Core questions – Unit 7 Biology - Ecology

No.	Question	Answer
1	What is a habitat?	The place where an organism lives
2	What is a 'population'?	All the organisms of one species living in a habitat
3	What is a 'community?	The populations of different species living in a habitat
4	What is an 'abiotic factor'?	A non-living factor of the environment
5	What are examples of abiotic factors?	Light intensity; temperature; moisture levels; soil pH; soil mineral content; wind intensity; carbon dioxide levels for plants; oxygen levels for aquatic animals
6	What is a 'biotic factor'?	Living factors of the environment
7	What are examples of biotic factors?	Availability of food; new predators; new pathogens; one species outcompeting another
8	What is an 'ecosystem'?	The interaction of a community of living organisms (biotic) with the non-living (abiotic) parts of their environment
9	What is 'interdependence'?	Each species depends on other species for things such as food, shelter, pollination and seed dispersal
10	What is a 'stable community'?	Where all the species and environmental factors are in balance so that population sizes remain fairly constant
11	What is 'competition'?	Where organisms compete with their own species or other species for the same resources
12	What do plants 'compete' for?	Light, space, water, mineral ions
13	What do animals 'compete' for?	Space, food, water, mates
14	What is an 'adaptation'?	Features or characteristics of an organism that allow them to survive in the conditions in which they normally live
15	What is a 'structural' adaptation?	Features of an animals body structure
16	What are examples of 'structural' adaptations?	White fur for camouflage; thick layer of fat to retain heat; large surface area to volume ratio
17	What is a 'behavioural' adaptation?	Ways in which animals behave
18	What is an example of 'behavioural' adaptations?	Birds migrating to warmer climates in the winter
19	What is a 'functional' adaptation?	Things that go on inside an organism's body that can be related to processes like reproduction or metabolism
20	What are examples of 'functional' adaptations?	Desert animals conserve water by producing very little sweat and urine; Brown bears low metabolism while hibernating to conserve energy
21	What is an extremophile?	A microorganism that is adapted to live in extreme conditions
22	What are examples of conditions that extremophiles live?	High temperature, high pressure, high salt concentration
23	What is a food chain?	Something that represents the feeding relationships within a community
24	What is a photosynthetic organisms?	Producers of all biomass for life on Earth using light from the Sun
25	What do food chains always start with?	A producer
26	What type of organism is a producer?	Green plants or algae

27	What is the job of a producer in the food chain?	To make glucose by photosynthesis
28	What is 'biomass'?	The living material of an organism
29	How is energy transferred through a food chain?	When organisms eat other organisms
30	What is a primary consumer?	An organism that eats a producer
31	What is a secondary consumer?	An organism that eats a primary consumer
32	What is a tertiary consumer?	An organism that east a secondary consumer
33	What is a predator?	A consumer that hunts and kills other animals
34	What is prey?	The animal that a predator hunts and kills
35	What happens to the number of predators and prey in a stable community?	The numbers will rise and fall
36	How can we study the distribution of an organism?	1. Measure how common an organism is in two sample areas and compare them 2. Study how the distribution changes across an area using a transect
37	What is a quadrat?	A square frame enclosing a known area e.g. $1m^2$
38	How can we compare how common an organism is in two sample areas?	1. Place a $1m^2$ quadrat on the ground at a **random point** within the first sample area 2. Count all the organisms within the quadrat 3. Repeat steps 1 and 2 as many time as you can (minimum 10) 4. Work out the mean number of organisms per quadrat with the first sample area 5. Repeat the process in the second sample area and compare
39	How do you calculate the mean number of organisms in an area?	Mean = TOTAL number of organisms NUMBER of quadrats
40	How do you ensure where you're placing the quadrat is totally random?	Split the area into a grid and use a random number generator to pick coordinates
41	How do you calculate the **total** number of organisms in a known area?	1. Work out the mean number of organisms per metre squared 2. Multiply the mean by the total area of the habitat
42	What is a transect?	A line used to help find how organisms are distributed from one place to another
43	How do you carry out a transect?	1. Mark out a line in the area you want to study with a tape measure 2. Place a quadrat down at the first point 3. Count the number of organisms in the quadrat 4. Place the quadrat at regular intervals along the tape measure, repeating steps 2 and 3 5. Repeat the transect at least 3 times at random places in the same area
44	What environmental changes can affect the distribution of a species? **(Triple only) (HT only)**	Temperature; availability of water; composition of atmospheric gases
45	What factors may affect environmental changes? **(Triple only) (HT only)**	Seasonal factors (wet/dry seasons), geographic factors, human interaction (global warming due to human activity)
46	What are the stages of the water cycle?	Evaporation (or transpiration from plants); condensation; precipitation
47	Why is the water cycle important?	It provides fresh water for plants and animals on land before draining into the seas

48	What is the carbon cycle?	Carbon from organisms is returned to the atmosphere as carbon dioxide to be used by plants in photosynthesis
49	How is carbon dioxide removed from the atmosphere?	Photosynthesis; creation of carbonate compounds
50	How is carbon returned to the atmosphere?	Respiration by plants, animals and microorganisms; combustion; decay
51	What role do microorganisms play in cycling materials through an ecosystem?	They respire to return carbon back to the atmosphere as carbon dioxide Break down dead organisms and return mineral ions to the soil
52	What is decomposition? **(Triple only)**	Bacteria and fungi breaking down dead organisms
53	What factors affect the rate of decay? **(Triple only)**	Temperature, oxygen availability, water availability, number of decay organisms
54	Explain how temperature affects the rate of decay? **(Triple only)**	Warmer temperatures increase enzyme activity so speed up decay. If the temperature is too hot, enzymes will denature and the organism will die
55	Explain how oxygen availability affects the rate of decay? **(Triple only)**	Most microorganisms need oxygen to respire, so the more oxygen, the higher the rate of decay
56	Explain how water availability affect the rate of decay? **(Triple only)**	Decay takes faster in moist environments because the organisms involved in decay need water to carry out biological processes
57	What is compost? **(Triple only)**	Decomposed organic matter that is used as a natural fertiliser for crops and garden plants
58	What is biogas? **(Triple only)**	Mainly methane gas made by the anaerobic decay of waste material
59	Where is biogas made? **(Triple only)**	In a fermenter called a digester or generator
60	What is a batch biogas generator? **(Triple only)**	A generator that makes biogas in small batches. They are manually loaded up and left to digest
61	What is a continuous biogas generator? **(Triple only)**	A generator that makes biogas all the time. Waste is continually fed in and biogas is produced at a steady rate
62	What is 'biodiversity'?	The variety of different species of organisms on Earth, or within an ecosystem
63	Why is high biodiversity important?	To ensure the stability of ecosystems by reducing the dependence of one species on another for food, shelter and the maintenance of the physical environment
64	What human activities are reducing biodiversity?	Waste production; deforestation; global warming
65	Why are more resources being used and more waste produced?	There has been a rapid growth in the human population and an increase in the standard of living
66	How does pollution in water occur?	From sewage, fertiliser or toxic chemicals from industry can wash into lake, rivers and oceans
67	How does pollution on land occur?	From landfill; toxic chemicals used for farming; radioactive materials;
68	How does pollution in air occur?	From smoke and acidic gases released into the atmosphere
69	What purposes do humans use land for?	Building, quarrying, farming, dumping waste
70	What is deforestation?	Cutting down forests
71	What do humans cut down forests?	To clear land for cattle and rice fields; to grow crops from which biofuel based on ethanol can be produced
72	What problems are associated with deforestation?	Less carbon dioxide taken in by trees so there is more carbon dioxide in the atmosphere Less biodiversity, as forests can contain a huge number of different species of plants and animals
73	What is a peat bog?	Areas of land that are acidic and waterlogged

74	How is peat formed?	When plants don't fully decay due to lack of oxygen, they build up forming peat
75	Why are peat bogs destroyed?	Peat can be dried and used as fuel, or sold to gardeners as compost
76	Why is the destruction of peat bogs harmful to the environment?	Reduces the area of habitat for many species of plants, animals and microorganisms reducing biodiversity The decay or burning of peat releases carbon dioxide into the atmosphere
77	What is global warming?	When too much carbon dioxide and methane are trapped in the Earth's atmosphere acting as an insulating, warming the Earth up too much
78	What are the biological consequences of global warming?	Seawater rising causes flooding of low lying areas Distribution of wild animal and plant species may change as temperature and rainfall changes Migration patterns might change Biodiversity could be reduced if some species are unable to survive a change in climate
79	What different programmes have been put in place to reduce the negative effects of humans on ecosystems and biodiversity?	Breeding programmes for endangered species Protection and regeneration of rare habitats Reintroduction of field margins and hedgerows Reduction of deforestation and carbon dioxide emissions Recycling resources rather than dumping waste in landfill
80	What is a trophic level? **(Triple only)**	The different stages of a food chain
81	How are trophic levels numbered? **(Triple only)**	According to how far the organism is along the food chain, the first level is 1
82	What does trophic level 1 always contain? **(Triple only)**	Plants and algae – they make their own food and are called producers
83	What does trophic level 2 contain? **(Triple only)**	Primary consumers that eat plants and algae
84	What is an herbivore? **(Triple only)**	Eat plants/algae
85	What does trophic level 3 contain? **(Triple only)**	Secondary consumers
86	What is a carnivore? **(Triple only)**	An animal that eats meat
87	What does tropic level 4 contain? **(Triple only)**	Tertiary consumers – carnivores that eat other carnivores
88	What is an apex predator? **(Triple only)**	Carnivores with no predators
89	How do decomposers break down dead plant and animal matter? **(Triple only)**	By secreting enzymes into the environment. Small soluble food molecules then diffuse into the microorganism
90	What is a pyramid of biomass? **(Triple only)**	They represent the relative amount of biomass in each level of a food chain
91	How are pyramids of biomass constructed? **(Triple only)**	Using a scale drawing to represent the biomass in g/m^2
92	What percentage of light that hits producers is transferred for photosynthesis? **(Triple only)**	1%
93	What percentage of biomass is usually transferred along to the next level? **(Triple only)**	10%
94	What are the reasons biomass is lost at each stage of the pyramid? **(Triple only)**	• Not all ingested material is absorbed, some is egested as faeces • Some absorbed material is lost as waste, such as carbon dioxide, water & urea • Large amounts of glucose are used in respiration

95	How is efficiency of biomass transfer between trophic levels calculated? **(Triple only)**	Efficiency = $\underline{\text{biomass transferred to the next level}}$ $\qquad\qquad$ Biomass available at the previous level $\qquad$ x100
96	What is 'food security'? **(Triple only)**	Having enough food to feed a population
97	What are the biological factors which are threatening food security? **(Triple only)**	• Increasing birth rate • Changing diets means scarce food resources are transported to other places • New pests and pathogens affect farming • Environmental changes such as lack of rainfall • High input costs of farming • Conflicts (war) which affect the availability of water or food
98	Why does the high input costs of farming affect food security? **(Triple only)**	It is too expensive for some people in some countries to start or maintain food production, meaning not enough people are producing food
99	Why are fish stocks in the oceans declining? **(Triple only)**	Due to overfishing
100	Why is it important to maintain fish stocks at a level where breeding continues? **(Triple only)**	Certain species may disappear in some areas
101	How are fish stocks maintained? **(Triple only)**	Fishing quotas; net size
102	How does a fishing quota help maintain fish stocks? **(Triple only)**	There are limits on the number and size of fish that can be caught
103	How does the control of net size help maintain fish stocks? **(Triple only)**	• Using a bigger mesh size lets 'unwanted' fish escape. • Young fish can escape allowing them to reach breeding age
104	How can food production be made more efficient? **(Triple only)**	By restricting energy transfer from food animals to the environment
105	What farming techniques are used to reduce energy transfer from food animals to the environment? **(Triple only)**	By limiting movement Controlling the temperature of the surroundings Feeding them high protein foods to increase growth
106	Why does limiting movement and controlling the temperature improve the efficiency of food production? **(Triple only)**	Reduces the amount of energy released in respiration for moving around or maintaining their body temperature. Therefore there is more energy for growth
107	What is factor farming? **(Triple only)**	Where animals are kept in small cages so their movement is restricted
108	What are the disadvantages of factory farming? **(Triple only)**	Disease spreads quickly It's cruel
109	What is mycoprotein? **(Triple only)**	Food produced from fungi
110	What fungus is used to make mycoprotein? **(Triple only)**	*Fusarium*
111	What is mycoprotein used to make? **(Triple only)**	High protein meat substitutes for vegetarian meals (Quorn)
112	What conditions are needed to make mycoprotein? **(Triple only)**	$\underline{\text{Fusarium}}$ is grown in $\underline{\text{aerobic conditions}}$ on $\underline{\text{glucose syrup}}$ which is then $\underline{\text{harvested and purified}}$
113	What is genetic engineering? **(Triple only)**	Transferring a useful gene from one organism to another

114	How can bacteria be genetically engineered to make human insulin? **(Triple only)**	1. Plasmid removed from a bacterium 2. Insulin gene cut out of a human chromosome using a restriction enzyme 3. The plasmid is cut open using the **same** restriction enzyme 4. The plasmid and gene are mixed together 5. Ligase enzyme is used to stick the two pieces of DNA together (recombinant DNA) 6. Recombinant DNA is placed back into the bacterium 7. Bacteria is left to multiply 8. Insulin is harvested and purified
115	What are the advantages of biotechnology? **(Triple only)**	Crops can be developed that are resistant to pests Crops can be developed that are resistant to droughts Crops can be modified to provide more nutritional value (golden rice)