YEAR 11 GCSE BIOLOGY

Spring Term Knowledge Organiser

Spring term 1

The endocrine system		
1	Describe how messages are sent through the endocrine system	Through blood (chemical)
2	Define the term 'hormone'.	A chemical messenger, released from an endocrine gland, that travels through the blood to a target organ.
3	Which system (nervous or endocrine) does the response last for longer?	Endocrine
4	Which gland is called the located in the brain?	The pituitary gland
5	What are the names of the reproductive glands in males and females?	Ovaries and testes
6	Name 4 other glands in the endocrine system	Thyroid gland, pituitary gland, pancreas, adrenal gland
7	State the hormone that is released from the pituitary gland and their effect on the body	FSH (egg development) & LH (ovulation)
8	State the hormone that is released from the testes and its effect on the body	Testosterone - puberty & sperm production (in boys)
9	State the hormones that is released from the ovaries and their effect on the body	Oestrogen - causes uterus lining to rebuild Progesterone - maintains uterus lining
Adrenalin and thyroxine		
	State the hormone that is released from the adrenal gland and its effect on the body (H)	Adrenalin - "fight or flight" (heart rate increases, liver breaks down glycogen into glucose, blood directed to muscles, air passages dilate)
	How does adrenalin help us with our 'fight or flight' response? (H)	It provides muscle cells with glucose and oxygen, so respiration can occur at a higher rate and more energy can be released for muscle contraction.
	State the hormone that is released from the thyroid gland and its effect on the body (H)	Thyroxine - increases the rate of metabolism (chemical reactions)
	What is metabolism? (H)	The rate at which food is broken down and used in chemical reactions within the body.
	State the hormone that is released from the pituitary gland and their effect on the body (H)	FSH (egg development) & LH (ovulation)
	Describe the pathway that occurs to release thyroxine. (H)	Hypothalamus releases TRH, pituitary releases TSH, thyroid releases thyroxine.
Homeostasis		
1	Which two systems help to control homeostasis?	Nervous system and endocrine system
2	What is homeostasis?	The maintenance of a constant internal environment.
3	Which disease is linked to an inability to control your blood glucose levels?	Diabetes
4	State three reasons for organisms requiring homeostasis	*So cells don't burst (too much water) *so enzymes work properly (temperature *so chemical reactions occur (water and glucose)
5	State 4 things that are regulated in the body	Body temperature, blood glucose, water levels, ion levels
6	Which part of the body detects and controls body temperature	Thermoregulatory centre in the hypothalamus
7	State three ways that your body increases your body temperature if you get too cold	*Muscles contract and relax (shiver) to release thermal energy due to respiration *blood vessels in skin constrict to reduce blood flow and thermal energy loss (vasoconstriction) (H)

		*hairs on arms stand on end, trapping an insulating layer of air beneath them preventing thermal energy transfer.
8	State three ways that your body decreases its temperature if you get too hot	*Sweat glands release sweat which evaporates - transferring thermal energy to the air *blood vessels in skin dilate so blood flow increases and more thermal energy lost (vasodilation) (H) *Hairs on arms lay flat
9	What happens to the enzymes in your body if you get (a) too hot (b) too cold	(a) too hot = denatured (b) too cold = too little energy so don't move quickly and don't form enzyme-substrate complexes quickly enough.
	Glucose regulation and diabetes	
1	Which organ monitors and controls your blood glucose concentration?	The pancreas
2	Which hormone is released if the concentration of glucose in the blood is too high?	Insulin
3	Which hormone is released if the concentration of glucose in the blood is too low? (H)	Glucagon
4	Describe the effects of insulin.	Glucose is stored in the muscle & liver cells as (insoluble) glycogen
5	Describe the effects of glucagon (H)	Glycogen is converted to glucose and released from liver and muscle cells into blood
6	Describe what is wrong with a person if they have type one diabetes and how it is treated	Not producing enough insulin (genetic). Treated with insulin injections before meals.
7	Describe what is wrong with a person if they have type two diabetes and how it is treated	Insulin doesn't have an effect on the muscle/liver cells- cells are resistant. Treated with controlled diet and exercise
8	State the hormones that is released from the pancreas and its effect on the body	Insulin - decreases blood glucose Glucagon - increases blood glucose
9	Define "gland"	An organ that releases a hormone into the blood
10	Define 'negative feedback'	Our body's way of monitoring changes in internal conditions and then responding so the change is reversed.
11	Which type of diabetes is inherited?	Type one
12	Which type of diabetes is caused by lifestyle	Type two
13	How do glucagon & insulin travel around the body?	In blood
14	State a risk factor for type 2 diabetes	Obesity Lack of exercise and sedentary way of life High blood pressure Family history Aging
	Hormones in the reproductive system	
1	State the function of FSH (follicle stimulating hormone) (H)	Causes egg to mature
2	State where FSH is produced (H)	Pituitary Gland
3	State the hormone that FSH stimulates the production of (H)	Oestrogen from ovaries
4	State the effect of oestrogen	Causes uterus lining to build up

5	Which hormone inhibits FSH release? (H)	Oestrogen
6	Which hormone does oestrogen stimulate? (H)	Luteinising hormone (LH)
7	State the effect of luteinising hormone (LH) on the body (H)	Causes ovulation
8	Where is luteinising hormone produced? (H)	Pituitary Gland
9	Where is progesterone produced?	The empty egg follicle (corpus luteum)
10	State the role of progesterone	Maintains uterus lining Inhibits FSH & LH.
11	Name 3 non-hormonal methods of contraception	Barrier method (diaphragm or condoms), abstinence, spermicide, sterilisation, some intrauterine devices.
12	Name 3 hormonal methods of contraception	Oral contraceptive pill, implant, injection, some intrauterine devices.
13	What does IVF stand for? (H)	In Vitro Fertilisation (outside of the body).
14	What are the main stages of IVF? (H)	1) Mother given FSH & LH to stimulate maturation of several eggs 2) eggs collected from mother and fertilised by sperm in lab 3) Fertilised eggs develop into embryos 4) Progesterone given to maintain uterus lining 5) one or two embryos inserted into mother's uterus.
Osmoregulation in the kidneys		
1	When amino acids are broken down by the liver, what is produced?	urea
2	What is the name for the process where useful substances are reabsorbed from urine into the blood?	Selective reabsorption
3	What are the tiny tubes in the kidney called?	Tubules
4	Which hormone controls the water level in the body? (H)	Antidiuretic hormone (ADH)
5	Where is the hormone that controls the water level in the body released from? (H)	Pituitary gland
6	What happens to the amount of ADH released when there is too much water in the blood? (H)	Very little ADH released
7	What happens to the amount of ADH released when there is too little water in the blood? (H)	A lot of ADH released
8	Name a treatment for kidney failure?	Dialysis or transplant
9	What is the name of the blood vessel going into and out of the kidney?	In: Renal ARTERY Out: Renal VEIN
10	What type of transport is used for water to be reabsorbed from the kidney tubules into the blood?	Osmosis
11	What type of transport is used for glucose/mineral ions to be reabsorbed from the kidney tubules into the blood?	Active Transport
12	Why is protein not filtered out of the blood by the nephron?	Too big

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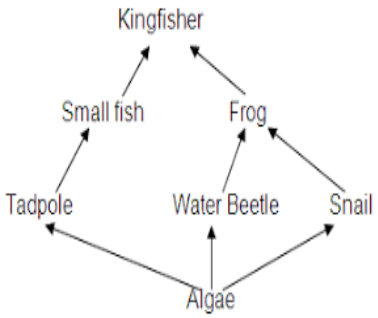
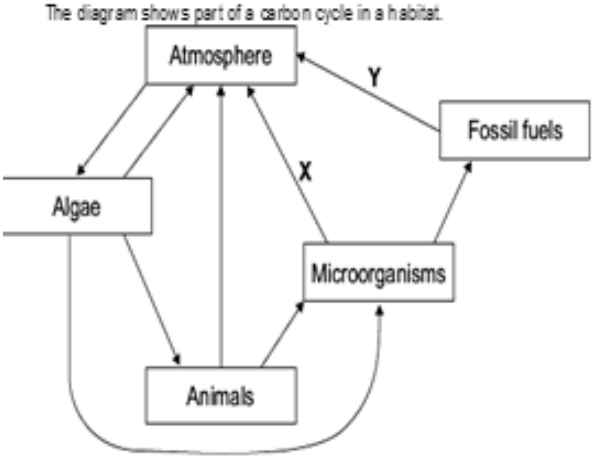
Spring 2

Interdependence, ecosystems and sampling techniques		
1	What is a 'community'?	The populations of different species living in a habitat at the same time
2	What is meant by the term interdependence?	The way that each species in a community depends on other species for things such as food, shelter, pollination and seed dispersal.
3	What is a population?	The total number of the organisms of the same species living in the same area at the same time
4	What is competition?	The relationships between organisms when they try to use the same resources such as food and shelter.
5	What is an ecosystem?	The interaction of a community with the non-living and living parts of the environment
6	Name three things' animals may compete for	Food Territory Mates
7	Name three things' plants may compete for	Space Light Mineral ions in the soil Water
8	What is a parasitic relationship?	A relationship between two organisms where one organism benefits and the other is harmed.
9	State three parasitic organisms.	headlice, parasitic wasps, parasitic worms.
10	What is a mutualistic relationship?	A relationship between two organisms where both organisms benefit.
11	Describe two mutualistic relationships.	Oxpeckers eat ticks on large land mammals, so the mammals don't become infected with diseases. Cleaner fish eat dead material from the skin of sharks, meaning it doesn't become infected. Nitrogen-fixing bacteria live in the root nodules of legumes. They convert atmospheric nitrogen into nitrogen compounds, and obtain nutrients from the plant. Clownfish remove debris from anemones and add nutrients through their waste, and obtain protection from predators.
12	What is an abiotic factor?	Non-living parts of the environment
13	Name three examples of an abiotic factor	Three from: • Light intensity • Temperature • Moisture levels • Soil pH

		• Wind direction • Carbon dioxide concentration in the air • Oxygen levels in water
14	What is a biotic factor?	The living parts of the environment
15	Name three examples of an abiotic factor	Three from: • Availability of food • New predators arriving • Pathogens • Competition with another species
16	What type of organisms are the producers of all biomass on earth?	Photosynthetic organisms
17	What is a producer?	A plant that makes its own food.
18	What is a carnivore?	An animal that only eats meat
19	What is a herbivore?	An animal that only eats plants
20	What is an omnivore?	An animal that eats plants and animals.
21	What is a primary consumer?	Animal that eats producers
22	What is a food chain?	A series of organisms each dependent on the next as a source of food.
23	What would the food chain look like for the following organisms? Owl, slug, robin, lettuce	Lettuce → slug→ robin → owl
24	What does the arrow in a food chain show?	The transfer of energy
25	What is the ultimate source of energy in a food chain?	The Sun
26	Why are plants at the start of the food chain?	Plants use the sunlight for photosynthesis which produces sugar. Sugar is needed for respiration to release energy

27	 What would happen if all the frogs are removed from this food web?	• Increase in water beetles and snails **because** less frogs to eat them. Less Algae **because** more water beetles and snails eating algae • Fewer kingfisher **because** less frogs for them to eat. or • Fewer small fish **because** kingfisher now only eat small fish
28	How is energy transferred to less useful forms at each stage of a food chain?	Some energy is wasted in urine and faeces, some energy is transferred during respiration, some energy is transferred for movement, keeping warm etc. Not al energy is transferred to biomass in the consumer organism.
29	Describe 3 impacts of energy being transferred to less useful forms at each trophic level.	It determines the number of organisms at each trophic level, determines the shape of a pyramid of biomass, and limits the number of organisms in a food chain.
30	How is percentage change in biomass calculated?	$\frac{\text{Biomass in higher trophic level}}{\text{Biomass in lower trophic level}} \times 100$
31	How is percentgae energy transfer calculated?	$\frac{\text{energy transferred to net trophic level}}{\text{total energy in}} \times 100$
32	What is a quadrat?	A square frame with a known area, used to sample the distribution of organisms.
33	Describe the stages involved in random sampling	1. Use two tape measures to create a grid over your area 2. Use a random number generator to obtain co-ordinates 3. Place the quadrat down where the co-ordinates meet 4. Count the abundance/number of this species you are investigating 5. Repeat this at least 10 times 6. Calculate the mean number per $1m^2$ 7. Mean per $1m^2$ x total area= estimate of the number of organisms in the whole area
34	What type of sampling do we use when wanting to estimate the abundance of an organism in a field?	Random sampling
35	Why do we use a random number generator to obtain co-ordinates?	To avoid bias
36	What type of sampling technique do we use when wanting to investigate how the distribution of on organism changes in an area?	A belt transect
37	What is a transect?	A line along which systematic sampling occurs
38	Describe the stages involved in using a belt transect	1. Place a tape measure along the area 2. Place a quadrat down at 0m and count the number of organisms/different species, as well

		as measuring the abiotic factors that may influence its distribution. 3. Record this in a table 4. Repeat this at regular intervals along the transect e.g. every 2m
39	Name an aquatic invertebrate that indicates high levels of water pollution (H)	Bloodworm, sludgeworm.
40	Name an aquatic invertebrate that indicates low levels of water pollution (H)	Freshwater shrimps, stonefly
41	Name a specices that can indicate the level of polluton in the air.	Lichen, blackspot fungus on roses.
Material cycles and decomposition		
1	What is a decomposer?	An organism which breaks down the remains of dead organisms.
2	Give two examples of decomposers	Bacteria and fungi
3	Name three ways to increase the rate of decay	1. Increase the temperature 2. Increase the oxygen concentration 3. Make conditions moist
4	Why does increasing temperature increase the rate of decay?	Enzymes involved in digestion work faster
5	Name three ways to decrease the rate of decay	1. decrease the temperature 2. decrease the oxygen concentration 3. Dry conditions 4. Acidic or alkaline conditions e.g. pickling
6	How do we calculate the rate of decay?	Rate of decay (g/day) = $\frac{\text{change in mass (g)}}{\text{time (day)}}$
7	What is the word equation for aerobic respiration?	*Glucose + Oxygen → Water + Carbon dioxide*
8	What is the word equation for photosynthesis?	*Water + Carbon dioxide → Glucose + Oxygen*
9	By what process is carbon dioxide taken into plants?	Photosynthesis
10	How is carbon transferred from plants to animals?	The animals eat the plant/feeding
11	How is carbon dioxide released into the atmosphere?	Respiration and combustion
12	What happens to carbon compounds locked in dead organisms?	The carbon enters decomposers and is released into the air as carbon dioxide when decomposers respire
13	How is carbon locked in fossil fuels released into the atmosphere?	Combustion

14	Q1. The diagram shows part of a carbon cycle in a habitat.  Name stages X and Y on the diagram	X= Respiration Y= Combustion
15	Give an example of precipitation	Rain, snow, hail or sleet
16	What process causes water in the liquid state to rise into the atmosphere in the gas state?	Evaporation
17	What is the name given to when water in the gas state becomes in the liquid state? What happens to water after this occurs during the water cycle?	Condensation, it falls as precipitation.
18	By what process is water lost from the leaves of trees and plants?	Transpiration
19	How is potable water obtained in hot countries?	Water is collected, then the sat is removed by distillation (evaporation then condensation).
20	What is a solar still?	Distills water with substances dissolved in it using heat from the Sun.
21	Name 3 bacteria involved in the nitrogen cycle.	Nitrogen fixing bacteria, decomposers, nitrifying bacteria, denitrifying bacteria.
22	What role do nitrifying bacteria play in the nitrogen cycle?	They convert ammonia into nitrates.
23	What role do denitrifying bacteria play in the nitrogen cycle?	They convert nitrates into nitrogen.
24	What role do decomposer bacteria play in the nitrogen cycle?	They convert animal waste into ammonia.
25	What role do nitrogen fixing bacteria play in the nitrogen cycle?	They convert nitrogen into nitrates.
26	State two ways that farmers may make nitrates available for uptake by plants.	Crop rotation, fertilisers.
Biodiversity and human impact on the environment		
1	Define biodiversity	The variety of organisms that exist in an ecosystem/on the planet.

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2	Why does biodiversity ensure a stable ecosystem is provided?	There are lots of sources of food, shelter and the physical environment e.g. oxygen concentration is stable.
3	What is deforestation?	Cutting down of trees
4	Name three ways humans are negatively impacting biodiversity	Three from: • Deforestation • Building houses • Quarrying • Burning of fossil fuels • Polluting water • Oil Spills
5	Name three ways humans are trying to reduce the negative effects of humans on biodiversity ecosystems	Three from: • Breeding programmes for endangered species • Protecting rare habitats • Quotas set on the amount of carbon dioxide emissions by some countries • Recycling resources rather than dumping waste in landfill
6	What does sustainable mean?	Describes an activity that can continue without damaging the environment
7	What is global warming?	The gradual increase in the average temperature of the earth
8	Define the term food security	Having enough high quality food to feed a population
9	Name three biological factors which are threatening good security	Three from: 1. Increasing human population 2. Increased animal farming and meat and fish consumption 3. New pests and pathogens affecting farming 4. Environmental change caused by human activity
10	How are humans attempting to prevent the numbers of fish in the oceans from decreasing?	Use of fish farms
11	What are the issues with this method?	Faeces sinks to the ocean floor and damages ecosystems, disease can spread rapidly.
12	What are the dangers of introducing a non-indigenous species to an ecosystem?	It could reproduce rapidly and eat organisms other than the ones it was intended to, affecting the food web.
13	Describe the process of eutrophication.	Fertilisers leak into rivers and lakes, adding nitrates and other nutrients. Algae and plants grow on the surface of the lake, preventing plants in the lake from getting sunlight. When these plants die, they are broken down by bacteria which use oxygen for respiration. This causes aquatic species to die.

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