BIOLOGY**SEMESTER PROJECT**



BIOLOGY **SEMESTER PROJECT**

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Unit 1 – STERNGRR

**STERNGRR**

|  |  |
| --- | --- |
| **S** - Synthesis | Creating larger molecules from smaller molecules |
| **T** - Transport | Moving materials throughout an organisms system |
| **E** – Excretion | The removal of waste |
| **R** – Regulation | Maintaining an internal balance (homeostasis) |
| **N** – Nutrition | Gathering and eating the food sources needed to create energy. |
| **G** – Growth & Develop | Increasing in size and increase into a better form. |
| **R** – Respiration | The act of breaking down the food into energy |
| **R** - Reproduction | Without it we would go extinct (asexual & sexual) |

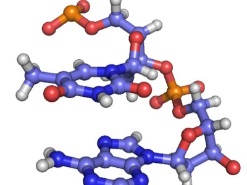
**Scientific Method**

**Steps**

1. **Identify the problem**
2. **Research the problem**
3. **Make a hypothesis**
4. **Test the hypothesis**
5. **Observe and record**
6. **Arrive at a conclusion**

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Unit 2 – Biological Molecules

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *Carbohydrates* | *Lipids* | *Nucleic Acids* | *Proteins* |
| *Monomer / Subunit* | Monosaccharide | Glycerol & 3 fatty acids | Nucleotides | Amino Acids |
| *Polymer* | Polysaccharides | Lipids | Nucleic Acids | Polypeptide Chain |
| *Composed of* | CHO | CHO | CHNOP | CHNOPS |
| *Function* | \*(Fast energy) Storage and transport of energy and structural components | Slow energy, insulation, cell membrane | Transfer or store genetic information | Make parts of cells, immunity, transport molecules, enzymes |
| *Indicator* | Benedict’s solution and Iodine | Sudan IV or brown paper bag. | None! It’s all living things | Biuret’s Solution |
| *Examples* | Sugar, Starch | Oil, Fats | DNA, RNA | Hemoglobin, antibodies, enzymes |
| *Examples* |  |  |  |  |

**Enzyme – substrate complex *DRAW IT HERE:***

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**Unit 2 – Biological Molecules**

**PH Scale Fill in where the Acid, Neutral, and Bases are:**

|  |  |  |
| --- | --- | --- |
|  |  |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |

|  |  |  |  |
| --- | --- | --- | --- |
| **11** | **12** | **13** | **14** |

**Examples:**

**1: Gastric Acid 2: Lemon Juice 3: Orange Juice 4: Tomato Juice 5: Black Coffee**

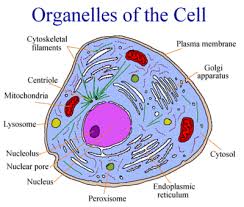
**6: Urine 7: Distillated Water 8: Sea Water 9: Baking Soda**

**10: Milk of Magnesia 11: Ammonia Solution 12: Soapy Water 13: Bleach**

**Vocabulary: Define The following**

|  |  |
| --- | --- |
| Reusable |  |
| Substrate |  |
| Active Site |  |
| Optimal |  |
| Lock and Key |  |

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Unit 3 – Cells

**Venn diagram**

**Animal BOTH Plant**

**Write 1 difference here** Eukaryote **Write 3 differences here**

Mitochondria

Nucleus

Cytoplasm

Cell Membrane

|  |  |
| --- | --- |
| Vocabulary |  |
| Nucleus |  |
| Cytoplasm |  |
| Chloroplast |  |
| Mitochondria |  |
| Vacuole |  |
| Ribosome |  |
| Golgi Bodies |  |
| Cell Membrane |  |

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**UNIT 3 - Cells**

**Cell Organelles**

**Factory Names:**

|  |  |
| --- | --- |
| Nucleus | Central Office |
| Cytoplasm | Factory Floor |
| Chloroplast | Plants grown in the factory |
| Mitochondria | Power Plant |
| Vacuole | Storage rooms |
| Ribosome | Workers in the assembly line |
| Golgi Bodies | Finishing/Packing Department |
| Cell Membrane | Shipping/Receiving Department |

**Cell Specialization:**

|  |  |
| --- | --- |
| Sperm |  |
| Red Blood Cell |  |
| Muscle Cell |  |
| Nerve Cell |  |
| Xylem Cell |  |
| Phloem Cell |  |

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Unit 4 – Transport & Energetics

**Photosynthesis:**

**Equation – *CO2 +H2O + SUN 🡺 C6H12O6 + O2***

**Draw a Chloroplast:**

**Cell Respiration:**

**Equation – *C6H12O6 + O2🡪 ATP + CO2 + H2O***

**Draw a Mitochondria:**

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**Unit 4 – Transport and Energetics**

**Comparing Aerobic and**

**Anaerobic Respiration**

**AEROBIC ANAEROBIC**

* Uses oxygen Both can create • Does not uses oxygen

3 letters \_\_ \_\_ \_\_

* Produces 36 ATP • Produces 2 ATP
* Efficient • Not efficient
* Its reactants include oxygen • Its reactants does not include O2
* It occurs in the mitochondria • It occurs in the cytoplasm

**Understanding Diffusion, Facilitated Diffusion,**

**Active Transport and Osmosis Draw an example of the following in each box below:**

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Unit 5 –DNA/Protein Synthesis

**DEFINE THE FOLLOWING:**

**DNA replication**

**Transcription:**

**Compare & Contrast DNA & RNA:**

**DNA RNA**

-Made of Nucleotides

-Use A, C, and G

-Can be seen in the

nucleus

**Creating a Protein:**

**Copy one side of DNA Strand and then transcribe it to RNA. mRNA goes from the nucleus to the cytoplasm and then to the ribosome. mRNA goes through ribosome 3 bases at a time Transfer RNA matches up with the open DNA bases. tRNA releases the amino acid at the top, which joins the chain of amino acids being produced**

**Making A Protein: ATG GTA GCT = UAC \_\_\_\_\_\_ \_\_\_\_\_\_ 🡪Tyrosine, \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_**

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Unit 6 – Biotechnology

Human Genome Project:

The Human Genome project is an international scientific research project with a primary goal of determine the sequence of chemical base pairs which make up human DNA.

It is important since it will help to predict and prevent diseases, to develop new and improved medicines where the diagnosis is accurate.

How Maury uses Gel electrophoresis:

They extract the DNA sample, cut DNA into smaller pieces using restriction enzymes, and put the smaller DNA fragments into the gel tray. Then they use a charge to separate the pieces of DNA the smaller pieces will travel further. Last they will analyze the DNA fragments.

STEM CELLS:

Stem cells are very controversial because in order to get an embryonic stem cell an embryo is destroyed. Stem cells are very useful since they hold the key to replace cells that have been damaged from injury or disease or can no longer generate.

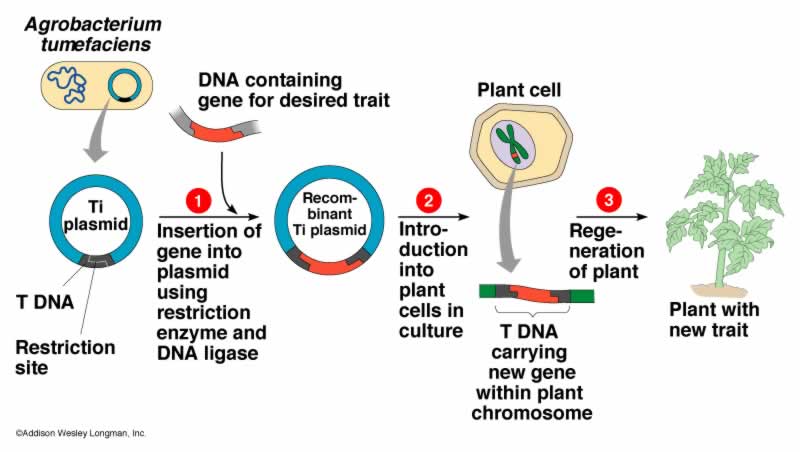
* Inserting bT into corn with genetic engineering can be both helpful and harmful to corn. One of the benefits is being able to manage corn pests but one disadvantage is putting at risks the health of people by injecting toxins into the corn.

CLONING:

Cloning is very controversial and one of the most controversial part of it is practicing human cloning since it will lead to crimes, and most important is considered as to “play with God”

Transgenic Organism: **Explain the diagram below**

Creating a transgenic organism will start by removing the plasmid, cut the bacterial DNA using



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Unit 7 – Mitosis/Meiosis

**Label the 3 parts of the**

**Cell Cycle**

**Mitosis Draw and Label the phases of Mitosis:**

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**Unit 7 – Mitosis and Meiosis**

**Haploid and Diploid Cells**

In Diploid the cell contains two sets of DNA. Most cells in the body are diploid. The diploid number of chromosomes in a human somatic (body) cell is 46.   
Haploid means that the cell contains one set of DNA, half of a diploid cell. The haploid number of chromosomes in a human body cell is 23. A human haploid body cell denotes a sex cell.

Somatic Cells and Gametes

Somatic cells are mostly body cells, they will reproduce using mitosis and will receive the same number of chromosomes (46). Gametes are known as to be the sex cells in which when they reproduce, they will receive 23 chromosomes. The two gametes cells from the parents will come together to fertilization and will create an offspring with a total of 46 chromosomes.

Vocabulary

|  |  |
| --- | --- |
| Crossing over |  |
| Random assortment |  |
| Mutation |  |
| Non – disjunction |  |
| Fertilization |  |

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Unit 8– GENETICS

**Explanting Genetic Diseases**

**Disease Recognized by Symptom**

|  |  |  |
| --- | --- | --- |
| **Down Syndrome** |  | * Distinctive facial features, such as a flat face, small [ears](http://www.webmd.com/brain/picture-of-the-ear), slanting [eyes](http://www.webmd.com/eye-health/picture-of-the-eyes), and a small mouth. |
| **Turners Syndrome** |  | frequent middle ear infections |
| **Hermaphroditism** |  | Ambiguous external genitalia |
| **Klinefelters Syndrome** |  | Enlarged breasts, wide lips. |

**Vocabulary**

|  |  |  |
| --- | --- | --- |
| Genotype |  | TT – Tall, Tt – hybrid tall |
| Phenotype |  | Blue Eyes |
| Heterozygous |  | TT or HH or hh or tt |
| Homozygous |  | Th or Hh |
| Dominant |  | If you have straight hair, you are more likely to have a dominant gene for straight hair |
| Recessive |  | You have a recessive gene for curly hair but you have straight hair |

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**Unit 8 – Genetics**

**Punnet Square Activity**

**Example :**Red and White flowers **Fill in the punnett square for incomplete dominance.**

**R R Conclusion: Genotype: Phenotype:**

**R’**

**R’**

**Example:** Black dogs are crossed with white dogs **Fill in the punnett square for co-dominance.** **Conclusion:**  **Genotype: Phenotype**

**B B**

**W**

**W**

**Example:** Father with normal vision and mother with colorblindness. B –normal, b - colorblind

Parent’s genotypes: **XBY, XbXb**

**Conclusion:** \_\_\_\_\_\_\_\_\_\_% females normal vision, \_\_\_\_\_\_\_\_% males normal vision, \_\_\_\_\_\_\_\_% males resulting in a sex linked inheritance problem.

**XB Y**

**Xb**

**Xb**

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**Unit 8 – Genetics**

**Pedigree**

**Draw and label a pedigree showing an affected male, unaffected female, mating pair, siblings, generations, and carriers.**

**Explain how to tell whether a pedigree is dominant or recessive and sex linked or autosomal.**

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Unit 9– Evolution

**Evolutionary Theories contrast:**

**Label which side is Darwin and which is Lamarck**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Use and disuse Variation

Transmission of acquired characteristics **EVOLUTION** Inheritance

Increasing complexity Different Survival

No extinction Extinction

**Define the following:**

**Four Major evidence of evolution**

|  |  |
| --- | --- |
| **Fossils** |  |
| **Homologous Structures** |  |
| **Embryology** |  |
| **Biochemistry** |  |

**Mechanism of evolution:**

|  |  |
| --- | --- |
| Coevolution |  |
| Geographic Isolation |  |
| Genetic Drift |  |
| Mimicry |  |

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**Unit 9 – Evolution**

**Bacteria evolving to be**

**Antibiotic resistant: Explain it below:**

|  |  |
| --- | --- |
|  | http://www.niaid.nih.gov/SiteCollectionImages/topics/antimicrobialresistance/1whatIsDrugResistance.gif |

**Hierarchy of Classification**

**Binomial Nomenclature**

**Binomial Nomenclature is a classification system, mostly in Latin, in which each species is assigned a two part scientific name. The first part identifies the Genus and the second part identifies the Specie. The Genus is capitalized, and the species is written in all alower case letters. The entire name is either italicized, or underlined.**

**Write the proper scientific name for a human:**

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Unit 10– Ecology

**Innate behavior vs. learned behavior**

Innate means existing in since birth (inborn). Learned refers to acquired from external sources.

**Carrying Capacity**

The total number of organisms in a given species for which there are sufficient resources, so that they survive and reproduce.

**Humans impacting the environment- Give 5 ways**

1.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_2.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_3.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_4.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_5.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Draw and label an example of Mutualism and Parasitism:**

**Draw an Energy Pyramid *Show the 10% rule!* Draw a Food Chain. *Show the trophic levels***

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**Teacher Comments**