Supplemental Instruction – Biology 2300

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Session 2: DNA

1. DNA and RNA are composed of monomers (building blocks) called _____.

    a. What are the three components of DNA/RNA? Draw them.

    b. the phosphate backbone is said to be _____ charged.

2. What nitrogenous bases are present in DNA and RNA?

    a. There are two different classifications for nitrogenous bases, they can be _____ or _____.

b. List the classification of each nitrogenous base.

c. What are the base pairing rules for DNA and RNA?

3. Polynucleotides are linked from phosphate to sugar by _____ in a _____ direction.

4. A DNA molecule is composed of two _____ polynucleotide chains and are held together by _____ between base pairs.

5. A pairs with T, forming _____ hydrogen bonds, G pairs with C, forming _____ hydrogen bonds.

6. Define the following terms:

    a. Chromosome

    b. Gene

    c. Genome

7. True or False: Two closely related species can have similar genome sizes but a different number of chromosomes.

8. What is the genetic code?

9. What is intergenic DNA

10. The two strands of a DNA helix can by separated by heating. Rank the DNA sequences by their melting points (high to low).

    a. 5’-GCGGGCCAGCCCGAGTGGGTAGCCCAGG-3’

       3’-CGCCCGGTCGGGCTCACCCATCGGGTCC-5’

    b. 5’-ATTATAAAATATTTAGATACTATATTTACAA-3’

       3’-TAATATTTTATAAATCTATGATATAAATGTT-5’

    c. 5’-AGAGCTAGATCGAT-3’

       3’-TCTCGATCTAGCTA-5’

11. Show the direction of replication. Write out the complementary sequence. Transcribed to RNA?

    a. 3’-CGATCCCTCATGCATGCTTT-5’

12. Define the following terms:

    a. Chromatin

b. Histone

c. Nucleosome

13. A nucleosome contains DNA wrapped around a protein core of 8 histone molecules there are _____ of each: _____, _____, _____, _____

    a. Are the amino acids of histones positively or negatively charged?

14. What is the function of an H1 histone?

    a. Is it likely to be modified during chromatin remodeling? Why?