B4 (Higher) Key Questions that will help you get the level you deserve
Learn these! Try each one. Ones you don't know try again and again
Fold over 'The Answers' column and reveal having attempted the questions

Sampling			
1.	Describe methods of collection when sampling organisms		Pooters Nets Pitfall traps Quadrats
2.	Describe how you use collecting/counting methods with pitfall traps		Use of capture-recapture data Use formula: $\frac{\text{No. 1st sample x no. in 2nd sample}}{\text{No. in 2nd sample previously marked}}$
3.	Describe how you use collecting/counting methods with quadrats		Scale up from a small sample area Randomly place a quadrat onto the sampling area Calculate the number of organisms in the square. Only count those under the top and left of the edges Gather at least 20 quadrat samples Work out an average for the samples Calculate the relative population within the whole area.
4.	How do you use keys to identify plants and animals?		Answer a series of questions. The questions have y/n answers Help to isolate and identify organisms based on this.
5.	Explain how the distribution of organisms within a habitat is affected		Biotic factors – other living organisms – competition Abiotic factors – physical factors
6.	Define biodiversity		Variety of different species living in a habitat
7.	Identify examples of natural ecosystems		Native woodlands and lakes
8.	Identify examples of artificial ecosystems		Forestry plantations and fish farms
9.	Explain the effect of sample size on the accuracy of an estimate of population size		The bigger the sample size, the greater the accuracy.
10.	Explain the need to make certain assumptions when using capture-recapture data		No death, immigration or emigration Identical sampling methods Marking not affecting survival rate
11.	What is meant by an ecosystem?		Self supporting in all factors other than an energy source
12.	What is meant by zonation?		Gradual change in the distribution of species across a habitat
13.	What can lead to the zonation of organisms in a habitat?		The gradual change of an abiotic factor
14.	Describe how to map the distribution of organisms in a habitat using a transect line.		Place a tape measure across the habitat. Take quadrat samples at regular intervals along the line. Map out using a kite diagram for example
15.	Explain the differences between ecosystem and habitat		An ecosystem includes all living things in the area. The habitat only refers to the physical conditions/surroundings

16.	Explain the differences between community and population		Population – grouping of individuals of a single species in an area -No relationship of eating and be eaten Community – grouping of individuals of different species found in an area. -Often a relationship of eating and being eaten
Photosynthesis			
17.	What is the word equation for photosynthesis?		Carbon dioxide + water →Glucose + Oxygen
18.	What pigment converts light energy into energy that can be used in the photosynthesis process?		Chlorophyll
19.	What is the bi-product of the photosynthesis reaction?		Oxygen
20.	How is the product (glucose) made in photosynthesis transported?		Soluble sugars
21.	What is the waste product of photosynthesis?		Oxygen
22.	How is glucose stored?		Insoluble starch
23.	Why is it important for glucose to be stored in the way it is?		Does not move away in solution from storage areas Does not affect water concentration inside cells
24.	How is glucose used by the plant? (in general)		Converted into other substances in plants to be used for energy, growth and storage.
25.	How is glucose used by the plant? (specific)		Glucose for energy (respiration) Cellulose for cell walls Proteins for growth and repair Starch, fats and oils for storage
26.	Explain why plants grow faster in the summer		More light and more warmth
27.	What other processes do plants do as well as photosynthesis?		Respiration
28.	What is the balanced symbol equation for photosynthesis?		$6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$
29.	Which key scientists have helped develop our understanding of the process of photosynthesis?		Greek scientists noted that plants gained mass only by taking in minerals from the soil Van Helmont's conclusion that plant growth cannot be solely due to nutrients from the soil Priestley's experiment showed that oxygen is produced by plants
30.	How have experiments using isotopes increased our understanding of photosynthesis?		Oxygen is produced by photosynthesis comes from the water and not the carbon dioxide
31.	Explain how photosynthesis can be described as a two stage process		Light energy is used to split water, releasing oxygen gas and hydrogen ions Carbon dioxide gas combines with the hydrogen to make glucose
32.	Describe how photosynthesis can be increased by providing		More carbon dioxide More light Higher temperature
33.	Explain the effects of limiting factors on the rate of photosynthesis		Carbon dioxide, light, temperature

34.	Explain why plants carry out respiration all the time.		Take in carbon dioxide and give out oxygen during the day and do the reverse at night. This requires both photosynthesis and respiration.
35.	How can you measure the rate of reaction?		Measure the rate of oxygen released from the pondweed.
36.	Explain why chloroplasts are not found in all plant cells		For example not found in root hair cells. Have to be in a position to absorb light
37.	What is the role of chlorophyll pigments in chloroplasts?		Absorb light energy for photosynthesis
38.	What are the entry points of materials required for photosynthesis?		Water through root hairs Carbon dioxide through stomata
39.	What is the exit point of materials produced in photosynthesis?		Oxygen through stomata
40.	What effect does the adaptation of broader leaves have?		Enable more sunlight to be absorbed
41.	Name an locate the parts of a leaf: Cuticle Upper epidermis Lower epidermis Palisade layer Spongy mesophyll later Stomata Guard Cells Vascular bundle		Cuticle Upper epidermis – transparent top Lower epidermis – transparent bottom Palisade layer – top contains most of the chloroplasts Spongy mesophyll – air spaces for diffusion between stomata and photosynthesising cells Stomata Guard Cells Vascular bundle
42.	Explain how leaves are adapted for efficient photosynthesis (6)		Broad – large surface area Thin – short diffusion distances for gases Chlorophyll + other pigments – absorb light Network of vascular bundles – support and transport Guard cells – open and close stomata Internal surface area:volume v.large
43.	Explain how plants maximise the use of energy from the sun		Use of a range of photosynthetic pigments which have different absorptions of light Chlorophyll a and b, carotene and xanthophyll
Diffusion and Osmosis			
44.	Describe diffusion		Movement of a substance from a region of high to low concentration
45.	Give an example of diffusion's use in cells		Substances (eg. Glucose) move in and out of cells by diffusion through the cell membrane
46.	How does water move in and out of plant cells?		Osmosis
47.	Define osmosis		The net movement of water from an area of high concentration to low concentration across a partially permeable membrane, as a consequence of the random movement of individual particles.
48.	What is the role of the plant cell wall?		Provide support
49.	What affect does a lack of water have on a plant?		Droops (wilts)
50.	Explain what increases the rate of diffusion		A shorter distance A greater concentration difference (gradient) A greater surface area

51.	Explain the term partially-permeable		Allows some substances (smaller substances) through and not others
52.	Explain how the rate of diffusion is increased		A shorter distance A greater concentration difference (gradient) A greater surface area.
53.	What is diffusion?		The net movement of particles by diffusion from an area of high concentration to an area of lower concentration, due to the random movement of individual particles.
54.	What is osmosis?		Osmosis is the movement of water across a partially-permeable membrane from an area of high water concentration (ie. Dilute solution) to an area of low water concentration (ie. Concentrated solution).
Transpiration			
55.	Explain the terms: flaccid, plasmolysed and turgid		Flaccid – plant cells that is limp through a reduction of pressure inside the cell Plasmolysed – the shrinking of the protoplasm away from the cell wall due to water loss Turgid – water moves into the cell's membrane which causes the cell membrane to press against the cell wall in a plant cell
56.	Explain how plants are supported by the turgor pressure within cells		Water pressure acting against inelastic cell wall
57.	What causes wilting?		A lack of turgor pressure due to loss of water
58.	Explain how leaves are adapted to increase the rate of diffusion of carbon dioxide and oxygen.		Number, distribution, position and size of stomata. Guard cells open when water make them turgid. Thin Spongy mesophyll layer has gaps allowing the diffusion of carbondioxide and water
59.	Describe the effects of the uptake and loss of water on animal cells		Uptake of water leads to plasmolysis Loss of water leads to crenation
60.	Describe how water travels through a plant		Absorption from soil through root hairs Transport through the plant, up the stem to the leaves Evaporation from the leaves (transpiration)
61	What factors could experiments show that transpiration rate is affected?		Light intensity Temperature Air Movement Humidity
62.	Describe the structure of xylem		Xylem vessels – thick strengthened cellulose cell wall with a hollow lumen (dead cells)
63.	Describe the structure of phloem		Phloem – columns of living cells with companion cells which produce ATP to support active transport.
64.	What is the role of the xylem?		Xylem – used in transpiration. Movement of water and minerals from the roots to the shoot and leaves
65.	What is the role of the phloem?		Phloem – used in translocation. Movement of food substances (sugars) up and down stems to

			growing and storage tissues.
66.	What is transpiration?		The evaporation and diffusion of water from inside leaves.
67.	Describe the effect on transpiration rate of: Increase in light intensity Increase in temperature Increase in air movement Decrease in humidity		All increase transpiration rate and therefore loss of water
68.	How do leaves reduce excessive water loss?		Waxy cuticle Small number of stomata on upper surface
		Minerals	
69.	Explain why plants require: Nitrates, phosphates, potassium and magnesium		Nitrates – make amino acids which are needed for proteins needed for cell growth Phosphates – make DNA and cell membranes needed for respiration and growth Potassium – make enzymes needed for respiration and photosynthesis Magnesium – make chlorophyll for photosynthesis
70.	Why are minerals often taken in 'against' or 'up' a concentration gradiet?		Minerals are usually present in soil in quite low concentrations
71.	Explain how mineral deficiencies to the resulting poor plant growth		Nitrate – poor growth and yellow leaves Phosphate – poor root grown and discoloured leaves Potassium – poor flower and fruit growth / discoloured leaves Magnesium – yellow leaves
72.	What does NPK stand for?		Nitrogen Phosphates Potassium
73.	Describe how minerals are absorbed		Dissolved in solution By the root hairs From the soil
74.	Explain how minerals are taken up into root hair cells by active transport		Move substances from low concentrations to high concentrations across a cell membrane, using energy and respiration.
		Decay	
75.	Recall the key factors in the process of decay		Presence of microorganisms Temperature Oxygen Moisture
76.	Explain why decay is important for plant growth		To provide the minerals needed for the plant – eg. Nitrates/phosphates
77.	How are microbes used by humans?		Sewage (break down human waste) Compost (break down plant waste)
78.	Which food preservation techniques reduce the rate of decay? How briefly do they work?		Canning Cooling Freezing Drying Adding salt/sugar Adding vinegar All reduce either oxygen, respiration or the enzymes. Water and temperature speeds up

			the process so restricting these reduce decay
79.	Explain the term saprophyte		Lives on dead or decaying organic matter
80.	Explain how saprophytic fungi digest dead material in terms of extracellular digestion		Extracellular enzymes released and simple products absorbed.
81.	What are detritivores?		Included earthworms, maggots and woodlice – feed on dead ad decaying material (detritus)
82.	How do detritivores speed up the rate of reaction?		Produce a larger surface area which increases the rate of decay
Farming			
83.	What are pesticides?		Pesticides kill pests which are organisms that damage crops
84.	Give examples of pesticides		Insecticides to kill insects Fungicides to kill fungi Herbicides to kill plants (weeds)
85.	What is meant by intensive farming?		Trying to produce as much food as possible from the land, plants and animals available
86.	Give examples of intensive farming methods that increase productivity methods		Fish farming Glass houses Hydroponics Battery farming
87.	Describe what is meant by organic farming methods		No artificial fertilisers No pesticides
88.	What is an alternative to controlling pests besides a chemical method?		Biological control – eg. Introducing predators.
89.	Explain the disadvantages of using pesticides		Pesticides may enter and accumulate in food chains Pesticides may harm organisms which are not pests Some pesticides are persistent
90.	Explain the advantages and disadvantages of hydroponics		Better control of mineral levels and disease Lack of support for plant Required addition of fertiliser
91.	Explain how intensive food production improves the efficiency of energy transfer by reducing energy transfer		To pests, including competing plants (weeds) As heat from farm animals by keeping them penned indoors so that they are warm and move around less
92.	Describe organic farming techniques		Use of animal manure and compost Crop rotation including use of nitrogen-fixing crops Weeding Varying seed planting times
93.	Explain the advantages and disadvantages of biological control		Advantages – no need for chemical pesticides, does not need repeated treatment Disadvantages –predator may not eat pest, may eat useful species, may increase out of control, may not stay in the area where it is needed.