Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**TOPIC 1: Biochemistry and the Molecules of Life**

1. What does it mean for a compound to be organic?
2. Water is (circle one) **polar / nonpolar** because the electrons are not evenly shared.
3. What two properties of water are mentioned?
	1.
	2.

1. What is the difference between a monomer and polymer?
2. Dehydration synthesis \_\_\_\_\_\_\_\_\_\_\_ water to \_\_\_\_\_\_\_\_ a bond, while hydrolysis \_\_\_\_\_\_ water to \_\_\_\_\_\_\_\_\_\_\_ a bond.
3. Carbohydrates have a \_\_\_: \_\_\_: \_\_\_ ratio of the elements C:H:O. Carbohydrates are the main \_\_\_\_\_\_\_\_\_\_\_\_\_\_ source for a cell.
4. What are the two monomers of lipids?
	1.
	2.
5. Lipids make up the majority of the cell \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. Nucleic acids have the following elements: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Nucleic acids store our \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. Amino acids (the monomers of a protein are made up of what three parts?
	1.
	2.
	3.
8. How do enzymes act as biological catalysts?

|  |  |  |  |
| --- | --- | --- | --- |
| **Macromolecule** | **Elements** | **Monomer and polymer** | **Roles** |
| Carbohydrates | CHO | Monosaccharide/ polysaccharide | Quick/main source of energy |
| Lipids | CH and a little O | Glycerol and fatty acid/lipid | Long-term source of energy; cell membrane |
| Nucleic acids | CHOPN | Nucleotide / nucleic acid | Genetic material |
| Proteins | CHOSN | Amino acid /polypeptide or protein | Structure and enzymes |

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**TOPIC 2: Cells and Cellular Organization**

1. What structure defines a cell? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What do we a call an organism that does have a nucleus? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
What do we call an organism that does not have a nucleus? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What are two examples of prokaryotes? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What are three types of eukaryotes? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Ribosomes help to make \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for the cell
6. The fluid in the cells is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (aka cytoplasm)
7. The Endoplasmic reticulum connects to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Bodies
8. The section of the Endoplasmic Reticulum with attached ribosomes is called the \_\_\_\_\_\_\_\_\_\_\_ ER
The section of the Endoplasmic Reticulum without ribosomes is called the \_\_\_\_\_\_\_\_\_\_\_ ER
9. When a protein leaves the Golgi Bodies, what does it take with it? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
This piece will help it float around in the cell and fuse with the cell membrane.
10. What items could be stored in a vesicle? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. Lysosomes and lytic vacuoles do what? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
12. What **is** an organelle? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
13. Where do we turn sugars into ATP? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
14. What do plants use for photosynthesis? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
15. What do filaments do? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



**TOPIC 3: Cellular Transport**

1. What 4 types of organisms have a cell wall?
	1.
	2.
	3.
	4.
2. Diffusion moves molecules form a \_\_\_\_\_\_\_\_\_\_\_\_ concentration to a \_\_\_\_\_\_\_\_\_ concentration.
3. True or false: after equilibrium is reached, molecules do not move anymore.
4. In a **hypotonic** solution, there is a low solute / high water concentration outside a cell. Water moves \_\_\_\_ the cell.
5. Circle one: Who does better in a hypotonic solution? **PLANTS ANIMALS**
6. In a **hypertonic** solution, there is a high solute / low water concentration outside a cell. Water moves \_\_\_\_\_ the cell.
7. In an **isotonic** solution, there is an \_\_\_\_\_\_\_\_\_ solute / water concentration outside and inside a cell.
8. Circle one: Who does better in an isotonic solution? **PLANTS ANIMALS**
9. Facilitated diffusion needs the help of a \_\_\_\_\_\_\_\_\_\_ to move large/charged molecules across a cell membrane.
10. What type of molecule is the “facilitator” in facilitated diffusion? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. The only type of cellular transport to go AGAINST the concentration gradient is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
12. What important energy molecules allows active transport to happen? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
13. What happens to the shape of the protein when the ATP binds to it? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
14. What happens to the shape of the protein when the potassium ions bind to it? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
15. In the Na+ K+ pump, \_\_\_\_\_\_\_ ions of sodium go through first. Then, \_\_\_\_\_ ions of potassium go through.

**TOPIC 4: Cell Division**

1. What are the three reasons that cells typically divide?
	1.
	2.
	3.
2. **Circle one:** The longest phase of the cell cycle is **INTERPHASE / MITOSIS**
3. G1 is about cells \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. How does a duplicated strand of DNA end up being identical to the original strand?
5. The last stage of Interphase is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. In mitosis, the goal is to get cells that are genetically \_\_\_\_\_\_\_\_\_\_\_\_\_\_. That is, we want to go 2N🡪2N.
7. Match the following Mitosis stages to what happens

\_\_\_Prophase a. Chromosomes move to opposite ends of cell

\_\_\_ Metaphase b. Nucleus reforms, DNA loosens, last stage

\_\_\_ Anaphase c. DNA condenses; nuclear breaks down

\_\_\_ Telophase d. Chromosomes line up in middle of cell

1. What is the difference between plant and animal telophase/cytokinesis?
2. What does meiosis do to the number of chromosomes? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Meiosis goes from 2N🡪 \_\_\_\_\_\_\_\_\_, or from diploid 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What is crossing over?
5. When does crossing over happen? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. What is the idea of Independent assortment?
7. When chromosomes fail to separate properly, it is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	1. \_\_\_\_\_\_\_\_\_\_\_ syndrome and Patau syndrome are results of nondisjunction.

**TOPIC 5: Cellular Energy**

1. What are examples of autotrophs?
2. What are examples of heterotrophs?
3. The most instant form of energy is known as \_\_\_\_\_\_\_\_\_\_\_\_.
4. Why is ATP a high energy molecule?
5. Complete the photosynthesis equation below

\_\_CO2 + \_\_\_ H2O + \_\_\_\_\_\_\_\_\_/enzymes 🡪 C6H12O6 +\_\_\_6O2

1. If the photosynthesis equation is reversed, then it is the formula for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. The \_\_\_\_\_\_\_\_\_ dependent reactions and the light \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactions make up photosynthesis.
3. Place a “D” if the statement refers to the light dependent reactions and an “I” if it refers to the light independent reactions

\_\_\_\_ water is split into oxygen, protons, and electrons

\_\_\_\_CO2 is taken in and converted into carbohydrates

\_\_\_\_ light energy is not needed

\_\_\_\_ light energy is needed

1. What initial process splits a molecule of glucose into 2 3-carbon molecules? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is the NET ATP yield from glycolysis? \_\_\_\_\_\_\_
3. What are the two different types of fermentation mentioned?
	1.
	2.
4. (Circle one) CO2 is created during **electron transport chain / Kreb’s cycle**
5. In the electron transport chain, oxygen joins with electrons and protons to make \_\_\_\_\_\_\_\_\_\_\_.
6. By going through glycolysis, Kreb’s Cycle, and Electron transport chain, a cell can make between \_\_\_\_\_ and \_\_\_\_\_\_ ATP as opposed to just the 2 of glycolysis.

**TOPIC 6: DNA and its processes**



1. Label the three parts of a nucleotide to the right.
2. DNA has \_\_\_\_\_\_ strands and the bases \_\_\_denine, \_\_\_ymine, \_\_\_tosine, and \_\_\_uanine.
3. RNA has \_\_\_\_\_ strand and the base \_\_\_racil instead of thymine.
4. What are the functions of

mRNA? tRNA? rRNA?

1. What are the three different processes that nucleic acid can do?
	1.
	2. 
2. What happens during replication?
3. What happens during transcription?
4. What does AUG code for? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. What do UGA, UAA, and UAG code for? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. What happens during translation?
7. What is the **biology** definition of a mutation?
8. What happens during
	1. Substitution mutation
	2. Insertion point mutation
	3. Deletion point mutation
	4. Duplication chromosomal mutation
	5. Deletion chromosomal mutation
	6. Inversion chromosomal mutation
	7. Translocation chromosomal mutation

**TOPIC 7: Genetics**

1. Match the vocab terms to their definitions.

\_\_\_\_\_ Dominant allele

1. Organism with two different alleles for the same trait
2. Genetic makeup
3. Parental generation
4. Physical characteristics
5. Organism that has two identical alleles for a trait
6. Tool that can predict and compare genetic variation
7. Allele that can be masked
8. Priest who worked with garden peas
9. First offspring generation
10. Allele that can mask other alleles
11. Second offspring generation

\_\_\_\_\_ F1 generation

\_\_\_\_\_ F2 generation

\_\_\_\_\_ Genotype

\_\_\_\_\_ Gregor Mendel

\_\_\_\_\_ Heterozygous

\_\_\_\_\_ Homozygous

\_\_\_\_\_ P generation

\_\_\_\_\_ Phenotype

\_\_\_\_\_ Punnett Square

\_\_\_\_\_ Recessive allele

1. A monohybrid cross looks at \_\_\_\_\_\_ trait, while a dihybrid cross looks at \_\_\_\_ traits at the same time.
2. What is Mendel’s idea of
	1. Dominance?
	2. Segregation?
	3. Independent Assortment?
3. When the dominant allele does not completely mask the recessive allele, it is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ dominance.
	1. What are two examples?
4. When both alleles show up together (one is not really dominant over the other), it is called\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	1. What are two examples?
5. Sex-linked traits are those found on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ chromosome, and show up more in (circle one) **males / females**
6. What is genetic engineering?
	1. Pros?
	2. Cons?

**TOPIC 8: Evolution**

1. A process in which new species develop from pre-existing species is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. TRUE or FALSE: There are always enough resources to support all organisms: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What happens to the species that have the advantageous traits?
	1. b.
4. What happens to the species that do NOT have advantageous traits?
5. Explain why the INCORRECT section on the right IS incorrect
6. What are the three different types of isolating mechanisms?
	1.
	2.
	3.
7. A decrease in genetic variation caused by the formation of a new population by a small number of individuals from a larger population is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
8. Describe the following pieces of evidence for evolution
	1. Fossils:
	2. Homologous structures:
	3. Analogous structures:
	4. Embryology:
	5. Biochemistry:
9. What happens during gradualism? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. What happens during punctuated equilibrium? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. Give an example of
	1. Selective breeding: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. Inbreeding: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hybridization: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**TOPIC 9: Ecology**

1. Write down the levels of ecosystem organization from smallest to largest
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ make their own food, while \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ eat other organisms for food.
3. When you move up an energy pyramid, the amount of available energy (circle one) **↑ ↓**
4. What is the difference between a food chain and a food web?
5. What is the difference between abiotic and biotic factors?
6. Explain the following organisms interactions
	1. Competition
	2. Predation
	3. Symbiosis

		1. Mutualism
		2. Commensalism
		3. Parasitism
7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ species are those that are naturally found in a location, while \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ species are accidentally or purposefully introduced to a new area
8. Explain the difference between
	1. Threatened
	2. Endangered
	3. Extinct
9. What is succession?