A1.2 Nucleic acids (HL)

What the Cell · DP Biology · worksheet · HL statements A1.2.11–15

Name _____ **Date** _____ **Total** _____ / 40

About 40 minutes, or one section at a time. The number of marks shows how many separate points to make.

Section A: Recall

9 marks

1 **State** the type of bond that links nucleotides in a strand, and the two carbon atoms it joins. A1.2.11 **[2]**

2 **Name** the two purine bases in DNA. A1.2.12 **[1]**

3 **State** the number of histone proteins in the core of a nucleosome. A1.2.13 **[1]**

4 **State** why radioactive sulfur labels protein but not DNA. A1.2.14 **[1]**

5 **State** two of Chargaff's findings about the bases in DNA. A1.2.15 **[2]**

6 **Distinguish** between the template strand and the coding strand of a gene. A1.2.11 **[2]**

Section B: Understanding

15 marks

7 **Explain** why the antiparallel arrangement of DNA strands affects how they are replicated. A1.2.11 **[3]**

8 **Explain** why pairing a purine with a pyrimidine gives DNA a regular, stable structure. A1.2.12 **[3]**

9 **Explain** how histone proteins hold on to DNA. A1.2.13 [2]

10 **Outline** two benefits of packing DNA into nucleosomes. A1.2.13 [2]

11 **Explain** why many scientists in the 1940s expected protein to be the genetic material. A1.2.14 [2]

12 **Explain** how Chargaff's data falsified the tetranucleotide hypothesis. A1.2.15 [3]

Section C: Working with evidence

10 marks

All data in this section are invented for practice. The patterns are realistic.

13 A1.2.14

Bacteria infected with labelled phages were shaken in a blender for different times, then centrifuged. The percentage of each label found in the liquid (outside the cells) was measured. The percentage of bacteria still alive was also recorded.

Blending time / min	0	1	2	4	8
^{35}S in liquid / %	15	55	72	80	81
^{32}P in liquid / %	10	18	20	21	21
Bacteria alive / %	100	100	99	98	97

a **Describe** the effect of blending time on the ^{35}S found in the liquid. **[2]**

b **Compare** the results for ^{35}S and ^{32}P after 8 minutes. **[2]**

c **Suggest** why about a fifth of the ^{32}P stayed in the liquid. **[2]**

d **Explain** why blending was needed, and why blending for longer than 4 minutes gave little benefit. **[2]**

e **Suggest** why the number of bacteria still alive was measured. **[2]**

Section D: Longer answer

6 marks

14 **Discuss** the evidence from Hershey and Chase, and from Chargaff, about the nature of the genetic material. A1.2.14, A1.2.15 **[6]**