

Mark Scheme

Combined Science GCSE

Ecosystems and Material Cycle Test

(Levels 4-9)

	Answer	Marks
1. (a)	accept any correct food chain identified from the food web, for example: algae > cod > leopard seal > killer whale algae > krill > crabeater seal > killer whale (All webs should have algae at the start and killer whale at the end.) arrows in the correct direction.	(1) (1)
1. (b)	Interacting organisms and their environment.	(1)
1. (c)	competition (for food) population of cod will decrease	(1) (1)
1. (d)	parasitism	(1)

(Total for Question 1 = 8 marks)

	Answer	Marks
2. (a)	Place the quadrats randomly in different sample areas.	(1)
2. (b)	Use of equation (total of samples taken ÷ number of samples taken) $128 \div 10$ 12.8 Award 2 marks for correct answer.	(2)
2. (c)	Award 1 mark for correct calculation of area Award 1 mark for correct use of equation Award full marks for correct answer Area of field $(80 \times 30) + (40 \times 30)$ Or $(110 \times 40) - (80 \times 10)$ $= 3600 \text{ (m}^2\text{)}$ 13.1×3600 $= 47160 \text{ (daisies)}$	(3)

(Total for Question 2 = 6 marks)

	Answer	Marks
3. (a)	Decreasing over time	(1)
3. (b)	fish are caught at a faster rate than they are reproducing size and number of boats fishing for cod has increased	(1) (1)
3. (c)	Award 1 mark for an advantage and 1 mark for a disadvantage. Advantages from: • predate on native pest species • increases biodiversity Disadvantages from: • no natural predators • competition to other (native) species	(2)
3. (d)	Award max 2 marks for advantages and 2 marks for disadvantages. A balanced answer is required for full marks. Advantages from: • control of water quality • lack of predation • lack of competition (from other species) • regular feeding for rapid growth Disadvantages from: • increased risk of disease • use of chemicals to control disease and pests • eutrophication in surrounding areas from removal of unclean water • fish food is made from other fish which are likely taken from the wild, damaging wild fish stocks	(4)
3. (e)	Only award full marks if answer is logical and coherent • fertilisers are washed into rivers/lakes by rainwater • increased levels of nitrate/phosphate (minerals) in the water • increased growth of algae, forming an algal bloom (on the surface) • sunlight is blocked to lower aquatic plants, therefore unable to photosynthesise • plants die and are decomposed by bacteria • increased bacteria are respiring and using up oxygen/O₂ • low levels of oxygen/O₂, so aquatic animals die	(5)

(Total for Question 3 = 14 marks)

	Answer	Marks
4. (a)	• carbon exists as carbon dioxide in atmosphere • removed by photosynthesising plants • converted to glucose/biomass in plants • consumed by other another organisms/animals • glucose broken down to release carbon as carbon dioxide in respiring plants and animals • carbon stored in fossil fuels (from dead organisms) • carbon dioxide released when burning/combustion of fossil fuels	(5)

(Total for Question 4 = 5 marks)

	Answer	Marks
5. (a)	condensation	(1)
5. (b)	evaporation	(1)
5. (c)	drinking water/safe for consumption	(1)
5. (d)	acts as a solvent within cells chemical reactions occur within the water (in cells)	(2)
5. (e)	• distillation • boiled • condensed Answers should be given in this order	(3)
5. (f)	It increases the use of fossil fuels. It increases CO ₂ emissions which contribute to global warming.	(2)
5. (g)	Points must be linked • test boiling point – pure water boils at 100°C Or • evaporate it – pure water leaves no solid residues in the dish after	(2)

(Total for Question 5 = 12 marks)

	Answer	Marks
6. (a)	78%	(1)
6. (b)	proteins/amino acids	(1)
6. (c)		(3)
6. (d)	decompose dead organisms (into ammonia) decompose urea/egested material (into ammonia)	(2)

(Total for Question 6 = 7 marks)