

REVIEW 1:

Unit 2: Biochemistry

1. What are the most common elements found in living things? Circle the one that makes the backbone of all organic molecules.

Carbon, Hydrogen, Oxygen, Nitrogen, Phosphorus, Sulfur

2. In the following equation, circle the reactants: **A + B** → C

3. Finish completing the chart below to describe the 4 macromolecules and their functions.

MOLECULE	MONOMER	EXAMPLES	FUNCTIONS
carbohydrates	monosaccharide/ sugar	glucose, cellulose, glycogen	• Main source of energy for living things • Make up the main structure of plants
lipids	fatty acids	fat, oil, waxes	• Long term energy storage • Waterproofing • Form biological membranes
nucleic acids	nucleotides	DNA, RNA	• Store and transmit genetic information
proteins	amino acids	enzymes, hormones, muscles	• Control the rate of chemical reactions • Form the structure of animals • Transport substances in and out of cells

4. What is the function of an enzyme?

To speed up a chemical reaction

5. What is ATP?

Molecule that living things use for energy

6. Fill in the table regarding photosynthesis and cellular respiration.

	photosynthesis	cellular respiration
purpose for organism	To make food (glucose)	To make ATP by breaking down food
reactants	Carbon dioxide and water and light	Glucose and oxygen
products	<u>Glucose</u> and oxygen	Carbon dioxide and water and <u>ATP</u>
equation	$6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$ carbon dioxide + water → glucose + oxygen	$\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} + \text{ATP}$ glucose + oxygen → carbon dioxide + water + energy

Unit 3: Human Body Systems & Cell Transport

1. Match the body systems with their function.

b	Digestive	a. moves materials such as nutrients, wastes, and hormones around the body
c	Respiratory	b. breaks down food, absorbs nutrients, and eliminates wastes
a	Circulatory	c. takes in oxygen and gets rid of carbon dioxide

2. Match the body organs with their structure/function.

e	stomach	a. muscular organ that squeezes to pump blood through blood vessels
b	pancreas	b. secretes digestive enzymes into the small intestine to aid in chemical digestion
k	small intestine	c. muscular tube that absorbs water from leftover food that could not be digested and absorbed before elimination from the body
h	villi	d. large muscle that controls breathing
c	large intestine	e. muscular sac that churns food to help mechanically digest food
i	lungs	f. tiny blood vessels that allow materials to be exchanged between blood and cells
d	diaphragm	g. tiny air sacs within the lungs that allow oxygen and carbon dioxide to be exchanged between the lungs and blood
g	alveoli	h. tiny projections within the small intestine that allow nutrients from food to be absorbed from the digestive tract into the bloodstream
a	heart	i. large organs that take in oxygen and expel carbon dioxide
j	arteries/veins	j. blood vessels that move blood around the body to transport oxygen, nutrients, wastes, and hormones
f	capillaries	k. Performs most of chemical digestion and absorbs nutrients into the blood

3. The cell membrane is selectively permeable. What does that mean?

The cell membrane only allows certain materials to pass through while prohibiting others.

4. What are membrane proteins and how do they help with cell transport?

Membrane proteins are proteins within the cell membrane that allow molecules through with facilitated diffusion. They also allow signaling.

5. Match the following types of cell transport with their correct definition.

c	Diffusion	a. molecules use protein channels in the cell membrane to move from an area of higher to lower concentration
d	Osmosis	b. energy is used to force molecules against the concentration gradient
a	Facilitated Diffusion	c. molecules move from an area of higher to lower concentration

b	Active Transport
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d. water molecules move across a membrane toward the area with more solutes

Unit 4: Human Body Systems & Homeostasis

1. Match the body systems with their function.

a	Nervous	a. controls body by sensing, processing, and responding to stimuli
c	Endocrine	b. removes wastes from the body
b	Excretory	c. secrete hormones to control growth, metabolism, and reproduction

2. Match the body organs with their structure/function.

h	brain	a. filter wastes from the blood and excretes them as urine
e	neurons	b. a protein made and released by glands to use as chemical messages within the body
c	spinal cord	c. bundle of nerves that carries info to and from the brain
g	gland	d. breaks down toxins in blood
b	hormone	e. cell in the nervous system that sends messages using electrical impulses
f	lysosome	f. breaks down old parts within a cell so the materials can be reused
c	kidneys	g. creates hormones that are released into the blood to help with signaling in the body
i	skin	h. receives signals, processes the information, and responds by sending signals
d	liver	i. helps release certain wastes in the form of sweat

3. What is homeostasis? And why is it important?

Homeostasis is the ability to maintain stable internal conditions in the body despite large fluctuations in the environment. It is important to allow us to survive.
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4. Give a general description of how negative feedback works to maintain homeostasis.

Our body senses a increase or decrease in a certain variable from its target value, determines the appropriate response to counteract the change, and provides a response to get back to the target value.
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REVIEW 2:

Unit 5: DNA and the Cell Cycle

1. What is the function of DNA?

It stores genetic information to create proteins.

2. Fill in the complementary second side of DNA.

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

3. Define DNA Replication.

DNA replication is when a cell makes an identical copy of DNA. It is important so when a cell divides each new cell will have a full copy of the genetic instructions.

4. The main events of the cell cycle are labeled A, B, C, and D. On the figure, write the name of the phases and briefly state what happens during each of these phases.

	Phase Name	Description of What Happens
A	G1	Cell grows
B	S	DNA replication
C	G2	More growth and prep for division
D	M	Division of nucleus and cell

5. Why does an organism go through mitosis and cell division?

Cells divide so an organism can grow, repair the body, and replace cells that die.

Unit 6: Protein Synthesis

1. What is transcription? Where in the cell does it happen?

Transcription is the process of copying part of the DNA to make mRNA - occurs in nucleus

2. What is translation? Where in the cell does it happen?

Translation is the process of making a protein using information in mRNA - occurs on the ribosomes

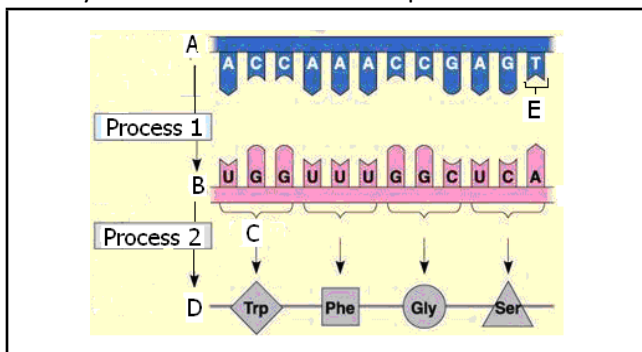
3. Transcribe and then translate the following DNA strand. USE THE GENETIC CODE FROM YOUR NOTES>

DNA T A C , C A C , T A G , A C T , C G T

RNA	A	U	G	G	U	G	A	U	C	U	G	A	G	C	A
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Protein	meth - val - iso - stop
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4. Identify all labeled structures and processes in the diagram below..



A	DNA
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B RNA

D	Protein
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PROCESS 1	transcription
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PROCESS 2 translation

5. What are gene mutations?

Any change in the DNA is a mutation. Remember, they are not always bad but may or may not change the protein being made depending on where the mutation falls.

Unit 7: Meiosis

1. Why do organisms go through **meiosis**?

To make sex cells / sperm or eggs

2. If a cell containing 20 chromosomes went through meiosis, how many cells would be produced and how many chromosomes would be in each?

4 cells with 10 chromosomes in each

3. Match the following terms with their correct definition.

d	haploid
b	diploid
c	gamete
a	zygote

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|----|--|
| a. | The first cell of a new offspring created when a sperm fuses with an egg |
| b. | Cells that contain both sets of homologous chromosomes |
| c. | A reproductive cell such as an egg or sperm |
| d. | Cells that contain only 1 set of chromosomes |

4. Define homologous chromosomes. How are they related to each other?

Carry same genes but slightly different versions because they came from mom and dad

5. What is the importance of crossing over during meiosis?

Genetic variety in offspring

6. How many chromosomes in a normal human body cell? In a normal human gamete cell?

46 chromosomes in a human body cell and 23 in a human gamete

REVIEW 3:

Unit 8: Genetics

1. Match the following terms with their correct definition.

b	genotype
d	phenotype
a	homozygous
c	heterozygous

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|----|--|
| a. | When a genotype contains 2 of the same alleles |
| b. | The genetic makeup of an organism |
| c. | When a genotype contains 2 different alleles |
| d. | The physical traits of an organism |

2. Which of Mendel's laws of inheritance are defined below?

Law of ... segregation	Alleles separate from each other during the formation of gametes. / This means that parents only pass on one copy of each of their genes to offspring.
Law of ... dominance	Some alleles are dominant over others. / This means that if organisms have a dominant and recessive allele they still have the dominant trait.
Law of ... independent assortment	During meiosis, the separation of one set of alleles does not affect the separation of another set. / This allows for offspring to have various combinations of traits from parents.

3. Define the following terms.

Incomplete dominance	Neither gene is dominant - so both traits blend in phenotype - red and blue would make purple
codominance	Both genes are dominant - so both show up in the phenotype - red and blue would make red/blue spotted
X-linked	Gene is on the X chromosome - so it is inherited differently in males and females - remember to use X and Y when doing punnett squares for this kind

4. In pea plants, tall is dominant over short. If a heterozygous tall plant was bred with a homozygous short plant, what are the chances that the offspring will be tall? Use a Punnett Square to predict the possible offspring.

	T	t
t	Tt	tt
t	Tt	tt

% tall	50
% short	50

5. Some flowers exhibit incomplete dominance so having a red gene and a white gene makes flowers pink. If a red flower was crossed with a white flower. Use a Punnett Square to predict the possible offspring.

	R	R
W	RW	RW
W	RW	RW

% red	0
% white	0
% pink	100

6. Hemophilia is an X-linked recessive trait. If a homozygous dominant female mated with a man who has hemophilia. Use a Punnett Square to predict the possible offspring.

	X ^H	X ^H
X ^h	X ^H X ^h	X ^H X ^h

% healthy girl	50	% healthy boy	50
% girl w/ hemophilia	0	% boy w/ hemophilia	0

Y	X ^H Y	X ^H Y
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Unit 9: Evolution

1. Which type of evidence to support the occurrence of evolution is demonstrated in each example.

Similarities in early development (embryos)	As embryos, humans and chimps both have tails even though neither of them have tails later in development.
Fossils	Scientists have found bones of ancient organisms that show how the organisms looked different at different times in history.
Vestigial structure	Some snakes have small remnants on legs leftover from their ancestors. These legs are not functional.
Similarities in molecular structure/ DNA	The sequence of amino acids in the hemoglobin protein of vertebrates is very similar, some are even identical.
Homologous structures	Birds and humans have the same bones in our front limbs, although they are shaped somewhat differently, even though birds can fly and we can't.

2. How does fitness relate to an organism's chance of survival and reproduction?

Greater fitness leads to a better chance of surviving and/or reproducing. Certain traits give an advantage.

3. Explain the 4 requirements/mechanisms of evolution and briefly explain what each means.

Overproduction	Organisms tend to produce more offspring than will survive any generation
Natural variation	Natural inherited genetic variation exists within populations of organisms
Differential survival	Organisms with particular traits are more likely to survive and reproduce leaving their genes to their offspring
Descent with modification	The adaptation that allowed for better survival will appear more in future generations

4. Variation is necessary for natural selection to occur. What are two sources of variation within a species?

Mutations and combining of genes through sexual reproduction

5. What is sexual selection or non-random mating? AND how does it compare with natural selection?

Sexual selection - differences in attractiveness to the opposite sex, with the females usually making the mate choice

Sometimes sexual selection gives a disadvantage in survival but such a strong advantage in reproducing that it is still passed on to new generations.

Unit 10: Ecology

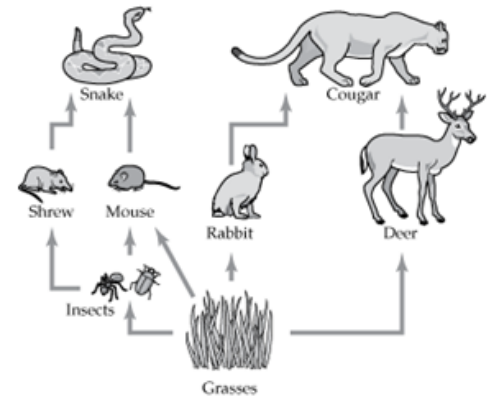
1. Match the following term with their correct definition:

b	predation
e	competition
c	parasitism
a	mutualism
d	commensalism

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| a. When two species form a relationship that benefits both species |
| b. When one organisms captures and eats another |
| c. When an organisms lives on or in another causing it harm |
| d. When one member of a relationship benefits and the other is unaffected |
| e. When organisms attempt to use the same resource at the same time |

2. In the food web, identify one of each of the following:

producer	grasses
Primary consumer	Insects, mouse, rabbit, deer
Secondary consumer	Snake, shrew, cougar
Tertiary consumer	snake
What would happen to the rabbits if more cougars moved into the population? Why?	Their population would decline because they would be eaten more.



3. In the food web above, how much energy is available for the primary consumers from the producers?

10% - Each trophic level only has 10% available for the next.

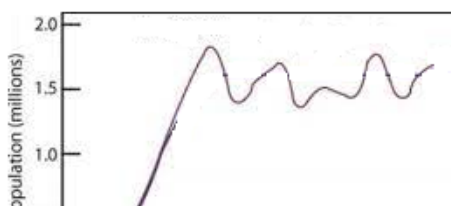
4. What is the importance of a top predator in the stability of an ecosystem?

Without a top predator the other animals overeat the producers reducing the amount of energy available to the whole ecosystem. Primary consumers, in particular, need to be kept in check.

5. What is a limiting factor?

Some factor or resource that prevents a population from continuing to grow

6. What is the carrying capacity of the species in the graph shown below? Support answer.



1.5 million - It is where the graph levels to a relatively horizontal line.

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7. List one biotic and one abiotic limiting factor that might affect the species in the graph.

Biotic - predators (living things)

Abiotic - weather (non-living things)