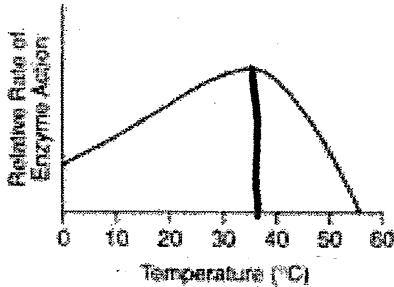
pg. 54

- List the three conditions that most often impact enzyme function:

- Salinity
- PH
- temperature

- Look at the graphs below.

- At what temperature does the enzyme function best? $\sim 35^\circ\text{C}$
- At what pH does the enzyme function best? $\text{pH} = 8$



1.

2.

6. Cell Organelles.

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Cell Organelle	Function	Animal, Plant, or both?
cytoskeleton	framework of a cell	B
nucleus	stores + protects DNA	B
nucleolus	assemble proteins	B
Endoplasmic reticulum	helps in production of protein + other molecules	B
ribosome	links amino acids to form proteins	B
Golgi apparatus	proteins are changed, packaged + brought to other locations in cell	B
vesicle	carry molecules around cell	B
mitochondrion	produce chemical energy "powerhouse of cell"	B
Vacuole	store materials in cell	P
Lysosome	attack bacteria + viruses + break down old cell parts	A
Centriole	form cilia, flagella, aid in cell division	A
Cell wall	strong, rigid layer to protect + support; + shape plant cells	P
Cell membrane	separates inside + outside of cell	B
chloroplast	carry out photosynthesis	P
cytoplasm	Jelly like substance that holds organelles	B




pg. 85 - a

7. Cell Membrane Transport.

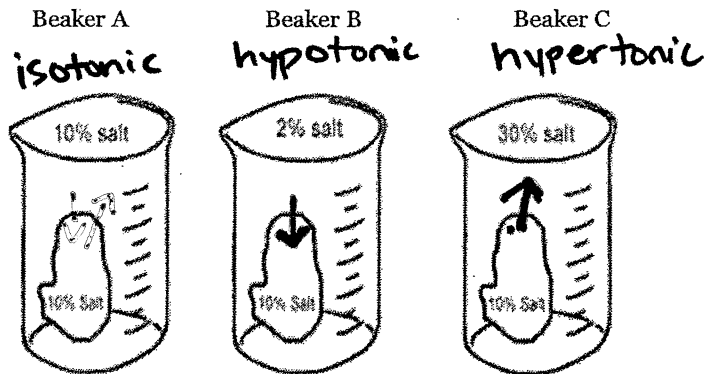
Characteristics	Active Transport	Passive Transport
Does this process require energy?	yes	no
Describe the movement of the molecules in terms concentration gradient.	low → High	High → low
Provide specific examples of each type of process.	endocytosis exocytosis	osmosis + diffusion

pg. 86

8. Types of Solutions.

Characteristics	Hypertonic	Hypotonic	Isotonic
What is the definition for each type of solution?	Solution that has a higher concentration compared to another	Solution that has a lower conc. compared to another	equal concentration
What happens to a cell placed in each type of solution?	decrease in size	increase in size	nothing
Draw the cell and use arrows to indicate the direction of water movement.			

- Identify the type of solution in each of the following beakers as Hypertonic, Hypotonic, or Isotonic:



pg. 78

9. Plant Vs. Animal Cells.

<i>Plant Cell</i>	<i>Animal Cell</i>
<p>List three organelles found in a plant cell but not in an animal cell:</p> <p>Chloroplast, cell wall, vacuole</p>	<p>List two organelles found in an animal cell but not in a plant cell:</p> <p>Lysosome, centriole</p>

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10. Prokaryotic Cell Versus Eukaryotic Cell.

<i>Prokaryotic Cell</i>	<i>Characteristic</i>	<i>Eukaryotic Cell</i>
NO	Nucleus?	Yes
NO	Membrane-bound Organelles?	Yes
Cytoplasm	Where is the DNA located?	nucleus
single	Single-Celled or Multi-Celled?	both
bacteria	Example Cell?	protist, fungi, plant, animal
asexual	Method of Reproduction?	both sexual + asexual



Biology SB2 EOC Review

Georgia Performance Standard: SB2 Students will analyze how biological traits are passed on to successive generations. A. Distinguish between DNA and RNA. B. Explain the role of DNA in storing and transmitting cellular information. C. Using Mendel's laws, explain the role of meiosis in reproductive variability. D. Compare and contrast the advantages and disadvantages of sexual and asexual reproduction in different situations.

1. Monomer & Polymer!

Monomer	Polymer
What is a monomer? molecular subunit of a polymer	What is a polymer? large molecule made up of monomers
What is the monomer subunit of DNA? nucleotide	What is the polymer DNA also known as? deoxyribonucleic acid
What are the three parts of a nucleotide? phosphate, 5 carbon sugar, nitrogen base	

2. The Four DNA Nucleotides!

Nucleotide	Abbreviation	Base Pair Rule	# Hydrogen bonds
Adenine	A	A-T	2
Guanine	G	G-C	3
Cytosine	C	G-C	3
Thymine	T	A-T	2

3. Convert the following DNA sequence via Replication (DNA → DNA)

A T G T C C G T T A A G
 T A C A G G C A A T T C

4. Compare DNA and RNA!

Characteristic	DNA	RNA
Full Name	deoxyribonucleic acid	Ribonucleic acid
Shape	double helix	single helix
Sugar	deoxyribose	ribose
Nitrogen Base	A, G, C, T	A, G, C, U


U=uracil

5. Convert the following DNA sequence via Transcription (DNA → RNA):

C G T T A C G T A A C G A
 G C A A U G C A U G C U

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Pg. 235, 239, 243

6. Protein Synthesis!

DNA Replication	Transcription	Translation
Purpose: DNA → DNA	Purpose: DNA → RNA	Purpose: RNA → amino acid → proteins
Location: NUCLEUS	Location: Nucleus	Location: Ribosome
Enzyme: DNA Polymerase	Enzyme: RNA Polymerase	Codon: 3 nucleotides on mRNA
DNA Nucleotides: A, T, C, G	RNA Nucleotides: A, U, G, C	Start Codon: AUG - Methionine (located on mRNA)
Shape of DNA Molecule: double helix	Shape of RNA Molecule: single helix	Stop Codon: UAA, UAG, UGA
Mini Visual of DNA: 	Three Types of RNA: mRNA rRNA tRNA	Anticodon: Located on tRNA

Pg. 252 + 255
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7. Mutations & Mutagens!

Mutation	Mutagen
<ul style="list-style-type: none"> Define Mutation: Change in DNA sequence List three types of Mutations: <ol style="list-style-type: none"> point mutation frameshift mutation Chromosomal mutation 	<ul style="list-style-type: none"> Define Mutagen: agent that cause or increase frequency of mutation Examples of Mutagens: <ul style="list-style-type: none"> - UV light - chemicals
<ul style="list-style-type: none"> Practice Problem! <p>Normal DNA Strand:</p> <p>TAC GCA TCC ATG CAT ACT AUG CGU AGG UAC GUA UGA</p> <p>➤ Convert to RNA: methionine - Arginine - arginine - tyrosine - Valine - stop</p> <p>➤ Convert to Amino Acids:</p> <p>Mutated DNA Strand:</p> <p>TAC GCA CCA TGC ATA CT AUG CGU AGU ACG UAU GA</p> <p>➤ Convert to RNA: methionine - Arginine - glycine - threonine - tyrosine -</p> <p>➤ Convert to Amino Acids:</p> <p>➤ Type of Mutation??? frameshift</p>	



Pg. 180

8. **Genotypes and Phenotypes!** Example: Pea shape is determined by the dominant allele **R**, for round shape and the recessive allele **r**, for wrinkled shape.

Genotype	Phenotype (looks like...)	Homozygous or Heterozygous? Dominant or Recessive?
RR	round shape	Homozygous Dominant
Rr	round shape	Heterozygous
rr	wrinkled shape	Homozygous Recessive

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9. **Monohybrid Cross:** Complete the Punnett square below for flower color with the following parent genotypes to predict the genotypes of the offspring: The dominant allele for flower color is **F**, purple, and the recessive allele for flower color is **f**, white.

Parent 1: Heterozygous dominant genotype **Ff**
Parent 2: Homozygous recessive genotype is **ff**

	F	f
f	Ff	ff
f	Ff	ff

What is the genotypic ratio of **Ff** to **ff**? **2:2**
What is the phenotypic ratio of **Ff** to **ff**? **2:2**

Pg. 186

10. **Dihybrid Cross!** Pink is dominant and white is recessive for color. Heart-shaped is dominant and round is recessive for shape. Suppose you cross two plants with pink, heart-shaped flowers that are heterozygous for both traits, **PpHh**. Construct a Punnett square for this dihybrid cross using the following information:

	PH	Ph	pH	ph
PH	PPHH	PpHh	PpHh	PpHh
Ph	PpHh	PpHh	PpHh	PpHh
pH	PpHh	PpHh	PpHh	PpHh
ph	PpHh	PpHh	PpHh	PpHh

PpHh × **PpHh**



What ratio of offspring produced have white, round-shaped flowers?

1:15

★
Pg. 148 + 170

11. Asexual Versus Sexual Reproduction!

Asexual Reproduction	Characteristic	Sexual Reproduction
Prokaryote	Types of organisms involved	Mostly multi-celled, eukaryotic organisms, including plants and animals, some single-celled eukaryotes
Genetically identical offspring	Type of offspring produced	genetically non-identical offspring
Population could die off	Outcome in non-ideal environment	Survival Genetic Variation!
faster than sexual	Overall rate of reproduction	Slower than Asexual

Pg. 135 + 173

12. Compare/Contrast Mitosis & Meiosis!

Characteristic	Mitosis	Meiosis
Purpose:	Growth, Development, Reproduction	reproduction
Type of Cell Involved:	somatic cells (body cells)	Gamete (sex) cells
Type of Cell Produced:	diploid	Haploid
Type of Reproduction:	Asexual	sexual
# of Cells Produced:	2 identical daughter cells	4 genetically unique cells
When does it take place:	constantly throughout life	Certain Times In Life (not continuous)

Biology SB3 EOC Review

Georgia Performance Standard SB3: Students will derive the relationship between single-celled and multi-celled organisms and the increasing complexity of systems. A. Explain the cycling of energy through the processes of photosynthesis and respiration. B. Compare how structures and functions vary between the six kingdoms. C. examine the evolutionary basis of modern classification systems. D. Compare and contrast viruses with living organisms.

1. **Photosynthesis:** Complete the table below:

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Reaction Details	Light-Dependent	Light-Independent
Purpose of this reaction:	create O_2	create glucose
Does this reaction require light?	Yes	NO
Where does this reaction take place?	thylakoids	Stroma of Chloroplast
Reactants:	Water and Sunlight	CO_2
Products:	O_2	Glucose (simple sugar)
Write the full chemical equation for Photosynthesis:	$6H_2O + 6CO_2 + \text{sun energy} \rightarrow 6O_2 + \text{glucose}$	

2. **Cell Respiration:** Complete the table below:

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Reaction Details	Glycolysis	Krebs cycle (cell respiration)	Electron Transport (cell respiration)	Fermentation "Plan B"
Purpose:	make 4 ATP	make ATP 34-36	make ATP	break down Pyruvic acid
Is this reaction aerobic or anaerobic?	anaerobic	Aerobic	aerobic	Anaerobic
Where does this reaction take place?	Cytoplasm of cell	mitochondria	Inner mitochondrial membrane	mitochondria cytoplasm + mitochondria
Reactants:	glucose 2 ATP	pyruvic Acid	$O_2 + ADP + \text{electrons}$	pyruvic acid
Products:	2 Pyruvate, 2 ATP, 2 NADH (energy-carrying molecules)	$CO_2 + \text{many } e^-$	ATP H_2O	Supplies NAD^+ that can be turned into NADH and allow glycolysis to continue
Write the full chemical equation for Cell Respiration:	$O_2 + \text{glucose} \rightarrow H_2O + CO_2 + \text{energy (ATP)}$			

Pg. 534

3. The **Kingdom** is the largest category in the Linnaean classification system. There are 3 Domains and 6 Kingdoms:

Domain	Domain Eubacteria (Bacteria/Prokarya)	Domain Archaeobacteria (Archea/Prokarya)	Domain Eukarya
Kingdom	Kingdom Eubacteria	Kingdom Archaeobacteria	Protista
			Fungi
			Plantae
			Animalia

4. **Kingdom Characteristics:** Complete the table below (write small!):

Characteristics	Pg. 559 Archaeobacteria	Eubacteria	Pg. 574 Protista	Pg. 589 Fungi	Pg. 612 Plantae	696 Animalia
Prokaryotic, Eukaryotic, or both?	prokaryotic	Prokaryote	eukaryotic	eukaryotic	eukaryotic	eukaryotic
Unicellular, Multicellular, or both?	uni	uni	uni + multi	uni + multi	Multicellular	multi
Mode of Nutrition?	Autotroph + Heterotroph		heterotroph + autotroph	Heterotroph Decomposer	autotroph heterotroph	heterotroph
Most common method of reproduction?	Autotroph asexual heterotroph		Asexual and Sexual	Sexual	Sexual + asexual	Sexual + asexual
Type of habitat?	Extreme environments	less extreme environments	water	Warm + humid	any	any
Example or Other?			Plant-like animal-like fungus-like	Mushroom yeast	flower, tree, moss, fern	Dog, Human

pg. 520

5. List the seven levels of the Linnaean system of classification from the most general to the most specific:

- 1) Kingdom
- 2) Phylum
- 3) Class
- 4) order
- 5) family
- 6) Genus
- 7) Species

pg. 519

6. Binomial Nomenclature: Write the following organisms with correct nomenclature rules:

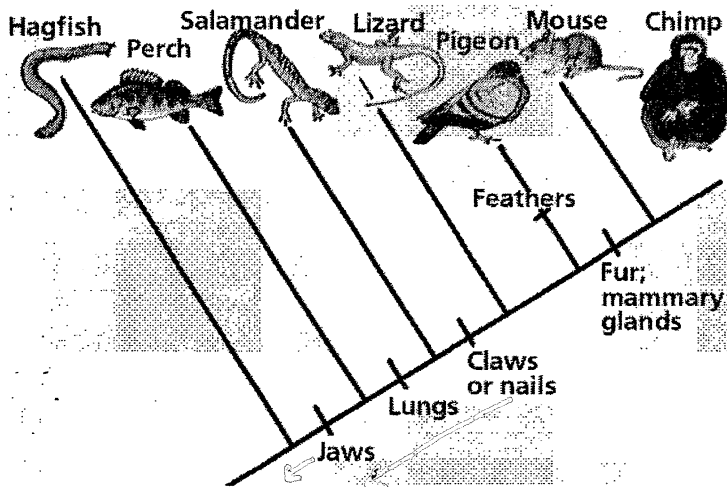
Hint: Genus species

> QUERCUS ALBA = Quercus alba

> TARAXACUM OFFICINALE = Taraxacum officinale

pg. 526

Cladistics.



Q: Which organism(s) exhibit(s) the trait of having claws or nails? Salamander, perch, hagfish
 Q: Which organism(s) exhibit(s) the trait of having jaws? hagfish

Refer to the diagram below. Which two organisms are the **most** related?

- A. Organisms 1 & 2
 B. Organisms 2 & 4

- C. Organisms 1 & 2
 D. Organisms 2 & 3

more specific

Common Name	Heart Worm	Hook worm	Tape worm	Round worm
Organism	1	2	3	4
Class	Secernentea	Secernentea	Secernentea	Secernentea
Order	Spirurida	Spirurida	Ascaridida	Spirurida
Family	<u>Filariidae</u>	Uncinariidae	Ascarididae	<u>Filariidae</u>
Genus	<i>Dirofilaria</i>	<i>Necator</i>	<i>Ascaris</i>	<i>Loa</i>

pg. 544, 556

8. Viruses & Bacteria. Compare & Contrast.

Characteristics	Viruses	Bacteria
Living or nonliving?	NONliving: need a host to reproduce	Living
Description of Structure	Capsid (protein coat), Genetic material, Surface Proteins	flagella, pilli to stick to surfaces, peptidoglycan
Shapes:	Enveloped, Helical, Polyhedral	bacilli: rod shaped spirilla: spiral shaped cocci: sphere shaped
Reproductive Strategies/Methods of Infection	lytic infection lysogenic infection	Mitosis, binary fission Conjugation with pilli
Examples	HIV Hepatitis Common cold or flu	strep, sinus infection
Other:	Vaccines to prevent	Antibiotics to treat (problems with overuse, underuse, and misuse)



pg. 414 1. Cycling of Matter: Carbon! Refer to Figure 13.14.

<p><i>Why is Carbon Important?</i></p> <p>carbon is a building block of life and macromolecules</p>	<p><i>What processes account for most of the transformation and movement of Carbon?</i></p> <p>the carbon cycle: photosynthesis and cellular respiration</p>
<p><i>Abiotic Sources of Carbon?</i></p> <p>fossil fuels air (CO₂)</p>	<p><i>Other sources of Carbon?</i></p> <p>macromolecules plants animals } dead organic matter</p>

pg. 415 2. Cycling of Matter: Nitrogen! Refer to Figure 13.15.

<p><i>What is the source of nitrogen for animals?</i></p> <p>plant + animal matter</p>	<p><i>What is the source of nitrogen for decomposers?</i></p> <p>animal excretions, dead animal + plant matter</p>
<p><i>What is the source of nitrogen for plants?</i></p> <p>soil</p>	<p><i>Which organisms act as a bridge between the nitrogen in the atmosphere and the organisms of the biosphere?</i></p> <p>bacteria</p>



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Biome	Location & Description	Climate	Dominant Plants	Dominant Animals	Animal Adaptations
Tropical Rain Forest	near equator	warm temp. + abundant rainfall	lush thick forests	insects	- loud vocalization to defend territory
Grassland	all continents	range of warm + cool temps and rainfall	tall grass w/ scattered trees + shrubs	bison, gophers, wolves, coyotes	- hooved herbivores - live below ground to survive dry + windy conditions
Desert	flat dry areas	hot + dry	cactus	reptiles + mice	nocturnal to avoid daily heat, ectothermic
Temperate Deciduous Forest	all continents	hot summer, cold winter, rains throughout year	broadleaf forest	birds, deer, raccoons, foxes	migration + hibernation
Taiga	far north	long, cold winters + short, warm, humid summers	coniferous trees	fox, wolves, caribou, moose	heavy fur
Tundra	near poles	subzero temp. w/ little precipitation	mosses and low-lying plants	caribou, polar bears, arctic wolf	heavy fur

★ PG. 443, 444

5. Density-Dependent & Density-Independent Limiting Factors!

Density-Dependent Limiting Factors	Density-Independent Limiting Factors
Examples: Disease Competition Predation	Examples: Natural disasters

6. Successional Compare and Contrast Primary and Secondary Succession in the table below.

Primary Succession	Secondary Succession
<ul style="list-style-type: none"> - Occurs on new land, such as after new volcanic rock or a glacier melts. - Pioneer species 	<ul style="list-style-type: none"> - Occurs after an ecosystem has been destroyed from natural disasters or humans or a farm has been abandoned - regrowth of already existing ecosystem

7. Levels of Organization

Define Each of the following Key Terms	Visual Analysis: Figure 13.2, p. 397
<ul style="list-style-type: none"> Ecology: study of interactions among living things + their surroundings 	<ul style="list-style-type: none"> Which populations besides alligators could you find in this ecosystem? turtles, fish, birds

Population:
all individuals of a species that live in the same area

PG. 402

8. Biotic and Abiotic Factors

Define Each of the following Key Terms	Visual Vocab II p. 403
<ul style="list-style-type: none"> Biotic Factor: living things Abiotic Factor: nonliving things Biodiversity: variety of life in an area 	<ul style="list-style-type: none"> What do these different populations taken together represent? Community What level of organization describes just the group of alligators? Population What does the ecosystem include in addition to the living things you see here? abiotic factors: water, rocks

Community: collection of populations in one area
 Ecosystem: collection of living + nonliving things in an area
 Biome: regional community characterized by climate + plants

PG. 408 & 411

9. Food Chains & Food Webs

Define Each of the following Key Terms	Visual Analysis: Figure 13.11 p. 410
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m = mutualism
 C = commensalism
 P = parasitism

pg. 432

1. Symbiotic Relationships - Practice Level 1! Determine the symbiotic relationship for each scenario: mutualism, commensalism, or parasitism.

- a) The Nile crocodile opening its mouth to permit the Egyptian plover to feed on any leeches attached to its gums. **M**
- b) A flea living upon a dog. The flea gains valuable nutrients and the dog is harmed. **P**
- c) Many bacteria live in our large intestine. They feed on food molecules the human intestine does not break down and they do not harm us. **C**
- d) Epiphytes are plants that live perched on sturdier plants. They do not take any nourishment from their host and simply benefit from being better exposed to sunlight, for example Spanish moss. **C**
- e) The remora and the shark. The dorsal fin of the remora (a bony fish) is modified into a sucker with which it forms a temporary attachment to the shark. What the shark feeds, the remora picks up scraps. The shark makes no attempt to prey on the remora. **C**
- f) A bacteria can live in the digestive tract of a termite. The bacteria break down the wood particles ingested by the termite to use as food. The bacteria get a home and both organisms are now able to use the wood as nutrients. **M**
- g) The spider crab and the algae. Spider crabs live in shallow areas of the ocean floor, and greenish-brown algae lives on the crabs backs, making the crabs blend in with their environment and unnoticeable to predators. The algae, in return get a good place to live. **M**
- h) An American robin benefits by building its nest in a red maple tree. The tree is unaffected. **C**
- i) A deer tick and a white tailed deer. The tick gets food from the deer without killing it. The deer is harmed by losing blood to the tick and possibly by getting an infected wound. **P**
- j) A barnacle attaches to a whale. The barnacle gains a food source by traveling through the ocean via the whale. The whale is neither harmed nor helped. **C**
- k) Cattle Egrets feed on the insects that the cows stir up in pastureland and have been observed pecking an insect off a cow's body. **M**
- l) Heartworms in dogs block the blood vessels of the heart and will lead to death if not treated. **P**

Visual Vocabulary Draw and describe the three types of Geographic Dispersion Patterns; Refer to Figure 14.7 for examples of Dispersion Patterns.

Clumped Dispersion	Uniform Dispersion	Random Dispersion
Description: live together in groups	Description: live a specific distance away	Description: live randomly in an area

pg. 437

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Visual: 	Visual: 	Visual:
Example: school of fish	Example: human neighborhood	Example: sloths

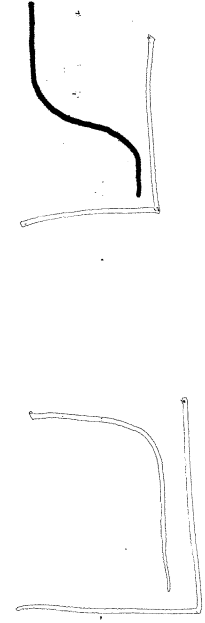
3. Survivorship Curves! Describe the three types Survivorship curves. Draw and Label the graph below.

Type 1	Type 2	Type 3
Description: humans live + babies die later in life 	Description: birds, mammals, reptiles, equal chance of surviving 	Description: high birth rate + death rate fish

pg. 434

4. Exponential & Logistic Population Growth! Describe the two types of Population Growth. Draw and Label a graph for each.

Exponential Population Growth	Logistic Population Growth
Description: when population size increases dramatically	Description: slow growth, exponential growth level off



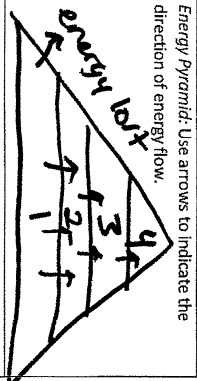
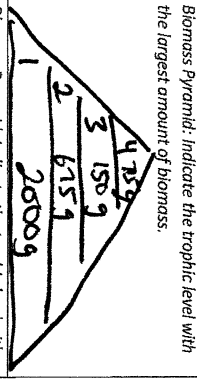
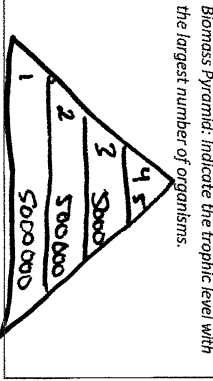
<p>Food Chain: sequence that links species by feeding</p> <ul style="list-style-type: none"> • Herbivore: eat only plants • Omnivore: eat plants + animals • Detritivore: eat dead, decaying matter • Decomposer: break down organic matter • Trophic Levels: levels of nourishment in food chain • Food Web: model that shows complex network of feeding relationships 	<p>Trophic Levels - Key</p> <ul style="list-style-type: none"> ❖ Tertiary Consumers (Carnivores that eat Secondary Consumers - <u>Top</u>) ❖ Secondary Consumers (Carnivores that eat Herbivores) ❖ Primary Consumers (Herbivores) ❖ Producers (Autotrophs, make their own food - <u>Bottom</u>) <p>What do the yellow arrows represent? flow of energy</p> <p>Which organisms bring energy into this ecosystem? Producers</p> <p>Starting with a Producer, identify one food chain in this food web: shrimp -> triggerfish -> shark</p> <p>Which organism is a Tertiary Consumer? shark</p> <p>How does energy flow in a food chain? producers to consumers</p> <p>What is the original source of energy? Sun</p>
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10. Pyramid Models

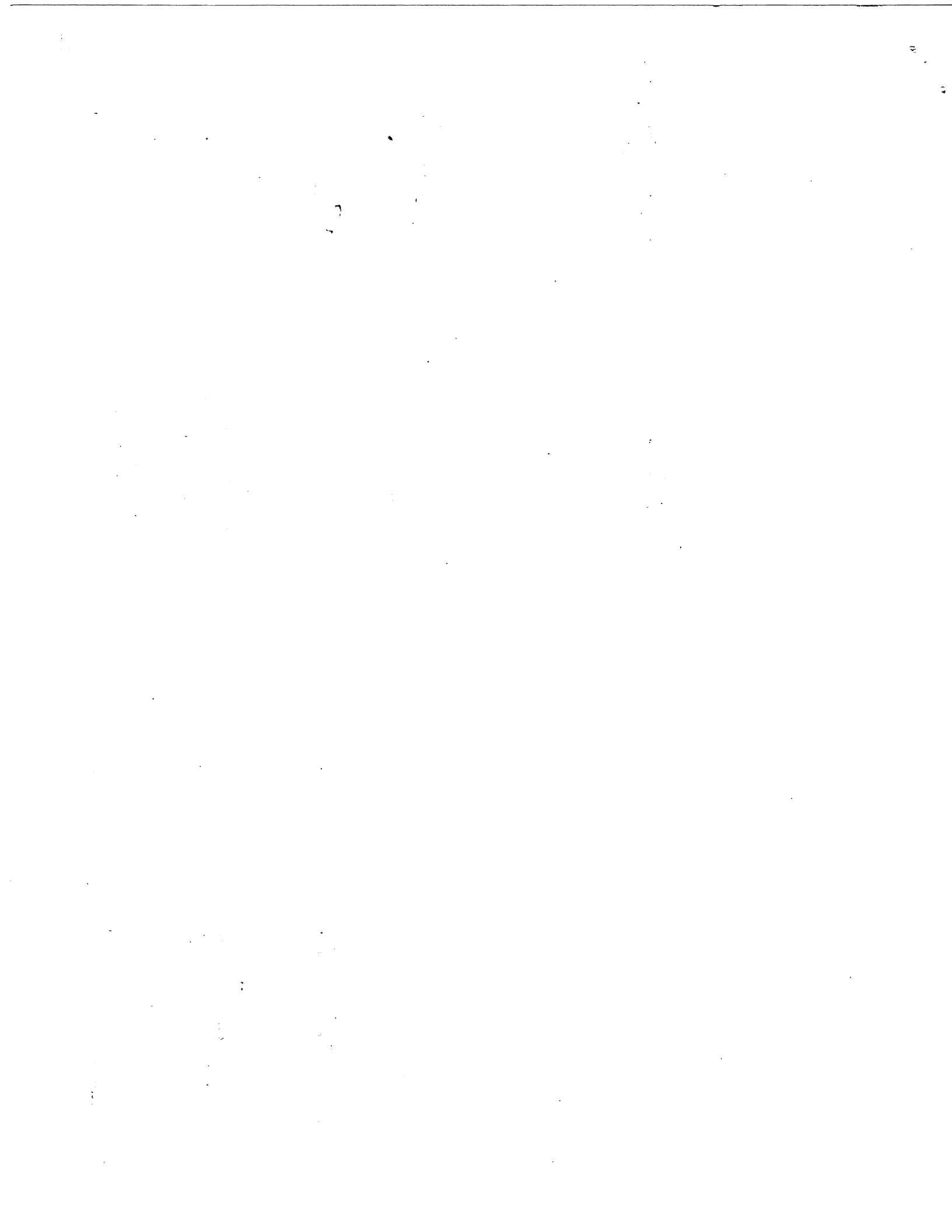
Define Each of the following Key Terms

Visual Vocabulary Draw an each pyramid with the following levels: Producers, Primary Consumers, Secondary Consumers, and Tertiary Consumers.

Producers = 1
 Primary Consumers = 2
 Secondary Consumers = 3
 Tertiary Consumers = 4

<p>Energy Pyramid: diagram that compares energy used by producers + consumers</p> <p>Biomass Pyramid: compares the biomass of different trophic levels</p> <p>Pyramid of Numbers shows number of individuals at each trophic level</p>	<p>Energy Pyramid: Use arrows to indicate the direction of energy flow.</p>  <p>Biomass Pyramid: Indicate the trophic level with the largest amount of biomass.</p>  <p>Pyramid of Numbers: Indicate the trophic level with the largest number of organisms.</p> 
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Energy transfer



pg. 306

1. List the Four Main Principles to the Theory of Natural Selection: p. 306

- 1) variation
- 2) overproduction
- 3) adaptation
- 4) descent with modification



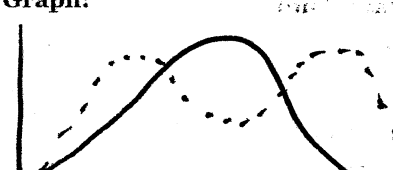
pg. 312

2. Structural Evidence of Evolution. P. 312-314

Homologous Structures	Analogous Structures	Vestigial Structures
Definition: Similar structure different function	Definition: different structure similar function	Definition: remnants of structures that had a function in ancestors
Examples/Research: human hand, bat wing, mole foot	Examples/Research: bat wing + moth wing	Examples/Research: wings of ostrich appendix

pg. 331

3. Distribution & Natural Selection. P. 330-332

Directional Selection	Stabilizing Selection	Disruptive Selection
Main Points: shift in population from one phenotype to another	Main Points: intermediate phenotype is favored	Main Points: both extreme phenotypes are favored
Graph: 	Graph: 	Graph: 

Pg. 336

4. Genetic Drift. Compare and Contrast Bottleneck Effect with Founder Effect. P. 336-337

Bottleneck Effect	Founder Effect
<p>Main Points: occurs after an event greatly reduces size of population</p>	<p>Main Points: after a small number of individuals colonize a new area</p>
<p>Visual and/or Examples:</p>	<p>Visual and/or Examples: Pilgrims to new world</p>

Pg. 340

5. Hardy-Weinberg. List the Five Factors that can lead to Evolution: p. 340, 343

- 1) Very large population
- 2) no emigration or immigration
- 3) no mutations
- 4) random mating
- 5) no natural selection

Pg. 348

6. Patterns in Evolution. Convergent and Divergent Evolution. P. 348

Convergent Evolution	Divergent Evolution
<p>Main Points: evolution toward similar characteristics in unrelated species</p>	<p>Main Points: when closely related species evolve in different direction & become increasingly different</p>
<p>Examples: analogous structures</p>	<p>Examples: red fox and kit fox</p>

Pg. 360

7. Describe ways in which Fossils can be formed: p. 360-361.

- ① permineralization: minerals carried by water deposit around hard structure
- ② natural cast: water removes bone & tissue, leaving an impression and minerals fill the mold
- ③ trace fossils: record activity of organism
- ④ Amber-preserved fossils: organisms become trapped in tree resin that hardens into amber
- ⑤ preserved remains: entire organism becomes encased in material such as ice or volcanic ash