**2nd Nine Weeks Biology Exam Study Guide**

**Semester I**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block: \_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **Experimental Design SOL BIO. 1abcefhijlm.**
2. Fill in the following chart about the **experimental design**.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Possible Hypothesis** | **Independent Variable** | **Dependent Variable** | **Control** | **Constant** |
| If I study then I will pass the semester exam. |  |  |  |  |
| If you break up with your bae then you will be sad. |  |  |  |  |
| If you add sunlight then the plant will grow faster. |  |  |  |  |

1. Fill in the following chart about the **experimental design**.

|  |  |  |  |
| --- | --- | --- | --- |
| **Problem** | **Independent Variable** | **Dependent Variable** | **Possible Hypothesis** |
| Will the use of antibiotics affect bacteria growth? |  |  |  |
| Will loud music affect the height of corn plants? |  |  |  |
| Will the amount of sunlight affect the amount of oxygen produced in a plant? |  |  |  |

1. The **best** places to get new and accurate data and information about science are?
2. Label the parts of the **microscope** below and describe their uses.



|  |  |
| --- | --- |
| **PART** | **FUNCTION (What does it do?)** |
| 1. |  |
| 2. |  |
| 3 |  |
| 4. |  |
| 5. |  |
| 6. |  |
| 7. |  |
| 8. |  |
| 9. |  |
| 10. |  |
| 11. |  |
| 12. |  |

1. **Cell Division SOL Bio 3e, 5a,f.**
2. **Fill in the following diagram on mitosis.**

****

1. **Fill in the following on the chromosomes.**

****

D.

C.

A.

B.

E.

1. **Fill in the following on the Cell Cycle.**
2. Asexual reproduction is reproduction with one \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Sexual reproduction requires \_\_\_\_\_\_\_\_\_\_\_\_\_ parents. This helps create genetic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. The longest phase of the cell cycle is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. What occurs during the G1 phase? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. What happens during:
6. Prophase: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Metaphase: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. Telophase: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. **Metabolism SOL Bio 2d, 3bc, 4a.**

**Write the photosynthesis equation in the boxes below.**

 + 🡪 +

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is how plants get energy. They receive the energy they need from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_. The process of photosynthesis is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ meaning it is able to store energy. Plants need \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to perform photosynthesis. Plants are considered \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which means they make their own food, unlike animals which are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because they have to consume their own food.

How do plants do **photosynthesis** at night? What do they do instead?

1. **The Stoma**

The stoma are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on the underside of leaves. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ enters through the stoma and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ exits through the stoma.

1. **The Chloroplast**

This is where \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is located and where \_\_\_\_\_\_\_\_\_\_\_\_\_ occurs. It is the green jelly like substance in the chloroplast. It \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ light from the sun.

**Write the cellular respiration equation in the boxes below.**

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 **Fill in the appropriate vocabulary words below about cellular respiration.**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is how we get energy. We need \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to do cellular respiration. \_\_\_\_\_\_\_\_\_\_\_\_\_ is the cellular energy created during this process. ATP’s structure is very similar to the structure of \_\_\_\_\_\_\_\_\_\_\_. Cellular respiration is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of photosynthesis.

There are \_\_\_\_\_ processes to cellular respiration.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. This is where glucose is broken down.
3. It produces \_\_\_\_\_ ATP’s.
4. Anaerobic respiration requires NO \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, whereas aerobic does.
5. When anaerobic respiration occurs in yeast, they perform \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. During this process \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is produced.
6. When we do anaerobic respiration and fermentation occurs, our cells produce a buildup of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and our muscles get \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. There are many beneficial products that come from fermentation. They include: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. **Krebs Cycle**- It is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
8. It produces \_\_\_\_\_\_\_\_ ATPs.
9. The Krebs Cycle occurs in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which is the powerhouse of the cell.
10. **Electron Transport Chain**
11. Makes most of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
12. A total of \_\_\_\_\_\_ ATPs.

The products from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are used as the reactants for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and vice versa. That is why \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and animals \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ need each other to survive.

1. **Cell Theory SOL Bio 3a.**
2. Name the 4 things **all** cells have.
3. Fill in the chart below about the **Cell Theory**.

|  |  |
| --- | --- |
| **Traditional Cell Theory** (**ABC**) | **Modern Cell Theory** (**D**on’t **M**ake **F**’**s**) |
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |
|  | 4.  |

1. Explain **cell specialization** and why it is important.
2. Fill in the chart below about cell specialization.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Kingdom** | **Does it have cell specialization?** | **Multi or Uni Cellular** | **Heterotroph or Autotroph** | **Type of Metabolism** | **How does it eat?** |
| **Animal** |  |  |  |  |  |
| **Plant** |  |  |  |  |  |
| **Fungi** |  |  |  |  |  |
| **Protist** |  |  |  |  |  |
| **Bacteria** |  |  |  |  |  |

1. **Prokaryotes SOL Bio 2d, 3bc, 4abf.**
2. **Illustrate a bacterial cell in the box below. Label the following parts and describe their functions:**
3. Ribosomes
4. Capsule
5. DNA
6. Cell membrane
7. Pili
8. Cell wall
9. **Eukaryotes SOL Bio 3d, 3bc, 4a.**
10. **Match each organelle with its appropriate function.**

|  |  |  |
| --- | --- | --- |
| **Vocabulary Word** | **Answer** | **Possible Answer/Explanation** |
| Vacuole |  | 1. Helps with motility.
 |
| Flagella |  | 1. Slimy coating on a prokaryotic cell.
 |
| DNA |  | 1. Found in the nucleus.
 |
| Cytoplasm |  | 1. Site of protein synthesis.
 |
| Cell membrane |  | 1. Like warm, moist environments.
 |
| Mitochondria |  | 1. Where DNA is located in the cell.
 |
| Chloroplast |  | 1. Shipping and packaging plant.
 |
| Bacteria |  | 1. Makes ATP.
 |
| Capsule |  | 1. Controls what comes in and out of the cell.
 |
| Endoplasmic reticulum |  | 1. Does photosynthesis, is green.
 |
| Cell wall |  | 1. Site of all chemical reactions in the cell.
 |
| Golgi bodies |  | 1. Has no nucleus or “organelles”.
 |
| Prokaryote |  | 1. Largest organelle in plant cell. Used to hold food and water.
 |
| Centrioles |  | 1. Transport system in the cell. May or may not have ribosomes on it.
 |
| Lysosome |  | 1. Aids in cell division.
 |
| Ribosomes |  | 1. Digestive part of the cell.
 |
| Nucleus |  | 1. Gives cell structure, protection, and shape.
 |

1. Define **homeostasis**. Provide an example.
2. Fill in the chart comparing cells.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Characteristic** | **Plant** | **Animal** | **Bacteria** | **Fungi** |
| Prokaryotic/Eukaryotic |  |  |  |  |
| Has nucleus |  |  |  |  |
| Has cell wall |  |  |  |  |
| Has mitochondria |  |  |  |  |
| Has chloroplast |  |  |  |  |
| Has ribosomes |  |  |  |  |
| Has DNA |  |  |  |  |

1. **Cell Membrane SOL Bio 2b, 3dce, 4ab.**
2. Describe the function of each labeled part in the diagram below.



1. Describe why the cell membrane is **semi-permeable**.
2. Define **passive transport**. In which direction would molecules travel? Why?
3. Define **active transport**.
4. List the **three types of active transport** and define them.
5. **Protists SOL Bio 4abc.**
6. Describe how the **contractile vacuole** works in a protist. What is its function?
7. Fill in the following chart about protists:

|  |  |  |  |
| --- | --- | --- | --- |
| **Protist Type** | **Example(s)** | **How do they eat/metabolize?** | **Special Organelles?****(Movement, ingestion, excretion)** |
| **Animal-Like** |  |  |  |
| **Fungus-Like** |  |  |  |
| **Plant-Like** |  |  |  |

1. **Nucleic Acids Structure and function SOL Bio 5 e g.**
	1. Draw and label a **section of DNA** which includes the items listed below.

|  |  |
| --- | --- |
| * + 1. Nucleotide
		2. Nitrogen bases (A, T, C, G) \*Be sure to correctly pair them.
		3. Sugar (Deoxyribose)
		4. Phosphate
		5. 3’ and 5’
		6. Hydrogen bonds-What strength do they have?
 |  |

* 1. Fill in the following chart on nucleic acids.

|  |  |  |
| --- | --- | --- |
| **Characteristic** | **DNA** | **RNA** |
| Single stranded |  |  |
| Double stranded |  |  |
| Can leave nucleus |  |  |
| Has Uracil |  |  |
| Has Thymine |  |  |
| Made of nucleotides |  |  |
| Three different types |  |  |
| Holds blueprint for all genetic material |  |  |
| Replicates before cell division |  |  |
| Contains deoxyribose |  |  |

* 1. Given the following DNA sequences, construct the **complementary strand** which would be produced in DNA replication. (\*\*\*Remember your base-pairing rules!\*\*\*)
1. 5’ A G T T A G G C C 3’
2. 5’ G C G C T A A G C 3’
3. 5’ C A A T A C G A T 3’
4. How does a **mutation** occur during DNA replication?
5. **Protein Synthesis SOL Bio h.**
	1. Fill in the following chart. Word Bank: transcription, translation, mRNA, tRNA, DNA, nucleus, cytoplasm, ribosome, T, A, C, G, U, codon, anticodon, protein, amino acids, and polypeptide chain.

|  |  |  |  |
| --- | --- | --- | --- |
| **Process in Protein Synthesis** | **Describe the process (who is involved?)** | **What is made?** | **Where does it occur in the cell?** |
| Transcription |  |  |  |
| Translation |  |  |  |
| Making of amino acids |  |  |  |
| Making of protein |  |  |  |

* 1. Using the following **codon chart**, transcribe and translate the following DNA strands below:



1. **DNA Template: C G A T A A C T G A T C T A C T A T A T C**

**Transcripton**-mRNA \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Translation**-tRNA \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Amino Acid Sequence** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **DNA Template: T A C G T A C G G C G A T A C G A C T A A**

**Transcription**-mRNA \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Translation**-tRNA

**Amino Acid Sequence**

1. **Biotechnology SOL Bio 5ij.**
	1. Describe the process of **cloning**, and give examples of how cloning is used to benefit mankind.
	2. Describe and give examples of how **biotechnology** creates “ethical issues”.