Fall Study Guide

Review Lab Safety Rules and Procedures

*Make sure you review all the safety rules and procedures we covered at the beginning of the school year.

CHAPTER 1: INTRO TO BIOLOGY

homeostasis	Maintenance of constant internal conditions in an organism
metabolism	all the chemical reactions that take place in an organism
data	Information gathered from an experiment
hypothesis	Educated guess
theory	Scientific explanations supported by lots of evidence
independent variable	What the scientist is testing during an experiment (aka manipulated variable)
dependent variable	What the scientist measures during an experiment (aka responding variable)

7 characteristics all living things	1. have genetic info (DNA/RNA)	2. respond to environment	3. made of cells	4. need energy	5. grow & develop	6. reproduce	7. maintain homeostasis

Steps in the scientific method.

1. ask a question
2. make hypothesis
3. perform experiment
4. gather and organize data
5. make conclusions

Chapters 13-16: Ecology

List the levels of organization in the biosphere:

Smallest to Largest:

Organism

Population

Community

Ecosystem

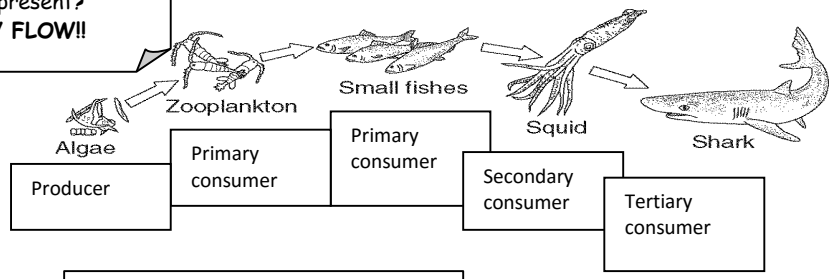
Biome

Biosphere

List 2 biotic and 2 abiotic factor in an ecosystem:

Tree	**wind**
Bird	**air**

LABEL the trophic levels. What do the arrows in the food chain represent? **ENERGY FLOW!!**



What percent of the energy is available to the next trophic level? 10%

What happens to the rest of the energy? It's lost as heat

Which level can support the most organisms? **PRODUCERS**

If there were a toxin in the environment, which organism would contain the most? **TERTIARY CONSUMER**

Who has the greatest biomass? **PRODUCERS**

List ways these elements cycle:

CO_2: photosynthesis, respiration, decomposition, combustion

H_2O: evaporation, transpiration, condensation, precipitation, runoff, seepage

N_2: nitrogen fixation (by bacteria), decomposition, denitrification

P: weathering, decomposition, leaching, sedimentation, geologic uplifting

Why do elements (nutrients) need to be cycled (recycled) in the environment? Matter cannot be created or destroyed; nutrients must be passed onto new living organisms

What is Ecology? Study of living organisms and how they interact with their environment

Describe primary succession:
Bare rock broken down by pioneer species to form soil; growth begins with grass, then small trees, then hardwoods leading to a climax community

CAUSES? Volcanic erruptions, glacial retreating

What are pioneer species? List two.
first organisms in an area:lichens & moss

Describe secondary succession:
period of regrowth after some type of disturbance

CAUSES? Bad weather, natural disasters, human interference

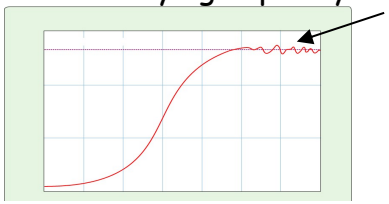
What is a climax community? Last stage of growth in an area (example: mature hardwood forest in deciduous biome)

Causes of Acid Rain? Environmental effects?
Burning fossil fuels for transportation, electricity generation, and industry; kills animals and plants (destroys tree bark), damages buildings

How does overpopulation affect the environment? (Exceeding carrying capacity!) often leads to the depletion of resources for a particular species resulting in a decline of population numbers

What is carrying capacity? Maximum number of organisms an area can support

Label carrying capacity-



What is a limiting factor? **Limits a population from growing**

List 3 density dependent limiting factors: **predation, disease, parasitism**

List 3 density independent limiting factors: **weather, natural disasters, human acitivities (pollution)**

What is the greenhouse effect? What's it purpose? Greenhouse gases in the atmosphere trap heat to keep earth's temperature stable

What is the ozone? What's the function? Gaseous layer that filters UV radiation from the sun

What is causing ozone depletion? Air pollution from fossil fuel use and the use chloroflourocarbons (CFCs)

What is biomagnification?
Pollution increases as it moves through the food chain from producers to consumers

What organisms are most affected by biomagnification? Tertiary consumers at the top

	What causes it?	What does it do to the environment?
Global warming	Too many greenhouse gases emitted into atomosphere	Increase tropical storms, melts glaciers & icecaps, raises sea level, destabilizes food webs & ecosystems, alters seasons/weather patterns

	Gravitropism	Phototropism	Thigmotrophism
What it causes plants to do	Roots grow down into soil, stems grow upward	Causes plants to bend towards light	Enables plants to respond to tough
Why this is helpful	Helps roots get nutrients from soil and stems get light	Helps plants get as much light as possible	Used to get food or for protection

What is an organism's niche? Their role in their enviroment

List an organism and give an example of its niche. Lions are predators

Behavior	**What is it? Give an example.**
Innate Instincts	Instinct; sea turtles immediately go to ocean after hatching
Classical Conditioning	Make a mental connection between stimulus and response; Pavlov's dog (bell means it's time to eat)
Operant Conditioning	+/- reinforcement: behave a certain way to receive reward or avoid punishment; you do your chores to get an allowance
Habituation	Stop responding to a repetitive stimulus; you can eventually sleep thru the night next to railroad tracks after a couple of weeks of restlessness
Insight	Problem solving and using prior knowledge to figure something out; otter uses a rock to break open a mussel
Imprinting	innate + learned; geese follow first moving thing they see, but must learn who mom is

Herbivores eat plants

Carnivores eat meat

Omnivores eat plants and animals

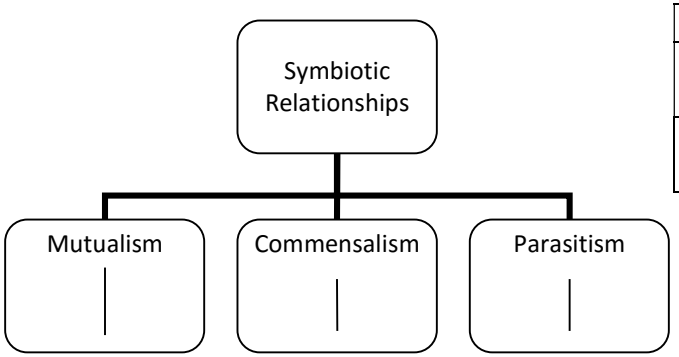
Decomposers break down dead material

Detritivores eat dead material

Photosynthesis	vs.	Chemosynthesis
Plants use sunlight To make glucose		bacterial use chemicals to make glucose

- Hetertroph/Consumers: eat food to get energy
- Autotroph/Producers: make their own food/energy

How does mimicry and camouflage enable animals to survive? **Helps to protect them from predators**



	Definition	Examples
Intraspecific Competition	Competition between organisms that are the same species	2 deer fighting for a mate
Interspecific Competition	Competition between organism that are different species	Lion and hyena chasing a gazelle

What is Homeostasis?
Maintenance of constant internal conditions in an organism
Give an example.
Sweating/shivering when hot/cold

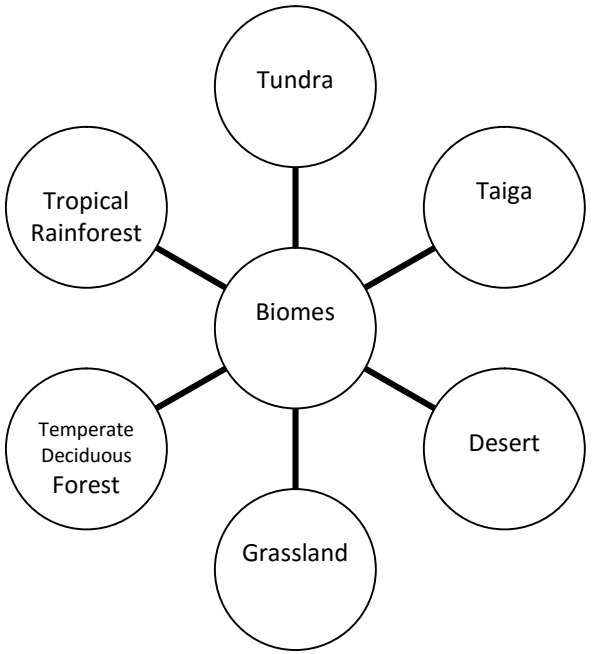
What is a keystone species?
Organism that has an unusually large effect on the ecosystem

Examples: beavers = build dams that allow for bird nesting and fish spawning

Illustrate the 3 types pf Disperation

clumped | Uniform | Random

What makes Estuaries different from all other environments? They're a mixture of fresh and salt water



Renewable Resources	Nonrewable Resources
1. water	1. coal
2. wind	2. oil
3. sunlight	3. Natural gas

What is a hormone? Chemical messenger
What does the hormone auxin do? stimulates plant growth in height
What do gibberellins cause? Dramatic/fast growth
What does ethylene cause? Fruit ripening

What is predation? One organism captures and eats another

Predators play a key role in ecosystems by controlling the sizes of prey populations.
What will happen to prey if the number of predators decrease? Describe how it could be bad. Prey populations would increase and resources such as food might decrease

What will happen to prey if the number of predators increase? Prey numbers will go down.

CHAPTER 2: MACROMOLECULES (ORGANIC MOLECULES)

Macromolecules	Major functions	Monomer	Examples
Carbohydrates	main energy source for living organisms; make up cell wall in plants; make up exoskeletons	Monosaccharides	Glucose, cellulose
Lipids	Stored energy source; make up cell membranes, cushion/protect /insulate body	Triglyceride (glycerol + 3 fatty acids)	Fats, oils, cholesterol, steroids, waxes
Proteins	Transport materials in/out of cell, speed up chemical reactions, make up muscle & bone	Amino acids	Hemoglobin, enzymes
Nucleic Acids	Contains genetic info and makes proteins	Nucleotides	DNA & RNA

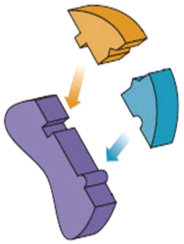
What group of macromolecules do enzymes belong to?
PROTEINS

What is a chemical reaction? Combining one set of chemicals to make another set

What are reactants? Chemicals you start with in a reaction

What are products in a chemical reaction? Chemicals made during the reaction

Make a sketch that explains what is meant by the sayings that "enzymes are specific" and fit like a "lock and key." Label your sketch with the following words: active site, substrate/reactants, enzyme.



Characteristics of Enzymes

1. What will happen to the rate of reaction if you….

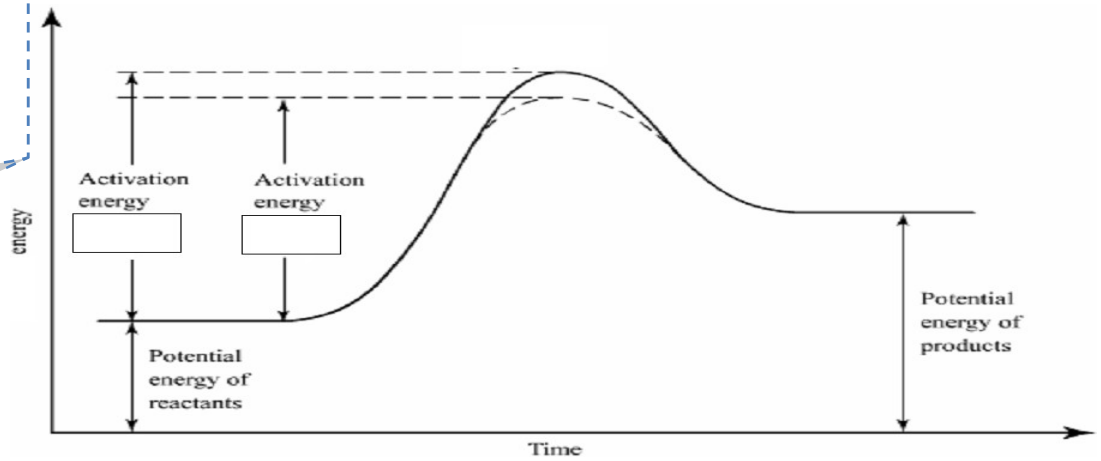
Heat up the enzyme? decrease

Cool down the enzyme? decrease

Change the pH? decrease

2. If you add more enzymes (increases the concentration) to a solution of substrate, what will happen to the reaction rate? It will increase

3. What do enzymes do? How do enzymes affect activation energy? Look at the graph. They decrease the amount of activation energy needed, and therefore speed up the reaction.



Chapter 3: Cell Theory & Cell Structure

Organelle	Function and which kingdom/s the organelle is in
Golgi Body	Modify, package, and transport proteins
Ribosome	make proteins
Nucleus	Control center-contains DNA
Lysosome	Digests foreign materials and worn out cell parts
Cell Membrane	Controls what enters and leaves cell
Mitochondria	Supplies energy
Vacuoles	Store food, water, and waste; large in plant cells and small in animal cells if present
ER (smooth and rough)	Membrane system where proteins are made

List three differences between plant cells and animal cells.
Plant: larger in size, square-ish shape, have cell wall, chloroplasts, and lg vacuole
Animal: smaller and irregular in shape, contain lysosomes

Only example of prokaryote cell: Bacteria

Examples of eukaryotes cells: plants, animals, fungi, & protists

What are the 3 part of the "cell theory?"
1. all living things are made of cells
2. cells are the basic unit of life
3. new cells come from preexisting cells

Describe the structure and composition of the cell membrane. (make a sketch)

*Did not cover this semester

How are prokaryotic cells different from eukaryotic cells (List 3 ways)?
P: no nucleus, no organelles, all are unicellular (bacteria)
E: contain, nucleus, organelles, and can be unicellular or multicellular

Which have been around longer? Prokaryotes

Organelles specific to plant cells	Function
Cell Wall	Rigid support for plant cells
Chloroplasts	Converts light energy to chemical energy (photosynthesis)
Vacuoles (large)	Store food, water, and waste

What are the cell walls of plants made of? Cellulose (sugar)

CHAPTER 3: CELL TRANSPORT

What is Diffusion?
Movement of molecules
From a high concentration
To a low concentration

What is osmosis?
Diffusion of water

Solute
Gets dissolved (salt/sugar)

Solvent
Does the dissolving (water)

Solution
Mixture of the two (Kool aid)

Describe each type of solution.
What happens to the cell?

Hypotonic	Isotonic	Hypertonic
Lower amt of salt Than cell; water Will move into cell; Cell will swell	same amt of salt than cell; water will move in & out; cell will stay the same	higher amt of salt than cell; water will move out of cell; cell will shrink

Venn Diagram
Put the following in the venn diagram:
- Need energy
- High to low
- Low to high
- Does not need energy
- Molecules pass through cell membrane

What is endocytosis and exocytosis?
Types of active transport:
Endo: materials move into cell
Exo: materials exit the cell