

Growth, differentiation and stem cells: practice questions

7 questions • 20 marks • mark scheme at the back

For Edexcel GCSE Biology 1BI0 and Combined Science 1SC0. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

Name

Total / 20

- 1** Name the three processes involved in the growth of a plant. [3 marks]

- 2** Explain why cell differentiation is important in the development of an organism. [2 marks]

- 3** The table shows the mass of girls aged 12 months on some percentile lines. A girl's mass was on the 50th percentile at 6 months old. At 12 months old her mass is 7.0 kg. Use the table to suggest why a doctor would want to check her growth. [2 marks]

Mass of girls aged 12 months (practice data)

Percentile	2nd	25th	50th	75th	98th
Mass in kg	7.0	8.2	8.9	9.7	11.3

- 4** A baby has a mass of 3.5 kg at birth. At 6 weeks old the baby's mass is 4.2 kg. Calculate the percentage gain in mass. **[2 marks]**

Answer =

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- 5** Many newborn babies lose some mass in the first few days. A baby had a mass of 3.5 kg at birth and 3.22 kg at 5 days old. Calculate the percentage loss in mass. **[2 marks]**

Answer =

[illegible]

- 6** Describe the function of embryonic stem cells, stem cells in adult animals and meristems in plants. **[3 marks]**

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- 7** Discuss the potential benefits and risks associated with the use of stem cells in medicine. [6 marks]

[illegible]

Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [3]

- cell division (1)
- elongation (1)
- differentiation (1)

2. [2]

- cells become specialised / gain structures for a particular job (1)
- so different cells can carry out different functions / the organism can have different tissues and organs (1)

3. [2]

- she has moved from the 50th percentile to the 2nd percentile (1) allow she has dropped down across the percentile lines
- a large change in percentile may show she is not growing properly / has a health problem (1)

4. [2]

- change in mass = $4.2 - 3.5 = 0.7$ kg and $0.7 \div 3.5 \times 100$ (1)
- 20% (1) correct answer with no working scores 2

5. [2]

- change in mass = $3.5 - 3.22 = 0.28$ kg and $0.28 \div 3.5 \times 100$ (1)
- 8% (1) correct answer with no working scores 2; do not accept 8.7% (divided by final mass)

6. [3]

- embryonic stem cells can differentiate into any type of cell / produce all the specialised cells of the developing embryo (1)
- stem cells in adult animals can differentiate into a limited range of cell types to replace damaged or worn-out cells, such as blood cells from bone marrow (1)
- meristems produce cells that can differentiate into any type of plant cell, allowing the plant to keep growing (1) allow found at tips of roots and shoots for growth

7. [6]

Level 3 5-6	Gives a balanced discussion with several benefits and several risks, which are explained, and may include a reasoned conclusion. Scientific terms are used accurately.
Level 2 3-4	Gives at least one benefit and one risk, with some explanation. The discussion may be one-sided or lack detail.
Level 1 1-2	States one or two simple points about benefits or risks, with little or no explanation.

Indicative content

- benefits: could treat conditions such as diabetes or paralysis
- benefits: could replace damaged or diseased cells with healthy cells
- benefits: new tissues could be grown for transplants
- risks: stem cells may divide out of control and form a tumour
- risks: viruses in donated stem cells could be passed to the patient
- risks: the immune system may reject cells from another person
- ethical or religious objections to using embryos
- a conclusion that weighs the benefits against the risks