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

BIO300/CMPSC300

Lab 2: Part 1

DNA: The Molecule Worksheet

Fall 2017

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| **DNA Structure** |  |

1. A nucleotide is made of three parts: a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ group, a five carbon

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ base.

1. In a single strand of DNA, the phosphate group binds to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the next nucleotide.
2. The DNA of any species contains equal amounts of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and also equal amounts of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. In DNA, thymine is complementary to (or pairs with) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ; cytosine is complementary to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. In a strand of DNA, if the percentage of thymine is 30%, what would the percentage of cytosine in the same DNA strand be? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. James Watson and Francis Crick with, the help of Rosalind Franklin and others, determined

that the shape of the DNA molecule was a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. A two-ring purine always pairs with a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ -ring \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. What type of bonds connect the deoxyribose sugars to the phosphate groups?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What type of bonds connect the bases to each other? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**DNA Replication**

1. Number the steps of DNA replication in the correct order (1, 2, 3):

\_\_\_\_\_ Daughter strands are formed using complementary base pairing.

\_\_\_\_\_ DNA unwinds

\_\_\_\_\_ The DNA of the daughter strands winds with together with its parent strand.

1. Why is DNA replication called “semi-conservative”?
2. What enzyme unwinds or unzips the parent strand? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What enzyme connects joins the new nucleotides during the synthesis of the daughter strand?

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

1. Show the complimentary base pairing that would occur in the replication of the short DNA molecule below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Original DNA Strand 1 | Original DNA Strand 2 |  | Original DNA Strand 1 | New DNA Strand |  | New DNA Strand | Original DNA Strand 2 |
| A | T |  |  |  | **+** |  |  |
| C | G |  |  |  | **+** |  |  |
| T | A |  |  |  | **+** |  |  |
| T | A |  |  |  | **+** |  |  |
| A | T |  |  |  | **+** |  |  |
| C | G |  |  |  | **+** |  |  |
| G | C |  |  |  | **+** |  |  |
| C | G |  |  |  | **+** |  |  |
| C | G |  |  |  | **+** |  |  |
| G | C |  |  |  | **+** |  |  |
| A | T |  |  |  | **+** |  |  |
| T | A |  |  |  | **+** |  |  |