

Name: _____ Period: _____ Date: _____

Open [peebedu.com](https://www.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 multiple base pairing errors in a DNA molecule would affect the proteins produced during gene expression.

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

Question 2 — Analyze Model / Visual Representation

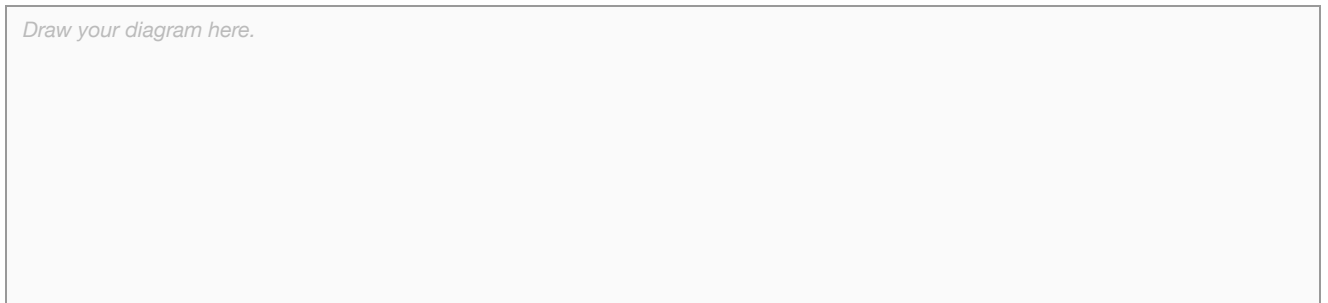
Simulation Task: Open Mission 4 (DNA vs RNA) using the Select Mission button. Build a complete DNA nucleotide on the left side by placing a phosphate, deoxyribose, and thymine. Then build a complete RNA nucleotide on the right side by placing a phosphate, ribose, and uracil. Click the Check button and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

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

(B) (1 pt) **Explain** why DNA is able to preserve genetic information across many generations of cell division while RNA molecules are typically short-lived in the cell.

(C) (1 pt) **Represent** the structural differences between DNA and RNA at the nucleotide level.

Draw your diagram here.



(D) (1 pt) **Explain** why a cell requires two structurally different nucleic acids rather than using a single type for both information storage and protein synthesis.

1.6.A.4