A3.1 Diversity of organisms

What the Cell · DP Biology · worksheet · SL statements A3.1.1–11

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

8 marks

1 **State** what each part of a binomial name shows. A3.1.3 **[2]**

2 **State** the biological species concept. A3.1.4 **[1]**

3 **State** the diploid chromosome number of humans and of chimpanzees. A3.1.6 **[1]**

4 **Define** genome. A3.1.8 **[1]**

5 **List** three features used to arrange chromosomes in a karyogram. A3.1.7 **[3]**

Section B: Understanding

13 marks

6 **Explain** why a horse and a zebra are classed as separate species, even though they can produce offspring. A3.1.4 **[2]**

7 **Outline** two difficulties in applying the biological species concept. A3.1.4 **[2]**

8 **Explain** why it can be difficult to tell populations from species during speciation. A3.1.5 **[3]**

9 **Compare and contrast** genome variation within a species and between species. A3.1.8, A3.1.9 **[3]**

10 **Outline** how sequencing is used now, and how it may be used in future. A3.1.11 **[3]**

Section C: Working with data

13 marks

The values in question 11 are approximate published figures, for practice.

11 A3.1.10

Organism	Genome size / million base pairs
E. coli	5
Fruit fly	140
Human	3100
Lungfish	130000

a **Calculate** how many times larger the human genome is than the fruit fly genome. **[1]**

b **Discuss** whether genome size is linked to the complexity of an organism. **[3]**

c **Suggest** why a large genome may not contain many more genes. **[1]**

12 A3.1.7

A student studies a karyogram from a human cell. Chromosomes are in 22 numbered pairs, plus one X and one Y chromosome. There are three copies of chromosome 21.

a **Deduce** the sex of the individual, giving a reason. **[1]**

b **Calculate** the total number of chromosomes in this cell. **[1]**

c **Evaluate** the use of length alone to identify chromosomes. **[2]**

13 A3.1.7

Human chromosome 2 has telomere sequences near its middle, a second inactive centromere, and a banding pattern matching two chimpanzee chromosomes.

a **Explain** how this supports the hypothesis of a chromosome fusion. **[3]**

b **Explain** why it is incorrect to say that humans evolved from chimpanzees. **[1]**

Section D: Longer answer

6 marks

14 **Discuss** the different ways of defining a species, and why no single definition works for every organism. A3.1.2, A3.1.4, A3.1.5 **[6]**