Biology I (Mrs. Franklin) Students

Biology I Week of March 23

Answer questions on your own paper. Make sure to number each answer correctly. Write your name, date, and class period in the top right corner of your answer page. You may write as many answers on one page that will fit front and back.

BIO.1A Students will demonstrate an understanding of the characteristics of life and biological organization.

BIO.1A.1 Develop criteria to differentiate between living and non-living things.

1. Develop a spider web to include criteria of living things.

BIO.1A.2 Describe the tenets of cell theory and the contributions of Schwann, Hooke, Schleiden, and Virchow.

2. Make a visual aid to organize the 3 parts of the cell theory along with the man that is given credit for coming up with each part.

3. Write an explanation of Hooke's contribution to the Cell Theory.

BIO.1A.3 Using specific examples, explain how cells can be organized into complex tissues, organs, and organ systems in multicellular organisms.

4. Draw and label the cellular organization of a human from the smallest to the largest organization.

BIO.1A.4 Use evidence from current scientific literature to support whether a virus is living or non-living.

5. State your evidence, as if you are an attorney in a court of law, to prove that "Viruses" are non-living.

BIO.1B Students will analyze the structure and function of the macromolecules that make up cells.

BIO.1B.1 Develop and use models to compare and contrast the structure and function of carbohydrates, lipids, proteins, and nucleic acids (DNA and RNA) in organisms.

6. Construct a data chart to include: Name, structure, element components, function, and examples of the four Macro-Molecules.

BIO.1B.2 Design and conduct an experiment to determine how enzymes react given various environmental conditions (i.e., pH, temperature, and concentration). Analyze, interpret, graph, and present data to explain how those changing conditions affect the enzyme activity and the rate of the reactions that take place in biological organisms.

7. Write an explanation of what enzymes are and why they are so important to life as we know it. Include how pH, temperature, and concentration affects the reactions of enzymes.

BIO.1C Students will relate the diversity of organelles to a variety of specialized cellular functions.

BIO.1C.1 Develop and use models to explore how specialized structures within cells (e.g., nucleus, cytoskeleton, endoplasmic reticulum, ribosomes, Golgi apparatus, lysosomes, mitochondria, chloroplast, centrosomes, and vacuoles) interact to carry out the functions necessary for organism survival.

8. Illustrate a plant cell and an animal cell. Draw organelles, label names, and label functions.

BIO.1C.2 Investigate to compare and contrast prokaryotic cells and eukaryotic cells, and plant, animal, and fungal cells.

9. Compare fungal cells to animal cells. Make a Venn Diagram.

10. Make a T-Chart to show characteristics and examples of Prokaryotic Cells and Eukaryotic Cells.

BIO.1C.3 Contrast the structure of viruses with that of cells, and explain why viruses must use living cells to reproduce.

11. Draw a Bacteriophage and write a comparison to a plant cell.

12. Fully explain, in a narrative, what causes a Virus to have to use living cells to reproduce.

BIO.1D Students will describe the structure of the cell membrane and analyze how the structure is related to its primary function of regulating transport in and out of cells to maintain homeostasis.

BIO.1D.1 Plan and conduct investigations to prove that the cell membrane is a semi-permeable, allowing it to maintain homeostasis with its environment through active and passive transport processes.

13. Illustrate what happens to an egg placed in syrup and an egg placed in water. Draw the flow of water (Osmosis) and explain the affect it has on the egg. This is the experiment we did in class at the start of the year.

1D.2 Develop and use models to explain how the cell deals with imbalances of solute concentration across the cell membrane (i.e., hypertonic, hypotonic, and isotonic conditions, sodium/potassium pump).

14. Section your paper into four (4) equal squares. Label each: hypertonic, hypotonic, isotonic, and sodium potassium pump. Draw an example in each box and write a sentence that explains the importance of each can be to a cell.

BIO.1E Students will develop and use models to explain the role of the cell cycle during growth, development, and maintenance in multicellular organisms.

BIO.1E.1 Construct models to explain how the processes of cell division and cell differentiation produce and maintain complex multicellular organisms.

15. Illustrate and explain Mitosis.

16. Illustrate and explain Meiosis.

17. Illustrate Cell Differentiation and explain why it is so important to maintain complex multicellular organisms.

BIO.1E.2 Identify and describe the changes that occur in a cell during replication. Explore problems that might occur if the cell does not progress through the cycle correctly (cancer).

18. Explain how cancer can possible happen to an individual.

19. Make a T-chart. On the left write possible causes of cancer. On the right write possible ways to prevent cancer.

BIO.1E.3 Relate the processes of cellular reproduction to asexual reproduction in simple organisms (i.e., budding, vegetative propagation, regeneration, binary fission). Explain why the DNA of the daughter cells is the same as the parent cell.

20. Construct a mini-poster on your paper. Illustrate budding, vegetative propagation, regeneration, and binary fission. Explain why the DNA of the daughter cells will be the same as the parent.

Biology I Assignments for Week of March 30 2020

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BIO.2 Students will explain that cells transform energy through the processes of photosynthesis and cellular respiration to drive cellular functions.

BIO.2.1 Use models to demonstrate that ATP and ADP are cycled within a cell as a means to transfer energy.

1. Draw and label an ATP molecule.

2. Illustrate an ATP molecule giving off energy. Explain how ATP can produce energy.

3. Draw and label an ADP molecule. Illustrate how ADP can store energy for future use, explain the transformation and what it will become when new energy source is formed.

BIO.2.2 Develop models of the major reactants and products of photosynthesis to demonstrate the transformation of light energy into stored chemical energy in cells. Emphasize the chemical processes in which bonds are broken and energy is released, and new bonds are formed and energy is stored.

4. Illustrate the process of photosynthesis in a real life situation. Label all the parts. Write the chemical formula for Photosynthesis at the bottom of the page.

5. Explain what happens when new bonds are formed.

BIO.2.3 Develop models of the major reactants and products of cellular respiration (aerobic and anaerobic) to demonstrate the transformation of the chemical energy stored in food to the available energy of ATP. Emphasize the chemical processes in which bonds are broken and energy is released, and new bonds are formed and energy is stored.

6. Draw and label a model of cellular respiration.

7. Explain the difference between aerobic and anaerobic respiration. What is the reason we need both?

8. Describe how chemical energy is stored in food.

BIO.2.4 Conduct scientific investigations or computer simulations to compare aerobic and anaerobic cellular respiration in plants and animals, using real world examples.

9. What is produced when plants experience anaerobic respiration?

10. Explain how humans can experience anaerobic respiration and what kind of feeling it can produce.

Biology I Assignments for Week of April 6 2020 Name: _____ Date: _____ Period: _____

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Biology Standard 3

BIO.3A.1 Model sex cell formation (meiosis) and combination (fertilization) to demonstrate the maintenance of chromosome number through each generation in sexually reproducing populations. Explain why the DNA of the daughter cells is different from the DNA of the parent cell.

1. Draw a Model of Meiosis and label each part.

2. Illustrate what happens at fertilization. (Zygote)

3. Draw and color "Crossing Over" when 2 non-sister chromatids cross over and share DNA.

4. Explain what Crossing-Over ensures in terms of reproduction.

BIO.3A.2 Compare and contrast mitosis and meiosis in terms of reproduction.

5. Make a Venn-Diagram to compare/contrast Mitosis and Meiosis.

BIO.3A.3 Investigate chromosomal abnormalities (e.g., Down syndrome, Turner's syndrome, and Klinefelter syndrome) that might arise from errors in meiosis (nondisjunction) and how these abnormalities are identified (karyotypes).

6. Identify the following key terms: a. chromosomal abnormalities, b. Down Syndrome, c. Turner's syndrome, d. Klinefelter syndrome, e. meiosis, f. nondisjunction, g. karyotype

7. Draw karyotypes for the following; Down Syndrome girl,, Turner's syndrome, and klinefelter syndrome.

8. Draw and label the chromosome pair to show sex of a girl.

9. Draw and label the chromosome pair to show sex of a boy.

10. How many pairs of chromosomes do humans have?

11. How many chromosomes do humans have?

12. Explain how you can identify a species by only looking at DNA.

BIO.3B.1 Demonstrate Mendel's law of dominance and segregation using mathematics to predict phenotypic and genotypic ratios by constructing Punnett squares with both homozygous and heterozygous allele pairs.

13. Identify the following terms: a. Mendel's Law of Dominance, b. Mendel's Law of Segregation, c. phenotype, d. genotype, e. ratio, f. Punnett Square, g. homozygous, h. heterozygous, i. allele

14. Illustrate a Punnett Square made from crossing a heterozygous Dominant allele with a homozygous recessive allele. Give percentages for offspring being homozygous Dominant, homozygous Reccessive, heterozygous dominant, and/or heterozygous recessive.

BIO.3B.2 Illustrate Mendel's law of independent assortment using Punnett squares and/or the product rule of probability to analyze monohybrid crosses.

15.Draw and Analyze a monohybrid cross between a Homozygous Dominant Allele and a Homozygous Recessive Allele.

BIO.3B.3 Investigate traits that follow non-Mendelian inheritance patterns (e.g., incomplete dominance, codominance, multiple alleles in human blood types, and sex-linkage).

16. Illustrate incomplete dominance.

17. Illustrate co-dominance in a cross between a red flower and a white flower.

18. Make a data chart showing human blood types. Label and explain.

19. Explain sex-linkage:

BIO.3B.4 Analyze and interpret data (e.g., pedigrees, family, and population studies) regarding Mendelian and complex genetic traits (e.g., sickle-cell anemia, cystic fibrosis, muscular dystrophy, color-blindness, and hemophilia) to determine patterns of inheritance and disease risk.

20. Draw and label how to read a pedigree.

21. Illustrate and label a pedigree showing color-blindness in 3 generations.

BIO.3C.1 Develop and use models to explain the relationship between DNA, genes, and chromosomes in coding the instructions for the traits transferred from parent to offspring.

22. Draw a model showing DNA all the way through to the protein.

23. Illustrate Central Dogma.

24. Write an explanation of how proteins are made in cells.

25. Write basic instructions explaining how to read a mRNA chart.

26. Explain what make up proteins and how they are made.

BIO.3C.2 Evaluate the mechanisms of transcription and translation in protein synthesis.

27. Illustrate and label the steps in Protein Synthesis (DNA->DNA, DNA->RNA, RNA->Protein)

28. List the types of RNA and explain each role in Protein Synthesis.

BIO.3C.3 Use models to predict how various changes in the nucleotide sequence (e.g., point mutations, deletions, and additions) will affect the resulting protein product and the subsequent inherited trait.

29. Illustrate a normal Nucleotide sequence, point mutation, deletion, and additions. These will affect the resulting protein product and the subsequent inherited trait. Explain how each will affect inherited traits.

BIO.3C.4 Research and identify how DNA technology benefits society. Engage in scientific argument from evidence over the ethical issues surrounding the use of DNA technology (e.g., cloning, transgenic organisms, stem cell research, and the Human Genome Project, gel electrophoresis).

30. Write an argument that supports the use of one specific DNA technology. Make sure you name the one you select to write evidence to argue the value of the technology.

31. Identify the following terms: a. cloning, b. transgenic organism, c. stem cell research, d. Human Genome Project, and e. gel electrophoresis.

32. BIO.3C.5 Enrichment: Investigate current biotechnological applications in the study of the genome (e.g., transcriptome, proteome, individualized sequencing, and individualized gene therapy)

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BIO.4 Students will analyze and interpret evidence to explain the unity and diversity of life.

BIO.4.1 Use models to differentiate between organic and chemical evolution, illustrating the steps leading to aerobic heterotrophs and photosynthetic autotrophs.

1. Illustrate chemical evolution: Urey and Miller Experiment

2. Illustrate organic evolution: Endosymbiosis Theory (Use what you know about mitochondria and chloroplast for your evidence to support the theory.)

BIO.4.2 Evaluate empirical evidence of common ancestry and biological evolution, including comparative anatomy (e.g., homologous structures and embryological similarities), fossil record, molecular/biochemical similarities (e.g., gene and protein homology), and biogeographic distribution.

3. Explain how each of the following is used as evidence to prove common ancestry: a. comparative anatomy, b. homologous structures, c. embryological similarities, d. fossil record, e. molecular similarities, and f. biogeographic distribution.

BIO.4.3 Construct cladograms/phylogenetic trees to illustrate relatedness between species.

4. Draw a model of a cladogram and explain how to read it.

BIO.4.4 Design models and use simulations to investigate the interaction between changing environments and genetic variation in natural selection leading to adaptations in populations and differential success of populations.

5. Explain impact of interaction between changing environments and genetic variation in natural selection leading to adaptations in populations and differential success of populations.

BIO.4.5 Use Darwin's Theory to explain how genetic variation, competition, overproduction, and unequal reproductive success acts as driving forces of natural selection and evolution.

6. Write an explanation, using Darwin's Theory to explain how genetic variation, competition, overproduction and unequal reproductive success acts as driving forces of natural selection and evolution.

BIO.4.6 Construct explanations for the mechanisms of speciation (e.g., geographic and reproductive isolation).

7. List and explain mechanisms of speciation:

8. BIO.4.7 Enrichment: Construct explanations for how various disease agents (bacteria, viruses, chemicals) can influence natural selection.

BIO.5 Students will Investigate and evaluate the interdependence of living organisms and their environment.

BIO.5.1 Illustrate levels of ecological hierarchy, including organism, population, community, ecosystem, biome, and biosphere.

9. Illustrate and label levels of ecological hierarchy from smallest to largest.

BIO.5.2 Analyze models of the cycling of matter (e.g., carbon, nitrogen, phosphorus, and water) between abiotic and biotic factors in an ecosystem and evaluate the ability of these cycles to maintain the health and sustainability of the ecosystem.

10. Describe the difference between abiotic and biotic factors in an ecosystem.

11. Illustrate and label the carbon cycle. Why is the carbon cycle so important to you?

12. Illustrate and label the nitrogen cycle. Why is the nitrogen cycle so important to you?

13. Illustrate and label the phosphorous cycle. Why is the phosphorous cycle so important to you?

14. Illustrate and label the water cycle. Why is the water cycle so important to you?

BIO.5.3 Analyze and interpret quantitative data to construct an explanation for the effects of greenhouse gases on the carbon dioxide cycle and global climate.

15. Explain the effects of greenhouse gases on global climate.

BIO.5.4 Develop and use models to describe the flow of energy and amount of biomass through food chains, food webs, and food pyramids.

16. Draw a food chain and label each part.

17. Compare and Contrast food chains and food webs. What is the major differences and similiarities?

18. Illustrate an energy/food pyramid and label each level.

19. Explain why the energy/food pyramid goes to a point in a short distance.

20. Write your interpretation of the "Rule of 10" in an energy pyramid.

BIO.5.5 Evaluate symbiotic relationships (e.g., mutualism, parasitism, and commensalism) and other co-evolutionary (e.g., predator-prey, cooperation, competition, and mimicry) relationships within specific environments.

21. Write explanations for each relationship with examples: a. mutualism, b. parasitism, c. commensalism, d. predator-prey, e. cooperation, f. competition, and e. mimicry

BIO.5.6 Analyze and interpret population data, both density-dependent and density-independent, to define limiting factors. Use graphical representations (growth curves) to illustrate the carrying capacity within ecosystems.

22. Explain the difference between density-dependent and density-independent to define limiting factors. Give examples.

23. Construct a graph to represent a fictional carrying capacity of Delta National Forest. Justify it by your explanation.

BIO.5.7 Investigate and evaluate factors involved in primary and secondary ecological succession using local, real world examples.

24. Draw a primary ecological succession and identify how it starts.

25. Draw a secondary ecological succession and identify how it starts.

26. Explain what a climax ecosystem consist of in the Mississippi Delta region.

27. BIO.5.8 Enrichment: Use an engineering design process to create a solution that addresses changing ecological conditions (e.g., climate change, invasive species, loss of biodiversity, human population growth, habitat destruction, bio-magnification, or natural phenomena).*

28. BIO.5.9 Enrichment: Use an engineering design process to investigate and model current technological uses of biomimicry to address solutions to real-world problems.*

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