ANSWER KEY.

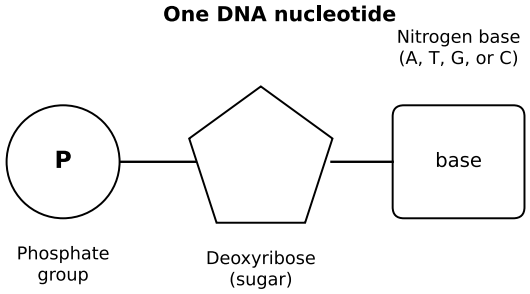
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Nucleotides and Base Pairing

Biology | ANSWER KEY

Directions: Answer each question in the space provided. Show your work for every calculation. For Claim, Evidence, Reasoning (CER) questions, write all three parts.

1. Label the parts of the DNA nucleotide.



A: _____ B: _____ C: _____

A = phosphate group, B = deoxyribose (sugar), C = nitrogen base.

2. Complete the table.

Base	Purine or pyrimidine?	Pairs with	Hydrogen bonds in the pair
Adenine (A)			
Thymine (T)			
Guanine (G)			
Cytosine (C)			

A: purine, T, 2. T: pyrimidine, A, 2. G: purine, C, 3. C: pyrimidine, G, 3.

3. Write the complementary DNA strand for GCATTACGGT.

CGTAATGCCA

4. A sample of double-stranded DNA is 31% thymine. Find the percent of A, G, and C. Show your work.

A = 31% (A pairs with T). A + T = 62%. G + C = 100 - 62 = 38%. G = C = 19%.

Answer: A 31%, G 19%, C 19%.

5. A DNA segment is 24 base pairs long and 9 of the pairs are G-C. How many hydrogen bonds hold the two strands together? Show your work.

A-T pairs = 24 - 9 = 15. Bonds = (15 x 2) + (9 x 3) = 30 + 27 = 57.

Answer: 57 hydrogen bonds.

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6. Why can A not pair with G? Use the sizes of the bases in your answer.

A and G are both large double-ring bases. Two large bases are too wide to fit between the backbones, and the pair would not have the same width as the others. A large base always pairs with a small base (A with T, G with C).

7. Each pair of strands is written base for base. Circle the pair that is NOT complementary and write the correct bottom strand.

a. CGTA / GCAT b. TTAG / AATC c. ACCG / TGGA

Pair c is wrong: G must pair with C. The correct bottom strand is TGGC.

8. Compare how DNA is packaged in a prokaryotic cell and in a eukaryotic cell. Give two differences.

Prokaryote: usually one circular chromosome, in the cytoplasm (no nucleus). Eukaryote: several linear chromosomes inside a nucleus, with the DNA wrapped around histone proteins.

9. A typical human cell has roughly 2 meters of DNA inside a nucleus about 10 micrometers wide. Explain how the DNA fits.

The DNA is wrapped around histone proteins, and the wrapped DNA coils again into compact chromosomes. This packs a very long molecule into a small space.

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