

Year 10 Term 2 Knowledge Organiser



	Topic:	Introducing ecosystems and interdependence (B.20)
1	State the name given to a habitat and all of the organisms living inside of it?	Ecosystem
2	What is the name for living factors that affect species?	Biotic
3	What is the name for non-living factors that affect an environment?	Abiotic
4	State the 3 types of adaptations that exist	1) Structural 2) Behavioural 3) Functional
5	State 4 things that animals compete for	Water, mates, territory, food
6	State 4 things that plants compete for	Nutrients, Water, Space, Light
7	What is the scientific word for species relying on each other?	Interdependence
8	Similar organisms that can breed together to produce fertile offspring are known to be the same _____?	Species
9	Name 7 abiotic factors	1) Light intensity, 2) temperature, 3) moisture, 4) soil pH, 5) wind intensity, 6) CO ₂ levels (plants) 7) oxygen levels (aquatic animals)
10	Name 4 biotic factors	1) food availability, 2) new predators, 3) new pathogens, 4) species outcompeting
11	What is the name given to an organism that lives in an extreme environment?	Extremophile
12	What is the name given to the TYPE of organism that absorbs sunlight and uses it to produce glucose?	Producer
13	What type of animal feeds off of the dead remains of other animals?	Scavenger
14	State two experimental techniques used to determine the abundance and distribution of a species	Transect (line across an environment) & quadrat (1m metal square)
15	What is the name given to the type of sampling that is done along a line?	Transect

	Topic:	Structure of a plant (B.21)
1	What is the name of the plant tissue where new cells are made?	Meristem
2	What is the name of the specialised plant cell adapted to absorb water & nutrients from the soil?	Root Hair Cell

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3	What is the name of the specialised plant cell adapted to open and close the stomata of a plant?	Guard Cell
4	Which word describes a guard cell (a) filled with water? (b) that has very little water	(a) filled = Turgid (b) lacking water = flaccid
5	What is the name of the specialised cell that is adapted to absorb lots of light energy in the leaf?	Palisade cell
6	What is the chemical in chloroplasts that allow plant cells to absorb lots of light energy?	Chlorophyll
7	Which type of plant tissue is made up of sieve cells and companion cells?	Phloem
8	What is the name for the hole in a leaf that allows gases in and water out?	Stoma/Stomata
9	What is the name of the plant tissue that is made up of a hollow tube of dead cells?	Xylem
10	Which tissue in a plant transports water?	Xylem
11	Which tissue in a plant transports glucose?	Phloem
12	In which plant organ is glucose made?	Leaf
13	What is the name for the process that converts water and carbon dioxide into glucose and oxygen?	Photosynthesis
14	Which organ of a plant is designed to absorb water?	Root
15	Which organ of a plant is designed to transport substances from the roots to the leaves and vice versa?	Stem
	Topic:	Transport in plants (B.23)
1	Define the term "osmosis"	Movement of water from a dilute solution to a concentrated solution through a semi permeable membrane
2	How do you calculate rate of water uptake by a plant?	volume of water absorbed ÷ time taken
3	How do you calculate percentage change in mass following osmosis?	Change in mass/initial mass x 100
4	When looking at an osmosis graph (change in mass of unknown substance vs concentration of known sucrose solution) - how can you identify the concentration of the unknown substance?	When the line of best fit crosses the X axis
5	Which piece of equipment is used to cut a cylindrical piece of potato?	A cork borer
6	What is the name given to a semi permeable piece of tubing?	Visking tube
7	Which substance moves into a plant by osmosis?	Water

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8	How are root hair cells adapted for osmosis?	Large surface area and large vacuole
9	Define 'active transport'	Movement of substances from a dilute to a concentrated solution against the concentration gradient. Requires energy
10	Name a substance that is moved into plants by active transport	Mineral ions
11	How are root hair cells adapted for active transport?	Lots of mitochondria for respiration
12	Define "diffusion"	Movement of particles from an area of high concentration to an area of low concentration
13	Name one substance that moves into a leaf by diffusion	Carbon dioxide
14	Name two substance that moves out of a leaf by diffusion	Oxygen and water
15	Which cells open and close to control the diffusion of substances from a leaf?	Guard cells

	Topic:	Transpiration and translocation (B.24)
1	Name the process by which glucose is moved from a leaf to other parts of the cell	Translocation
2	What is the scientific name given to the evaporation of water from a leaf?	Transpiration
3	On which side of the leaf are there more stomata?	Underside/lower
4	What is covering the top layer of the leaf to reduce the loss of water?	Waxy Cuticle
5	Which organ in a plant does water enter through?	Root
6	Do guard cells become flaccid or turgid when it is very sunny?	Turgid
7	Do stomata open or close when it is night time?	Close
8	Describe the structure of xylem	Hollow tubes strengthened with lignin
9	Describe the structure of phloem	Elongated cells with a sieve plate and companion cell
10	How do you calculate surface area of a cuboid?	Sum of all the 2D faces
11	State four factors that increases the rate of transpiration	1) High wind intensity 2) high light intensity 3) arid (dry) 4) high temperature
12	Why does high wind intensity increase transpiration?	Increases concentration gradient
13	Why does high light intensity increase transpiration?	Causes stomata to open

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14	Why does arid conditions increase the rate of transpiration?	Increases concentration gradient
15	Why does high temperature increase the rate of transpiration?	Water particles have more kinetic energy
	Topic:	Photosynthesis (B.25)
1	Name the two reactants in photosynthesis	Carbon Dioxide and water
2	Name the two products formed in photosynthesis	Oxygen and glucose
3	Write the word equation for photosynthesis	Carbon dioxide + water -> oxygen and glucose
4	Write the symbol equation for photosynthesis	CO ₂ + H ₂ O -> O ₂ + C ₆ H ₁₂ O ₆
5	Describe what happens to the rate of photosynthesis as temperature increases	Rate increases and then decreases
6	Describe what happens to the rate of photosynthesis as light intensity increases	Rate increases and then remains constant
7	Describe what happens to the rate of photosynthesis as carbon dioxide increases	Rate increases and then remains constant
8	Define a limiting factor	A factor that directly affects the rate of photosynthesis on its own, regardless of the level of the other factors.
9	Name the plant used to investigate the effect of different factors on rate of photosynthesis	Elodea (pondweed)
10	How can you calculate the rate of photosynthesis of an aquatic plant?	Count the number of O ₂ bubbles produced in a minute
11	How can you more accurately calculate the rate of photosynthesis of an aquatic plant?	Record volume of gas produced (using a gas syringe)
12	Which cells are adapted for increased photosynthesis?	Palisade cells
13	How are palisade cells adapted for increased rates of photosynthesis?	Lots of chloroplasts (and chlorophyll)
14	State three limiting factors for photosynthesis	1) Carbon dioxide concentration, 2) Temperature, 3) Light intensity
15	In a variegated leaf, why do some parts appear white?	There is no chlorophyll

	Topic:	The products of photosynthesis (B.26)
1	State 5 uses of glucose produced during photosynthesis	1) respiration, 2) stored as insoluble starch, 3) stored as fats/oils 4) making cellulose, 5) making amino acids
2	State two substances required for making proteins in plants	Nitrate ions and glucose
3	Which substance is used to test for the presence of starch?	Iodine solution
4	What colour will iodine solution turn in the presence of starch?	Blue/black

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5	What colour will iodine solution turn if no starch is present?	Remains orange
6	Which substance is used to test for the presence of sugar?	Benedict's solution
7	What colour will benedict's solution turn in the presence of sugar?	Red (lots of sugar), orange (some sugar), green (small amount of sugar)
8	What colour will benedict's solution turn if no glucose is present?	Remains blue
9	Which substance is used to test for the presence of protein?	Biuret's solution
10	What colour will biuret solution turn in the presence of protein?	Purple
11	What colour will biuret solution turn if no protein is present?	Remains blue
12	Which substance is used to test for the presence of lipids (fats)?	Ethanol
13	What colour will ethanol solution turn in the presence of fats?	Creamy white
14	What colour will ethanol solution turn if no fat is present?	Remains colourless
15	Describe the relationship between a light's distance from a plant and rate of photosynthesis (HT only)	power ÷ distance squared (inverse square law)

	Topic:	Natural recycling (B.28)
1	How do plant remove carbon from the air?	Photosynthesis (CO ₂ in)
2	How is carbon moved from living organisms back into the air?	Respiration (CO ₂ released)
3	How is carbon moved from fossil fuels back into the air?	Combustion (CO ₂ released)
4	How is carbon moved from dead organisms into the air?	Decomposition (by decomposers) (CO ₂ released)
5	What is the scientific name for rain?	Precipitation
6	How does water move from lakes/the sea into the air?	Evaporation
7	Which process leads to cloud formation?	Condensation
8	What is the name of evaporation of water from plants?	Transpiration

	Topic:	Humans and the environment (B.29)
1	Define by "biodiversity"	variety of all the different species on earth/within an ecosystem
2	Why is increased biodiversity good?	Increases ecosystem stability
3	State three ways that humans can cause water pollution	Sewage, fertilisers, toxic chemicals

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4	State three ways that humans can cause air pollution	Smoke, acidic gases
5	State three ways that humans can cause land pollution	Landfill sites, toxic chemicals
6	State 4 ways that humans are decreasing the land available for living organisms	building, quarrying, farming, dumping waste
7	State two uses of peat	Fuel & fertiliser
8	What is the name for 'cutting down trees'	Deforestation
9	State two reasons for deforestation occurring	Land for farming & growing biofuels
10	State 5 ways that humans are trying to increase biodiversity	1) Breeding endangered species 2) protecting rare habitats 3) Hedgerows 4) Afforestation 5) Recycling

	Topic:	RP: Osmosis (B3) (B.43)
1	What is the independent variable?	The concentration of the solution
2	What is the dependent variable?	The percentage change in mass
3	Name 5 control variables	1) Length of potato 2) Diameter of potato 3) Volume of solution 4) Time potato is left for 5) Temperature of solution
4	Give 3 ways to make the results accurate	1) Read the volume of the solution from the meniscus 2) Dab the potatoes dry before measuring the mass 3) Use a digital top pan balance
5	Name one risk and precaution	Risk = cutting yourself with the potato borer Precaution = push the borer down towards the desk not upwards
6	What is the purpose of the distilled water?	To act as a control to compare your results to
7	How is the concentration inside the tissue estimated?	Plot a graph of concentration against % change in mass and find where the line of best fit crosses 0%
8	How is the percentage change in mass calculated?	$\% \text{ change in mass} = \frac{\text{change in mass}}{\text{initial mass}}$
9	Why is percentage change calculated rather than just the change?	The potato may be slightly different sizes and shapes to begin with
10	Why does the tissue increase in mass?	Water has entered the tissue by osmosis in more dilute solutions
11	How can you tell if there has been an increase in mass?	The % change in mass is +ve
12	Why does the tissue decrease in mass?	Water has left the tissue by osmosis in more concentrated solutions
13	How can you tell if there has been a decrease in mass?	The % change in mass is -ve
14	What does no change in mass mean?	The concentration of the solution is the same as the concentration inside the tissue
15	What are possible variations on this method?	1) Using any other vegetable/plant tissue 2) Using any other food substance 3) Using a salt solution

	Topic:	RP: Photosynthesis (B6) (B.46)
1	What is the independent variable?	Distance from the light source (light intensity)

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2	What is the dependent variable?	Number of bubbles per minute
3	Name 3 control variables	1) Temperature of the water 2) Carbon dioxide concentration 3) Colour of the light
4	How is the rate of photosynthesis measured?	rate = total O ₂ produced / time
5	How is the volume of oxygen measured?	Counting the number of bubbles per minute
6	How is the light intensity changed?	Changing the distance of the beaker from the light
7	Name one random error	Counting the bubbles incorrectly
8	Give one way to make the results more accurate	Increase the amount of time you count the bubbles for
9	How is the concentration of carbon dioxide controlled?	Adding sodium hydrogen carbonate to the solution
10	Give an alternative way to measure the volume of gas produced?	Volume of water displaced from a measuring cylinder
11	Name one risk and precaution	The lamp may be hot so do not touch it
12	How is the temperature controlled?	Water bath
13	How is the pondweed controlled?	Same species, same age and same length
14	What results should you see?	As the light intensity increases, the rate photosynthesis increases
15	What are possible variations on this method?	1) Investigate the effect of different coloured lights 2) Investigate the effect of temperature 3) Investigate the effect of CO ₂ concentration

	Topic:	RP: Field investigations (B9) (B.49)
1	What is the first aim?	Investigating the population size of a plant species using random sampling
2	How do we prepare the area we are investigating?	Lay out two measuring tapes at right angles to each other
3	Name the equipment	a 25 cm x 25cm quadrat, a 30 m tape measure, a clipboard, a pen, paper.
4	How do we ensure the sample is random?	Choose random co-ordinates and place the quadrat in these places
5	What are the steps in the method?	1) Place the quadrat down and count the number of organisms inside. 2) Repeat for 10 quadrats 3) Calculate the mean
6	How do we work out an estimate for the whole area?	estimated population size = (area sampled /total area) x mean number of organisms counted
7	How can we improve the accuracy of the estimate?	increase the number of quadrat throws and calculate the mean
8	Why might the estimate be inaccurate?	Not all parts of the area contain an equal distribution of the organism and so the sample may not be representative
9	What is the second aim?	Investigating the effect of light intensity on plant distribution using a transect line.
10	How do we set up a transect line?	Place a tape measure from one part of the area to another

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11	How do we measure the number of organisms?	Place a quadrat down and count the number of organisms inside
12	How do you measure the change in distribution of the organism?	Move the quadrat 1m along the transect and count the number of organisms. Repeat every 1m.
13	How do you measure the light intensity?	Use a light meter or light probe
14	How do you represent the data?	Plot a graph of light intensity against number of organisms
15	What are possible variations on this method?	1) Effect of pH 2) Effect of temperature 3) Effect of carbon dioxide levels 4) Distance from a factory/road