D1.3 Mutation

What the Cell · DP Biology · worksheet · SL statements D1.3.1–7

Name _____ **Date** _____ **Total** _____ / 36

About 35 minutes, or one section at a time. You will need a table of mRNA codons. The number of marks shows how many separate points to make.

Section A: Recall

7 marks

1 **Define** gene mutation. D1.3.1 **[1]**

2 **State** three types of gene mutation. D1.3.1 **[1]**

3 **State** the type of mutation that occurs in the HTT gene. D1.3.3 **[1]**

4 **List** two chemical mutagens and two forms of mutagenic radiation. D1.3.4 **[2]**

5 **State** two causes of gene mutation other than mutagens. D1.3.4 **[2]**

Section B: Understanding

13 marks

6 **Explain** what is meant by a single-nucleotide polymorphism, and how one arises. D1.3.2 **[2]**

7 **Explain** how the delta 32 mutation gives resistance to HIV. D1.3.3 **[3]**

8 **Explain** what is meant by the randomness of mutation. D1.3.5 **[3]**

9 **Compare and contrast** mutations in germ cells and in somatic cells. D1.3.6 **[3]**

Germ cells	Somatic cells

10 **Explain** why meiosis cannot be the original source of new alleles. D1.3.7 **[2]**

Section C: Working with sequences and data

10 marks

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

11 D1.3.2, D1.3.3

A section of mRNA reads: A U G C C U G A A U G G

a **Deduce** the amino acid sequence. **[1]**

b The second codon changes to C C C. **Deduce** the effect, giving a reason. **[2]**

c The third codon changes to U A A. **Deduce** the effect. **[1]**

d The first C in the second codon is deleted. **Write** the new codons, and **deduce** the amino acid sequence. **[2]**

12 D1.3.4, D1.3.5

Barley seeds were given different doses of X-rays and then grown. The percentage of seedlings with visible changes was recorded.

X-ray dose / arbitrary units	0	10	20	40
Seedlings with changes / %	0.1	2.4	4.6	9.0

a **Describe** the relationship. **[1]**

b **Suggest** why some changes appeared at a dose of 0. **[1]**

c **Explain** why a researcher could not predict which gene would change in a given seed. **[2]**

Section D: Longer answer

6 marks

13 **Explain** the consequences of gene mutations, both for the individual and for a species. D1.3.2–7 **[6]**