Nucleic Acid Builder

Name: _____ **Period:** _____ **Date:** _____

> Open **peebedu.com** and navigate to **Nucleic Acid Builder**. Click the **Start Learning** button to begin. The simulation contains 7 progressive missions that guide you through building nucleotides, applying base pairing rules, comparing DNA and RNA, and exploring genome organization.

Free Response Questions

Question 1 — Conceptual Analysis

> **Simulation Task:** *Open Mission 3 (The Base Pairing Rules) using the Select Mission button. A template DNA strand is displayed with four bases reading 5' to 3'. Select bases from the toolbox and place each one into the correct complementary position on the opposite strand. Click the Check button to verify your answers.*

(A) (1 pt) **Describe** the rules that determine how nitrogenous bases pair between the two strands of a DNA molecule.

(B) (1 pt) **Explain** why the sequence of bases on one strand of DNA can be used to determine the sequence of bases on the opposite strand.

(C) (1 pt) **Predict** how a change in one base of the template strand would affect the base that must be placed opposite it on the complementary strand.

(D) (1 pt) **Justify** your prediction.

Question 2 — Analyze Model / Visual Representation

Simulation Task: *Open Mission 4 (DNA vs RNA) using the Select Mission button. Build a complete DNA nucleotide on the left side by placing a phosphate, deoxyribose, and thymine. Then build a complete RNA nucleotide on the right side by placing a phosphate, ribose, and uracil. Click the Check button and read the comparison information.*

(A) (1 pt) **Describe** the structural differences between a DNA nucleotide and an RNA nucleotide.

(B) (1 pt) **Explain** why a nucleotide built with uracil belongs in an RNA strand rather than in a DNA strand.

(C) (1 pt) **Represent** a complete RNA nucleotide showing its three structural components.

Draw your diagram here.

(D) (1 pt) **Explain** why an organism must obtain phosphorus and nitrogen from its environment in order to build nucleotides.

1.6.A.4