B2.3 Cell specialization

What the Cell · DP Biology · worksheet · SL statements B2.3.1–6

Name _____ **Date** _____ **Total** _____ / 32

About 30 minutes, or one section at a time. You will need a calculator. The number of marks shows how many separate points to make.

Section A: Recall

6 marks

1 **State** two properties of stem cells. B2.3.2 **[2]**

2 **State** two locations of stem cell niches in the adult body. B2.3.3 **[2]**

3 **Define** totipotent and multipotent. B2.3.4 **[2]**

Section B: Understanding

12 marks

4 **Explain** how cells in one embryo can differentiate differently despite having the same genes. B2.3.1 **[3]**

5 **Outline** the role of a stem cell niche. B2.3.3 **[2]**

6 **Explain** how the sizes of a red blood cell and an egg suit their roles. B2.3.5 **[3]**

7 **Explain** why a low surface area-to-volume ratio limits cell size. B2.3.6 **[4]**

Section C: Working with data

9 marks

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

8 B2.3.6

Agar cubes containing a pH indicator were placed in dilute acid. The time taken for each to change colour completely was recorded.

Side of cube / mm	5	10	20
Surface area / mm^2	150	600	2400
Volume / mm^3	125	1000	8000
Time to change / s	120	410	1500

a **Calculate** the surface area-to-volume ratio of each cube. **[3]**

b **Describe** the relationship between ratio and time. **[1]**

c **Explain** this relationship. **[2]**

d **State** two variables that should be kept constant. **[2]**

e **Suggest** one way in which this model differs from a real cell. **[1]**

Section D: Longer answer

5 marks

9 **Outline** how potency changes from a zygote to adult tissue, with examples. B2.3.1, B2.3.4 **[5]**