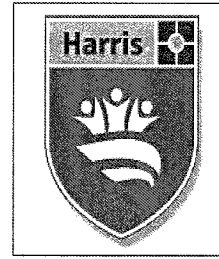


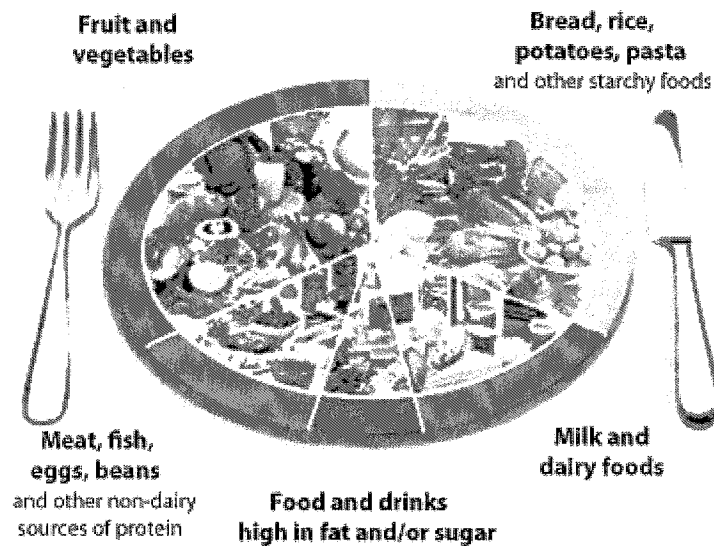
Harris Academy Greenwich



Science

Core Biology

Revision Pack



Student Name: _____

Teacher Name: _____



Unit 1: Biology 1 Tick Sheet

- Tick column A when you have covered the statement in class.
- Tick column B when you feel you *understand* the statement
- Tick column C when you are confident you can answer any questions on it.
- In your revision for the B1 exam, concentrate most time on those statements **not** ticked.
- Statements in bold can only appear on the Higher tier paper.

	A	B	C
B1.1 Keeping Healthy			
evaluate information about the effect of food on health			
evaluate information about the effect of lifestyle on development of disease			
analyse and evaluate claims made by slimming programmes, and slimming products.			
B1.1.1 Diet and exercise	A	B	C
a) A healthy diet contains the right balance of the different foods you need and the right amount of energy.			
b) Carbohydrates, fats and proteins are used by the body to release energy and to build cells. Mineral ions and vitamins are needed in small amounts for healthy functioning of the body. A person is malnourished if their diet is not balanced. This may lead to a person being overweight or underweight. An unbalanced diet may also lead to deficiency diseases or conditions such as Type 2 diabetes.			
c) A person loses mass when the energy content of the food taken in is less than the amount of energy expended by the body. Exercise increases the amount of energy expended by the body.			
d) The rate at which all the chemical reactions in the cells of the body are carried out (the metabolic rate) varies with the amount of activity you do and the proportion of muscle to fat in your body. Metabolic rate may be affected by inherited factors.			
e) Inherited factors also affect our health; for example cholesterol level.			
f) People who exercise regularly are usually healthier than people who take little exercise.			
B1.1.2 How our bodies defend themselves against infectious diseases	A	B	C
relate the contribution of Semmelweis in controlling infection to solving modern problems with the spread of infection in hospitals of antibiotics and immunity			
explain how the treatment of disease has changed as a result of increased understanding of the action			
evaluate the consequences of mutations of bacteria and viruses in relation to epidemics and pandemics			
a) Microorganisms that cause infectious disease are called pathogens.			
b) Bacteria and viruses may reproduce rapidly inside the body and may produce poisons (toxins) that make us feel ill. Viruses damage the cells in which they reproduce.			
c) The body has different ways of protecting itself against pathogens.			
d) White blood cells help to defend against pathogens by: <ul style="list-style-type: none"> ☐ ingesting pathogens ☐ producing antibodies, which destroy particular bacteria or viruses ☐ producing antitoxins, which counteract the toxins released by the pathogens 			
e) The immune system of the body produces specific antibodies to kill a particular pathogen. This leads to immunity from that pathogen. In vaccines, dead or inactivated pathogens stimulate antibody production. If a large proportion of the population is immune to a pathogen, the spread of the pathogen is very much reduced.			
f) Semmelweis recognised the importance of hand-washing in the prevention of spreading some infectious diseases. He insisted that doctors washed their hands before examining patients, and greatly reduced the number of deaths from infectious diseases in his hospital.			

g) Some medicines, including painkillers, help to relieve the symptoms of infectious disease, but do not kill the pathogens.			
h) Antibiotics, including penicillin, are medicines that help to cure bacterial disease by killing infectious bacteria inside the body. Antibiotics cannot be used to kill viral pathogens, which live and reproduce inside cells. It is important that specific bacteria should be treated by specific antibiotics.			
i) The use of antibiotics has greatly reduced deaths from infectious bacterial diseases. Overuse and inappropriate use of antibiotics has increased the rate of development of antibiotic resistant strains of bacteria.			
j) Many strains of bacteria, including MRSA, have developed resistance to antibiotics as a result of natural selection. To prevent further resistance arising it is important to avoid over-use of antibiotics.			
k) Mutations of pathogens produce new strains. Antibiotics and vaccinations may no longer be effective against a new resistant strain of the pathogen. The new strain will then spread rapidly because people are not immune to it and there is no effective treatment.			
Higher Tier candidates should understand that:			
☐ antibiotics kill individual pathogens of the non-resistant strain			
☐ individual resistant pathogens survive and reproduce, so the population of the resistant strain increases			
☐ now, antibiotics are not used to treat non-serious infections, such as mild throat infections, so that the rate of development of resistant strains is slowed down.			
l) The development of antibiotic-resistant strains of bacteria necessitates the development of new antibiotics.			
m) People can be immunised against a disease by introducing small quantities of dead or inactive forms of the pathogen into the body (vaccination). Vaccines stimulate the white blood cells to produce antibodies that destroy the pathogens. This makes the person immune to future infections by the microorganism. The body can respond by rapidly making the correct antibody, in the same way as if the person had previously had the disease. MMR vaccine is used to protect children against measles, mumps and rubella.			
n) Uncontaminated cultures of microorganisms are required for investigating the action of disinfectants and antibiotics. For this: <ul style="list-style-type: none"> ☐ Petri dishes and culture media must be sterilised before use to kill unwanted microorganisms ☐ Inoculating loops used to transfer microorganisms to the media must be sterilised by passing them through a flame ☐ The lid of the Petri dish should be secured with adhesive tape to prevent microorganisms from the air contaminating the culture 			
o) In school and college laboratories, cultures should be incubated at a maximum temperature of 25 °C, which greatly reduces the likelihood of growth of pathogens that might be harmful to humans.			
p) In industrial conditions higher temperatures can produce more rapid growth.	A	B	C
B1.2. Nerves and hormones			
evaluate the benefits of, and the problems that may arise from, the use of hormones to control fertility, including In Vitro Fertilisation (IVF)			
evaluate the use of plant hormones in horticulture as weedkillers and to encourage the rooting of plant cuttings.			
B1.2.1 The nervous system	A	B	C
a) The nervous system enables humans to react to their surroundings and coordinate their behaviour.			
b) Cells called receptors detect stimuli (changes in the environment). Receptors and the stimuli they detect include receptors: <ul style="list-style-type: none"> ☐ in the eyes that are sensitive to light 			

<ul style="list-style-type: none"> ☒ In the ears that are sensitive to sound ☒ In the ears that are sensitive to changes in position and enable us to keep our balance ☒ on the tongue, and in the nose that are sensitive to chemicals and let us taste and smell ☒ in the skin that are sensitive to touch, pressure, pain and to temperature changes 			
<p>c) Light receptor cells, like most animal cells, have a nucleus, cytoplasm and cell membrane</p> <ul style="list-style-type: none"> ☒ Information from receptors passes along cells (neurons) in nerves to the brain. The brain coordinates the response. Reflex actions are automatic and rapid. They often involve sensory, relay and motor neurones. 			
<p>e) Understand the role of receptors, sensory neurones, motor neurones, relay neurones, synapses and effectors in simple reflex actions. In a simple reflex action:</p> <ul style="list-style-type: none"> ☒ Impulses from a receptor pass along a sensory neurone to the central nervous system at a junction (synapse) between neurones in the central nervous system, a chemical is released that causes an impulse in the next neurone. This continues until the motor neurone is reached and stimulated. ☒ the effector is either a muscle or a gland, a muscle responds by contracting and a gland responds by releasing (secreting) chemical substances 			

B1.2.2 Control in the human body

<p>a) Internal conditions in the body that are controlled include:</p> <ul style="list-style-type: none"> ☒ water content – water leaves the body via the lungs when we breathe out and via the skin when we sweat to cool us down, and excess water is lost via the kidneys in the urine ☒ ion content – ions are lost via the skin when we sweat and excess ions are lost via the kidneys in the urine ☒ temperature – to maintain the temperature at which enzymes work best ☒ blood sugar levels – to provide the cells with a constant supply of energy 	A	B	C
<p>b) Many processes within the body are coordinated by chemical substances called hormones. Hormones are secreted by glands and are usually transported to their target organs by the bloodstream.</p>			
<p>c) Hormones regulate the functions of many organs and cells. For example, the monthly release of an egg from a woman's ovaries and the changes in the thickness of the lining of her womb are controlled by hormones secreted by the pituitary gland and by the ovaries.</p> <ul style="list-style-type: none"> ☒ Several hormones are involved in the menstrual cycle of a woman. Hormones are involved in promoting the release of an egg: <ul style="list-style-type: none"> ☒ follicle stimulating hormone (FSH) is secreted by the pituitary gland and causes eggs to mature in the ovaries. It also stimulates the ovaries to produce hormones including oestrogen ☒ luteinising hormone (LH) stimulates the release of eggs from the ovary ☒ oestrogen is secreted by the ovaries and inhibits the further production of FSH 			
<p>e) The uses of hormones in controlling fertility include:</p> <ul style="list-style-type: none"> ☒ Giving oral contraceptives that contain hormones to inhibit FSH production so that no eggs mature – oral contraceptives may contain oestrogen and progesterone to inhibit egg maturation – the first birth-control pills contained large amounts of oestrogen. These resulted in women suffering significant side effects – birth-control pills now contain a much lower dose of oestrogen, or are progesterone only – progesterone-only pills lead to fewer side effects ☒ giving FSH and LH in a 'fertility drug' to a woman whose own level of FSH is too low to stimulate eggs to mature, for example in In Vitro Fertilisation (IVF) treatment – IVF involves giving a mother FSH and LH to stimulate the maturation of several eggs. The eggs are collected from the mother and fertilised by sperm from the father. The fertilised eggs develop into embryos. At the stage when they are tiny balls of cells, one or two embryos are inserted into the mother's uterus (womb) 			

B1.2.3 Control in plants

a) Plants are sensitive to light, moisture and gravity.

A	B	C
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<ul style="list-style-type: none"> ☒ Their shoots grow towards light and against the force of gravity ☒ Their roots grow towards moisture and in the direction of the force of gravity. 			
<p>b) Plants produce hormones to coordinate and control growth. Auxin controls phototropism and gravitropism (geotropism).</p>			
<p>c) The responses of plant roots and shoots to light, gravity and moisture are the result of unequal distribution of hormones, causing unequal growth rates.</p>			
<p>d) Plant growth hormones are used in agriculture and horticulture as weed killers and as rooting hormones.</p>			

B1.3 The use and abuse of drugs

<p>evaluate the effect of statins in cardiovascular disease</p> <p>evaluate different types of drugs and why some people use illegal drugs for recreation</p> <p>evaluate claims made about the effect of prescribed and non-prescribed drugs on health</p> <p>consider the possible progression from recreational drugs to hard drugs</p> <p>evaluate the use of drugs to enhance performance in sport and to consider the ethical implications of their use.</p>	A	B	C
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B1.3.1 Drugs

<p>a) Scientists are continually developing new drugs.</p>			
<p>b) When new medical drugs are devised, they have to be extensively tested and trialled before being used. Drugs are tested in a series of stages to find out if they are safe and effective. New drugs are extensively tested for toxicity, efficacy and dose:</p> <ul style="list-style-type: none"> ☒ in the laboratory, using cells, tissues and live animals ☒ in clinical trials involving healthy volunteers and patients. Very low doses of the drug are given at the start of the clinical trial. If the drug is found to be safe, further clinical trials are carried out to find the optimum dose for the drug. In some double blind trials, some patients are given a placebo, which does not contain the drug. Neither the doctors nor the patients know who has received a placebo and who has received the drug until the trial is complete 			
<p>c) Be aware of the use of statins in lowering the risk of heart and circulatory diseases.</p>			
<p>d) Thalidomide is a drug that was developed as a sleeping pill. It was also found to be effective in relieving morning sickness in pregnant women.</p> <p>Thalidomide had not been tested for use in pregnant women. Unfortunately, many babies born to mothers who took the drug were born with severe limb abnormalities. The drug was then banned. As a result, drug testing has become much more rigorous. More recently, thalidomide has been used successfully in the treatment of leprosy and other diseases.</p>			
<p>e) Be aware of the effects of misuse of the legal recreational drugs, alcohol and nicotine. Candidates should understand that the misuse of the illegal recreational drugs ecstasy, cannabis and heroin may have adverse effects on the heart and circulatory system.</p>			
<p>f) Cannabis is an illegal drug. Cannabis smoke contains chemicals which may cause mental illness in some people.</p>			
<p>g) The overall impact of legal drugs (prescribed and non-prescribed) on health is much greater than the impact of illegal drugs because far more people use them.</p>			
<p>h) Drugs change the chemical processes in peoples' bodies so that they may become dependent or addicted to the drug and suffer withdrawal symptoms without them. Heroin and Cocaine are very addictive.</p>			
<p>i) There are several types of drug that an athlete can use to enhance performance. Some of these drugs are banned by law and some are legally available on prescription, but all are prohibited by sporting regulations. Examples include stimulants that boost bodily functions such as heart rate; and anabolic steroids which stimulate muscle growth.</p>			

B1.4 Interdependence and adaptation

<p>suggest how organisms are adapted to the conditions in which they live</p> <p>observe the adaptations, eg body shape, of a range of organisms from different habitats</p> <p>develop an understanding of the ways in which adaptations enable organisms to survive</p>	A	B	C
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<p>suggest the factors for which organisms are competing in a given habitat evaluate data concerned with the effect of environmental changes on the distribution and behaviour of living organisms.</p> <p>B1.4.1 Adaptations</p> <p>a) To survive and reproduce, organisms require a supply of materials from their surroundings and from the other living organisms there.</p> <p>b) Plants often compete with each other for light and space, and for water and nutrients from the soil.</p> <p>c) Animals often compete with each other for food, mates and territory.</p> <p>d) Organisms, including microorganisms have features (adaptations) that enable them to survive in the conditions in which they normally live.</p> <p>e) Some organisms live in environments that are very extreme. Extremophiles may be tolerant to high levels of salt, high temperatures or high pressures.</p> <p>f) Animals and plants may be adapted for survival in the conditions where they normally live, eg deserts, the Arctic. Animals may be adapted for survival in dry and arctic environments by means of:</p> <ul style="list-style-type: none"> ▣ changes to surface area ▣ thickness of insulating coat ▣ amount of body fat ▣ camouflage <p>g) Plants may be adapted to survive in dry environments by means of:</p> <ul style="list-style-type: none"> ▣ changes to surface area particularly of the leaves, ▣ water-storage tissues ▣ extensive root systems <p>h) Animals and plants may be adapted to cope with specific features of their environment, e.g. thorns, poisons and warning colours to deter predators.</p> <p>B1.4.2 Environmental change</p> <p>a) Changes in the environment affect the distribution of living organisms</p> <p>b) Animals and plants are subjected to environmental changes. Such changes may be caused by living or non-living factors such as a change in a competitor, or in the average temperature or rainfall.</p> <p>c) Living organisms can be used as indicators of pollution:</p> <ul style="list-style-type: none"> ▣ lichens can be used as air pollution indicators, particularly of the concentration of sulfur dioxide in the atmosphere ▣ invertebrate animals can be used as water pollution indicators and are used as indicators of the concentration of dissolved oxygen in water <p>d) Environmental changes can be measured using non-living indicators such as oxygen levels, temperature and rainfall</p> <p>B1.5 Energy and biomass in food chains</p> <p>interpret pyramids of biomass and construct them from appropriate information.</p> <p>B1.5.1 Energy in biomass</p> <p>a) Radiation from the Sun is the source of energy for most communities of living organisms. Green plants and algae absorb a small amount of the light that reaches them. The transfer from light energy to chemical energy occurs during photosynthesis. This energy is stored in the substances that make up the cells of the plants.</p> <p>b) The mass of living material (biomass) at each stage in a food chain is less than it was at the previous stage. The biomass at each stage can be drawn to scale and shown as a pyramid of biomass.</p> <p>c) The amounts of material and energy contained in the biomass of organisms is reduced at each successive stage in a food chain because:</p> <ul style="list-style-type: none"> ▣ some materials and energy are always lost in the organisms' waste materials ▣ respiration supplies all the energy needs for living processes, including movement. 	A	B	C
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<p>Much of this energy is eventually transferred to the surroundings</p> <p>B1.6 Waste materials from plants and animals</p> <p>evaluate the necessity and effectiveness of schemes for recycling organic kitchen or garden waste.</p> <p>B1.6.1 Decay processes</p> <p>a) Living things remove materials from the environment for growth and other processes. These materials are returned to the environment either in waste materials or when living things die and decay.</p> <p>b) Materials decay because they are broken down (digested) by microorganisms. Microorganisms are more active and digest materials faster in warm, moist, aerobic conditions.</p> <p>c) The decay process releases substances that plants need to grow.</p> <p>d) In a stable community, the processes that remove materials are balanced by processes that return materials. The materials are constantly cycled.</p> <p>B1.6.2 The carbon cycle</p> <p>The constant cycling of carbon is called the carbon cycle. In the carbon cycle:</p> <ul style="list-style-type: none"> ▣ carbon dioxide is removed from the environment by green plants and algae for photosynthesis. ▣ The carbon from the carbon dioxide is used to make carbohydrates, fats and proteins, which make up the body of plants and algae. ▣ When green plants and algae respire, some of this carbon becomes carbon dioxide and is released into the atmosphere. ▣ When green plants and algae are eaten by animals and these animals are eaten by other animals, some of the carbon becomes part of the fats and proteins that make up their bodies ▣ When animals respire some of this carbon becomes carbon dioxide and is released into the atmosphere ▣ When plants, algae and animals die, some animals and microorganisms feed on their bodies ▣ Carbon is released into the atmosphere as carbon dioxide when these organisms respire ▣ by the time the microorganisms and detritus feeders have broken down the waste products and dead bodies of organisms in ecosystems and cycled the materials as plant nutrients, all the energy originally absorbed by green plants and algae has been transferred ▣ Combustion of wood and fossil fuels releases carbon dioxide into the atmosphere. <p>B1.7 Genetic variation and its control</p> <p>interpret information about cloning techniques and genetic engineering techniques make informed judgements about the economic, social and ethical issues concerning cloning and genetic engineering, including genetically modified (GM) crops.</p> <p>B1.7.1 Why organisms are different</p> <p>a) The information that results in plants and animals having similar characteristics to their parents is carried by genes, which are passed on in the sex cells (gametes).</p> <p>b) The nucleus of a cell contains chromosomes which carry genes that control your characteristics.</p> <p>c) Different genes control the development of different characteristics of an organism.</p> <p>d) Differences in the characteristics of different individuals of the same kind may be due to differences in:</p> <ul style="list-style-type: none"> ▣ the genes they have inherited (genetic causes) ▣ the conditions in which they have developed (environmental causes) ▣ or a combination of both 	A	B	C
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	A	B	C
B1.7.2 Reproduction			
a) There are two forms of reproduction: <ul style="list-style-type: none"> ☒ sexual reproduction – the joining (fusion) of male and female gametes. The mixture of the genetic information from two parents leads to variety in the offspring ☒ asexual reproduction – no fusion of gametes and only one individual is needed as the parent. There is no mixing of genetic information and so no genetic variation in the offspring. These genetically identical individuals are known as clones 			
b) New plants can be produced quickly and cheaply by taking cuttings from older plants. These new plants are genetically identical to the parent plant.			
c) Modern cloning techniques include: <ul style="list-style-type: none"> ☒ tissue culture – using small groups of cells from part of a plant ☒ embryo transplants – splitting apart cells from a developing animal embryo before they become specialised, then transplanting the identical embryos into host mothers ☒ adult cell cloning – the nucleus is removed from an unfertilised egg cell. The nucleus from an adult body cell is then inserted into the egg cell. An electric shock causes the egg cell to divide to form embryo cells containing the same genetic information as the adult skin cell. When the embryo has developed into a ball of cells, it is inserted into the womb of an adult female to continue its development. 			
d) In genetic engineering, genes from the chromosomes of humans and other organisms can be 'cut out' using enzymes and transferred to cells of other organisms.			
e) Genes can also be transferred to the cells of animals, plants or microorganisms at an early stage in their development so that they develop with desired characteristics. <ul style="list-style-type: none"> ☒ New genes can be transferred to crop plants ☒ Crops that have had their genes modified in this way are called genetically modified crops (GM crops) ☒ Examples of genetically modified crops include ones that are resistant to insect attack or to herbicides. Genetically modified crops generally show increased yields. ☒ Concerns about GM crops include the effect on populations of wild flowers and insects, and uncertainty about the effects of eating GM crops on human health. 			
B1.8 Evolution	A	B	C
Interpret evidence relating to evolutionary theory			
suggest reasons why Darwin's theory of natural selection was only gradually accepted			
Identify the differences between Darwin's theory of evolution and conflicting theories, such as that of Lamarck			
suggest reasons for the different theories.			
B1.8.1 Evolution	A	B	C
a) Darwin's theory of evolution by natural selection states that all species of living things have evolved from simple life forms that first developed more than three billion years ago.			
b) The theory of evolution by natural selection was only gradually accepted because: <ul style="list-style-type: none"> ☒ the theory challenged the idea that God made all the animals and plants that live on Earth ☒ there was insufficient evidence at the time the theory was published to convince many scientists ☒ the mechanism of inheritance and variation was not known until 50 years after the theory was published 			
c) Other theories, including that of Lamarck, are based mainly on the idea that changes that occur in an organism during its lifetime can be inherited. We now know that in the vast majority of cases this type of inheritance cannot occur.			
d) Studying the similarities and differences between organisms allows us to classify living organisms into animals, plants and microorganisms, and helps us to understand evolutionary and ecological relationships. Models allow us to suggest relationships between organisms.			

e) Evolution occurs via natural selection: <ul style="list-style-type: none"> ☒ individual organisms within a particular species may show a wide range of variation because of differences in their genes ☒ individuals with characteristics most suited to the environment are more likely to survive to breed successfully ☒ the genes that have enabled these individuals to survive are then passed on to the next generation 			
f) Where new forms of a gene result from mutation there may be relatively rapid change in a species if the environment changes			

B1 REVISION - CHAPTER 1 - Keeping Healthy

Diet & Exercise

What does metabolic rate mean?

What is the proportion of fruit and vegetables that should be in a balanced diet?

Weight Problems

What health problems can obesity lead to?

It is also unhealthy to be very underweight. Why might they suffer from deficiency diseases?

Defence Mechanisms

What prevents pathogens entering the body?

White blood cells are part of the _____ what three things do they do to defend the body?

- 1.
- 2.
- 3.

Inheritance, exercise & Health

What factors can affect your metabolic rate?

What are the two types of cholesterol and what does each type do?

What can you do to lower your blood cholesterol levels?

Pathogens & Disease.

What is a pathogen and how do they make us ill?

How do viruses replicate?

Washing hands removes pathogens from them. Semmelweis was the first doctor to realise this. What did he tell his staff to do?



Using Drugs to treat disease.

Who first discovered Penicillin and what is it?

Why are antibiotics unable to kill viruses?

KEY WORDS:

Malnourished
Metabolic rate
Obese
Pathogen
virus
bacteria
antibiotic

ASSESSMENT:

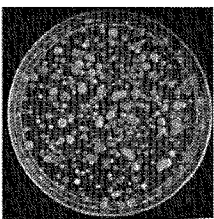


B1 REVISION - CHAPTER 1 cont. - Keeping Healthy

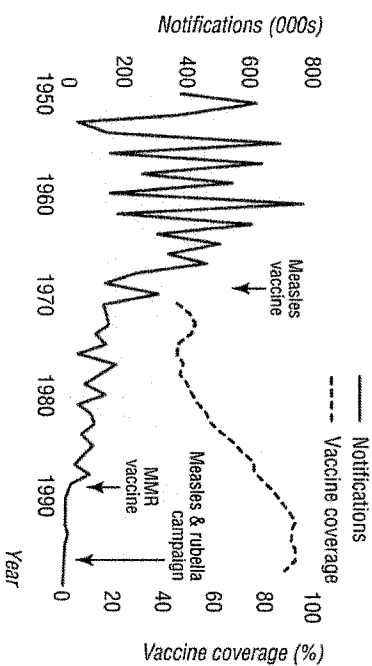
Growing & Investigating Bacteria

Pure cultures of safe (non-pathogenic) bacteria can be used for laboratory investigations.

What cultures need to grow	To keep the culture pure you must:



How do we deal with disease?



You will need to be able to explain what a graph is showing you. Practice with this one.

Advantages of vaccination	Disadvantages of vaccination

Why is it necessary to continue to develop new vaccinations and medicines?

Changing Pathogens

If a pathogen changes by mutation the new strain may spread rapidly. Diseases that spread within a country result in an _____ . Those that spread across countries result in a _____ .

MRSA has evolved through natural selection, how?

Immunity



What is used to make a vaccine?

What can vaccines protect against?

How do vaccines work?

KEY WORDS:

Epidemic
 Pandemic
 Vaccination
 Immunisation
 Natural selection

ASSESSMENT:



B1 REVISION - CHAPTER 2 - Coordination and Control

Responding to change

The nervous system has receptors to detect stimuli.
List the sense organs and the stimuli they detect.

Neurons are nerve cells which are found in nerves, which carry electrical impulses.

Hormones and the menstrual cycle.

Follicle stimulating hormone (FSH) is made by the pituitary gland and causes eggs to mature and oestrogen to be produced.
Oestrogen is produced by the ovaries and inhibits the further production of FSH.
Luteinising hormone (LH) also made by the pituitary gland and stimulates the mature egg to be released from the ovary (ovulation).

The artificial control of fertility

Contraceptive pills contain _____ and/or _____ to inhibit FSH. FSH can also be used to help a woman produce _____.
Fertility treatment can be used to prevent pregnancy (e.g. the contraceptive pill), or increase chance of pregnancy (e.g. IVF)

Issues involved in fertility treatment.

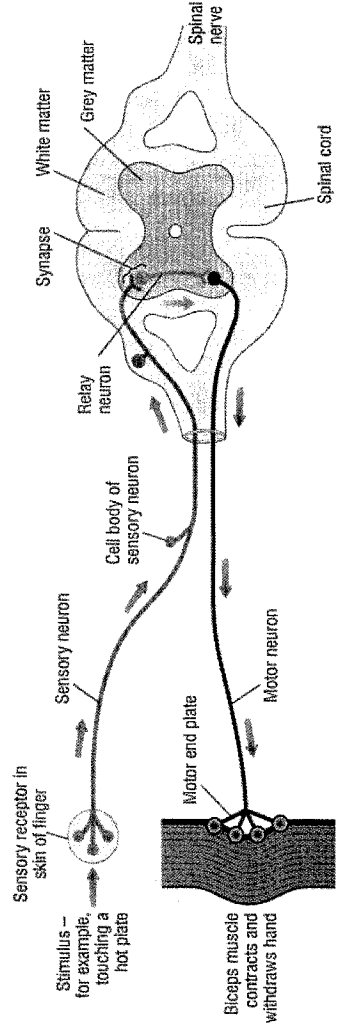
Advantages	Disadvantages

Reflex Actions

The main six stages of a reflex action are:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

At the junction between two neurons is a synapse, chemicals transmit the impulse across this gap.



KEY WORDS:
Progesterone
Reflex
Synapse
Oestrogen
Pituitary gland
Receptor
Neuron

ASSESSMENT:



B1 REVISION - CHAPTER 2 continued - Coordination and control

Controlling Conditions

The body carefully controls its internal environment. What are 4 of the internal conditions that are controlled?

Why must we keep our temperature constant?

What organ controls the level of sugar in our blood?

Using Hormones in Women

Many use the contraceptive pill to prevent unwanted pregnancies, and also to plan when they have a baby. Hormones can also be used to help women get pregnant. Older women can use hormone treatment to allow them to have babies later in life.

Side effects are possible in some women if they take hormones for a long time.

What ethical concerns are there about using fertility drugs?

Using Hormones in Plants

Plant hormones can be used by farmers and gardeners.

Weedkillers can be used, rooting powder to encourage roots on cuttings, and some hormones are used to help some fruit to ripen.

What damage to the environment can the use of plant hormones cause?

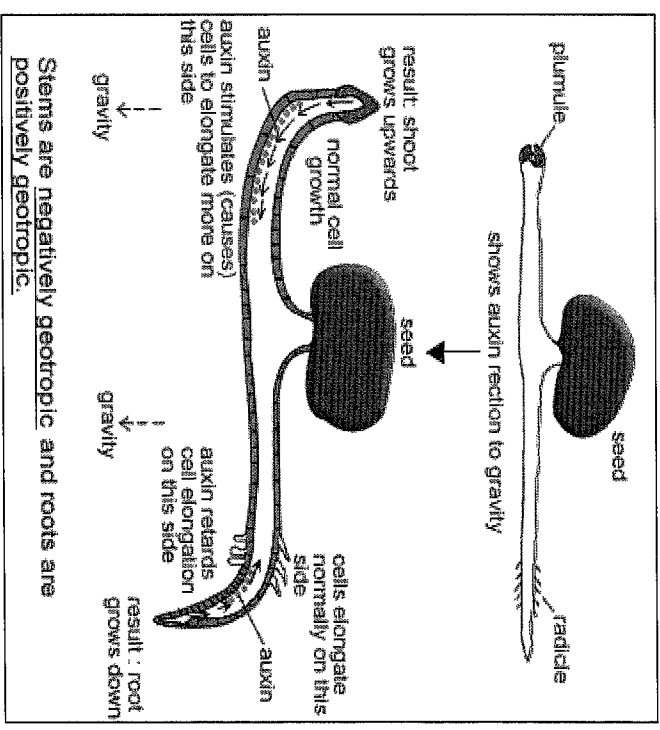
Hormones and the control of plant growth

Plants are sensitive to light gravity and moisture. Plant shoots grow towards light. This response is

Roots grow down towards gravity. This response is

Roots also grow towards water.

Auxin is the hormone which controls phototropism and gravitropism.



Stems are negatively geotropic and roots are positively geotropic.

KEY WORDS:

- Gravitropism (geotropism)
- Auxin
- Phototropism
- Enzyme
- Pancreas

ASSESSMENT:



B1 REVISION - CHAPTER 3 - Medicine and Drugs

Developing New Medicines

Why are drugs tested ?

What is a placebo?

What is a double-blind trial?

Thalidomide was developed as a sleeping drug but not tested for preventing morning sickness, so some babies were born with birth defects.

Does Cannabis lead to hard drugs?

Cannabis is an illegal drug which must be bought from drug dealers. This may put the person in contact with hard drugs. However not all cannabis users go on to use hard drugs.

What problems can using cannabis lead to?

How effective are medicines?

Statins are drugs which lower blood cholesterol levels. They have reduced the incidences of cardiovascular disease in the population by over 40%.

Some people prefer to use herbal medicines how will you know if they actually work?

Drugs

Drugs may be _____ or _____
They may also be _____
or _____.

Recreational drugs are for pleasure and affect the brain and the nervous system. They may also have adverse effects on the _____ system and _____ system.

Nicotine and caffeine are two examples of legal drugs that are used recreationally.

Heroin and cocaine are two examples of addictive illegal drugs.

Drugs in Sport

Which drugs may build up muscle mass?
Why is it unethical to take drugs to enhance performance?

Why do some athletes risk taking performance enhancing drugs?

KEY WORDS:

Placebo
Thalidomide
Statin
Withdrawal system
Steroid
Double-blind trial
Depression

ASSESSMENT:



B1 REVISION - CHAPTER 4 - Adaptation for survival

Adapt & Survive

What does adaptation mean?

What is an extremophile?

Measuring environmental change

Name 3 non-living factors:

Name 3 living factors:

Name an indicator species for both land and water.

Why are these indicator species?

Adaptation in Animals & Plants

	Animals	Plants
Cold areas	Thick fur & blubber to keep warm Usually large with a small surface area: volume ratio	Reduce the surface area of leaves, tissues that store water & extensive root system.
Hot dry areas	May hunt or feed at night May have large surface area: volume ratio	Plants develop thorns etc to put animals off. Loose water through holes in the leaves called stomata.
	Coat colour may change in different seasons giving year round camouflage	

Competition

Give some examples of how animals and plants compete with each other.

	Animals	Plants

Impact of Change

What may happen if birds fly further North if the climate gets warmer?

The distribution of living organisms is affected by changes in what two factors?

The data on the effect of environmental change is not always easy to interpret.

KEY WORDS:

Adaptation
Herbivore
Carnivore
Extremophile
Denature
Stomata
Competition

ASSESSMENT:

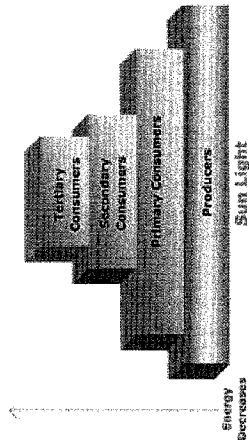


B1 REVISION - CHAPTER 5 - Energy in Biomass

Pyramids of biomass

Biomass is the mass of living material in _____ and _____.

Don't confuse with pyramid of number which can look similar!



Decay Processes

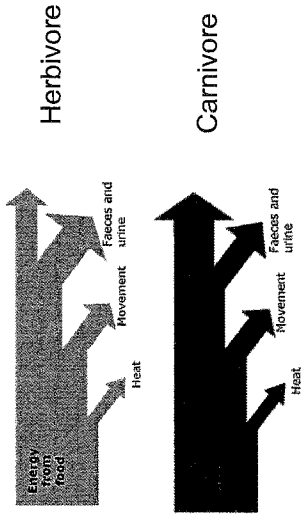
What is needed for decay to happen?

Bacteria and fungi are microorganisms. Some bacteria and fungi cause decay. what do we call these?

Name two ways humans can recycle waste.

Under what conditions is decay quicker?

Energy Transfers



There is less biomass and energy available at each stage in a food chain.

What differences can you see in the two Sankey diagrams?

Recycling organic waste

Why is it necessary to recycle organic kitchen and garden waste?

Why might gardeners add worms and layers of garden soil to composters?

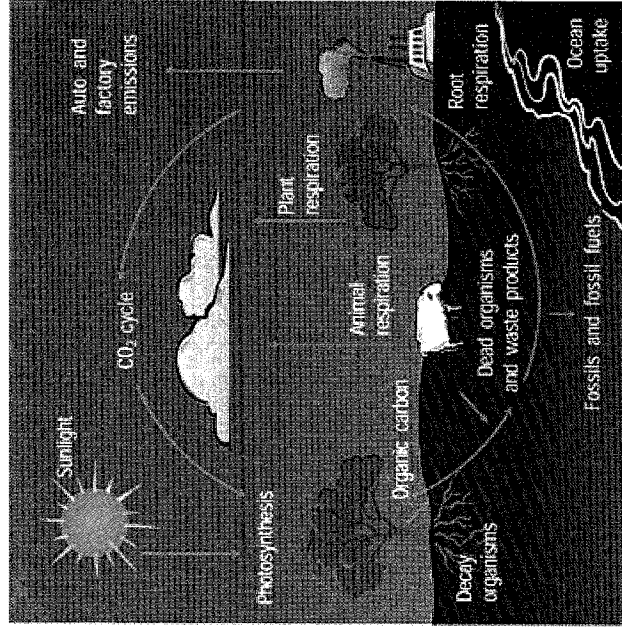
Why might councils shred garden waste before putting it into big bins?

The Carbon Cycle

The recycling of carbon involves both photosynthesis and respiration.

What does photosynthesis remove from the atmosphere?

When is CO₂ released back into the atmosphere?



KEY WORDS:

- Biomass
- Detritus feeder
- Decomposer
- Sewage
- Combustion
- Organic waste

ASSESSMENT:



B1 REVISION - CHAPTER 6 - Variation, reproduction & new technology

Inheritance

What does the nucleus of a cell contain that are thread like?

What do they carry?

When is genetic information from the parents passed to offspring?

In most body cells the chromosomes are in pairs. One set from the female gamete and one from the male gamete.

What do genes control?

Genetic & Environmental Differences

Name two factors that may result in differences between individuals.

What is the most important factor in controlling appearance?

What may affect plants even though they have the same genes?

What might affect human development in the uterus?

Genes may determine if someone has potential to be a good athlete, but what will also help?

Types of Reproduction

Asexual reproduction	
Sexual Reproduction	

How are clones produced?

What are they?

What leads to variety in offspring?

KEY WORDS:

Clone
Chromosome
Gene
Gamete
Sexual reproduction
Asexual reproduction

ASSESSMENT:



B1 REVISION - CHAPTER 6 cont. - Variation, reproduction & new technology

Cloning

How can you clone a plant?

What is used to clone an animal?

What type of reproduction is used for cloning?

Tissue culture is more expensive but can be used to reproduce large numbers of a rare or top quality plant. Sometimes animals or plants are genetically modified to reproduce substances before being cloned.

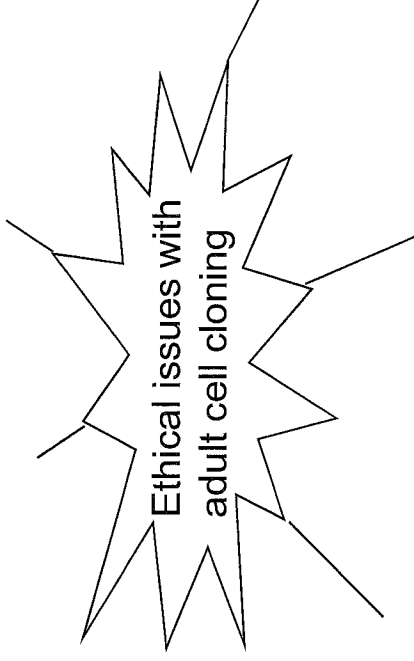
Genetic Engineering

What does genetic engineering change?

What is used to cut a gene out of the chromosome?

What might GM crops be resistant to?

Adult cell cloning



In adult cell cloning the nucleus of an adult cell e.g. a skin cell, replaces the nucleus of an egg cell.

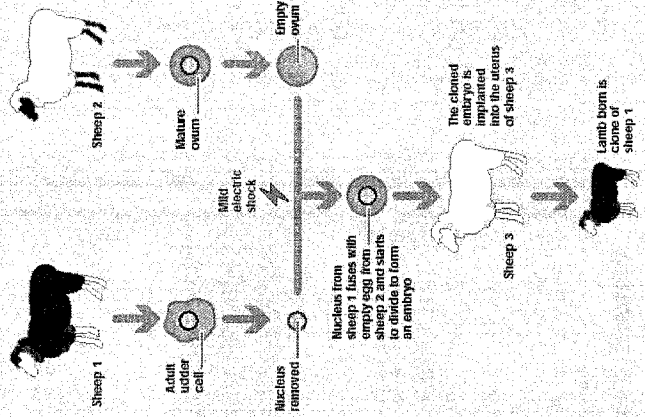
The nucleus of an adult cell is transplanted into an 'empty' egg cell. When the animal develops it has the genetic material of the original adult cell.

ASSESSMENT:



KEY WORDS:
Tissue culture
Genetically modified
Genetic engineering
Adult cell cloning

Adult cell cloning diagram



Making choices about technology

Advantages	Disadvantages

For cloning & genetic engineering

B1 REVISION - CHAPTER 7 - Evolution

Theories for Evolution

Jean-Baptiste Lamarck	Charles Darwin

Natural Selection

In natural selection which organisms are more likely to survive?

If an organism survives what will this enable them to do?

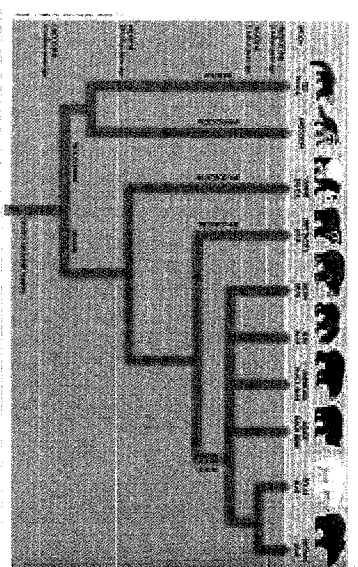
What is a mutation?

How might a mutation help an individual to survive?

Darwin's theory of evolution was only gradually accepted, why was this?

How did the mockingbird species of the Galapagos help Darwin come up with his theory?

Classification and Evolution



This is an example of an evolutionary tree. What can it tell us?

What is group of organisms that can all interbreed called?

Name the three main kingdoms of Eukaryotes.

Biologists study the similarities and differences between organisms in order to classify them. What is this branch of biology called?

KEY WORDS:

Evolution
Mutation
Species
Kingdom
Evolutionary
Natural classification system

ASSESSMENT:



B1 - Examination 'hints and tips'

Candidates should:

Explain the effects (eg underweight, overweight), of Type 2 diabetes and deficiency diseases. E.g. scurvy, rickets and kwashiorkor.

Define obesity.

State two factors that affect the metabolic rate.

Explain why too much saturated fat is bad for us.

State the benefits of exercise on the body.

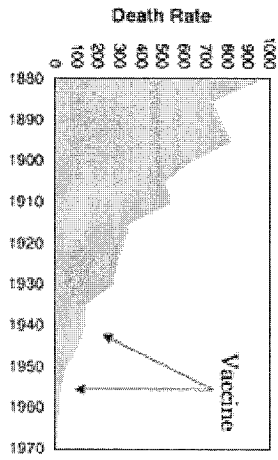
Calculate percentage ratios of saturated fat to unsaturated fat from nutritional information on food packets.

Food	Saturated fat (g/100g)	Unsaturated fat (g/100g)	Percentage ratio Sat:unsat
Heroes	15.9	10.7	
Chicken in mushroom sauce	1.2	1.6	
Nutri-grain bar	3.5	5.5	

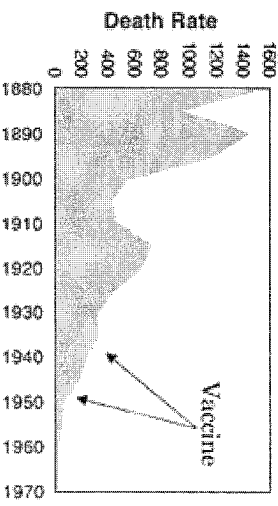
B1.1.2 How our bodies defend themselves against infectious diseases

Be able to use data from a bar chart and line graphs to compare the numbers of deaths from different pathogens.

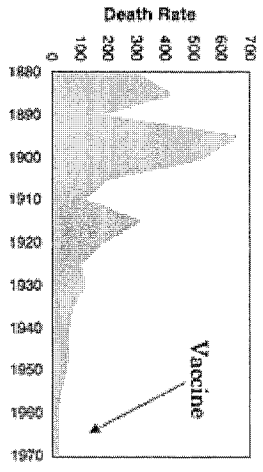
Whooping Cough



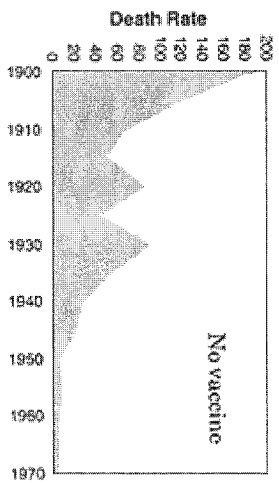
Diphtheria



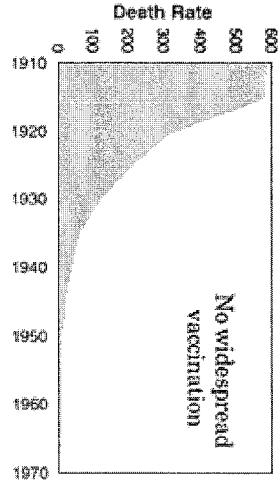
Measles



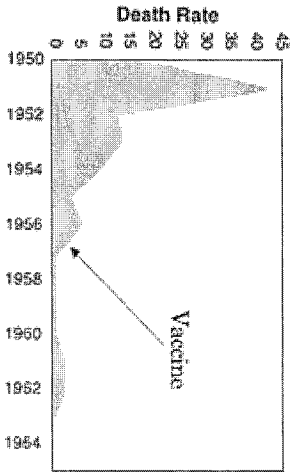
Scarlet Fever



Typhoid Fever



Polio



Relate the work of Ignaz Semmelweis to the reduced spread of infection in hospitals today.

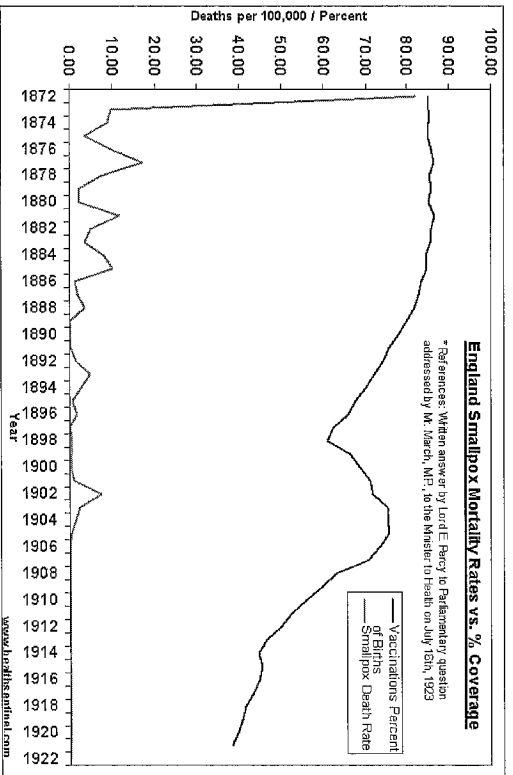
Describe ways in which the body defends itself against disease entering it.

Describe the actions of white blood cells using terms 'ingest', 'antibodies' and 'antitoxins'.

Explain the processes of natural immunity (vaccination).

Write a method to describe the aseptic technique of culturing bacteria

Be able to use data from a line graph to describe the relationship between the per cent vaccinated and frequency of the disease.



Explain why schools do not incubate above 25 °C.

Explain why drugs that kill bacteria cannot be used to treat viral infections.

Compare and contrast how bacteria and viruses make us feel ill.

Explain what we should do to slow down the rate of development of resistant strains of bacteria.

B1.2 Nerves and hormones

B1.2.1 The nervous system

Correctly describe and sequence a reflex action from stimulus to response.

Match the 5 organs containing receptors to the stimulus detected.

Explain the role of chemicals at synapses.

B1.2.2 Control in the human body - homeostasis

Be able to link the organ to the condition it helps control in the body.

Name three conditions which are controlled within our bodies.

Explain what hormones are.

Name the hormones that control the menstrual cycle and state the glands that produce them.

Be able to explain the different roles of FSH, oestrogen and LH.

State how oral contraceptives have been improved over the years.

Describe the main stages involved in IVF treatment.

B1.2.3 Control in plants

Draw diagrams to explain the role of auxin in plant responses in terms of unequal distribution in shoots and roots.

State some commercial uses of plant hormones.

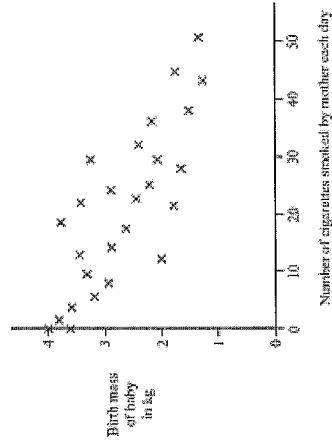
B1.3 The use and abuse of drugs

B1.3.1 Define the term 'drug'.

Give reasons for the different stages in drug testing.

Explain why a person might become addicted to a recreational drug.

Be able to use data from a line graph to describe the relationship between birth mass of a baby and the number of cigarettes smoked by the mother.



Give three possible effects of the misuse of alcohol.

Give examples of specific effects of cannabis on the body.

Describe and evaluate the effect of statins in cardiovascular disease.

Evaluate the use of drugs to enhance performance in sport.

B1.4 Interdependence and adaptation

B1.4.1 Adaptations

Describe and explain adaptations for survival in the Arctic.

Describe and explain adaptations for survival in a desert.

Be able to name two things for which plants compete.

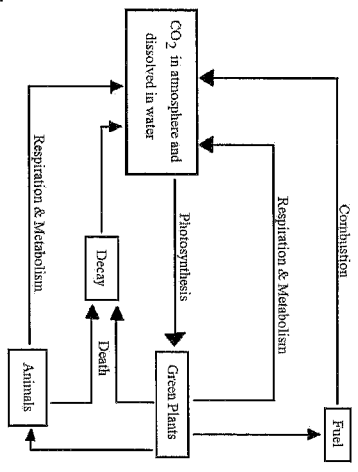
Define the term extremophile and be able to give general examples.

B1.4.2 Environmental change
Suggest two ways in which humans damage the environment.
Be able to demonstrate an understanding of the use of equipment to measure oxygen, temperature and rainfall.
B1.5 Energy and biomass in food chains
B1.5.1 Energy in biomass
Be able to draw a pyramid of biomass using information given in a food chain. Grass → rabbits → foxes → fleas
Explain why energy and biomass is reduced at successive stages in a food chain.
B1.6 Waste materials from plants and animals
B1.6.1 Decay processes
Name the type of living organism which causes leaves to decay? Give one reason why leaves decay faster in summer than winter.
Name the gas needed for decay.

B1.6.2 The carbon cycle

Give two reasons why deforestation increases the amount of carbon dioxide in the atmosphere.

Describe how the carbon in dead bodies may be recycled.



Describe the stages in the carbon cycle.

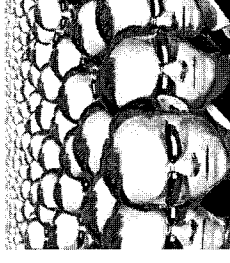
B1.7 Genetic variation and its control

B1.7.2 Reproduction

Be able to sequence the stages involved in adult cell cloning.

State the difference between sexual and asexual reproduction and why sexual reproduction leads to variation.

Be able to present arguments for and against human cloning.



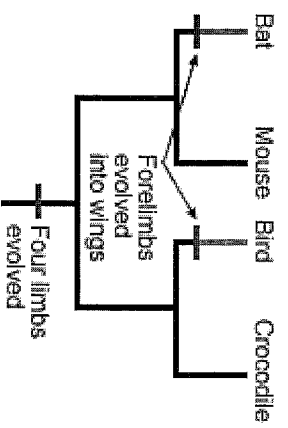
Give two reasons why farmers are in favour of growing GM crops.

Give two reasons why people are against growing GM crops.

B1.8 Evolution

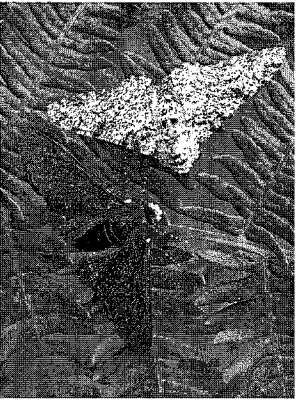
Be able to give two reasons why people were against Darwin's ideas at that time.

Be able to use an evolutionary tree to describe relationships between organisms and the time scales involved in evolution.



Identify similarities and differences between Darwin's and Lamarck's theories of evolution.

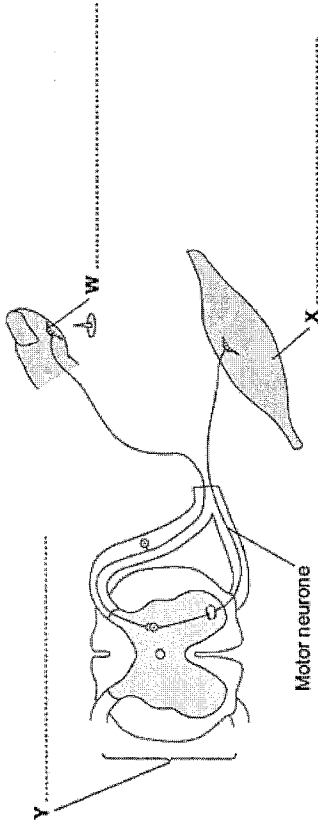
Describe how and why the peppered moth appeared in the industrial revolution.



Define the term 'mutation'.

Past Exam Questions

Q1. The diagram shows the structures involved in a reflex action.



(a) On the diagram, name the structures labelled W, X and Y. (3)

(b) The control of blood sugar level is an example of an action controlled by hormones. Give two ways in which a reflex action is different from an action controlled by hormones.

- 1
- 2

(2)
(Total 5 marks)

Q2. (a) List A gives the names of three stages in trialling a new drug. List B gives information about the three stages.

Draw a line from each stage in List A to the correct information in List B.

List A
Stage

- Tests on humans including a placebo
- Tests on humans using very small quantities of the drug
- Tests on animals

List B
Information

- Used to find if the drug is toxic
- The first stage in the clinical trials of the drug
- Used to find the optimum dose of the drug
- Used to prove that the drug is effective on humans

(b) Read the passage.

Daily coffee dose delays development of Alzheimer's in humans.

Alzheimer's is a brain disease that causes memory loss in elderly people. Scientists studied 56 mice that had been genetically engineered to develop Alzheimer's.

Before treatment all the mice did badly in memory tests.

Half the mice were given a daily dose of caffeine in their drinking water. The dose was equivalent to the amount of caffeine in six cups of coffee for a human.

The other mice were given ordinary water.

After two months, the caffeine-drinking mice did better in memory tests than the mice drinking ordinary water.

(3)

The headline for the passage is not justified.
 Explain why as fully as possible.

.....

.....

.....

.....

.....

.....

(3)
 (Total 6 marks)

Q3. Squirrels live in woodland.

Table 1 shows:

- the total area of England, Scotland and Wales
- the area of different types of woodland in these countries.

Country	Total area of country in thousands of km ²	Area of woodland in thousands of km ²		
		Coniferous woodland	Broadleaf woodland	Total
England	130	3.6	7.8	11.4
Scotland	79	10.4	3.0	13.4
Wales	21	1.9	0.9	2.8

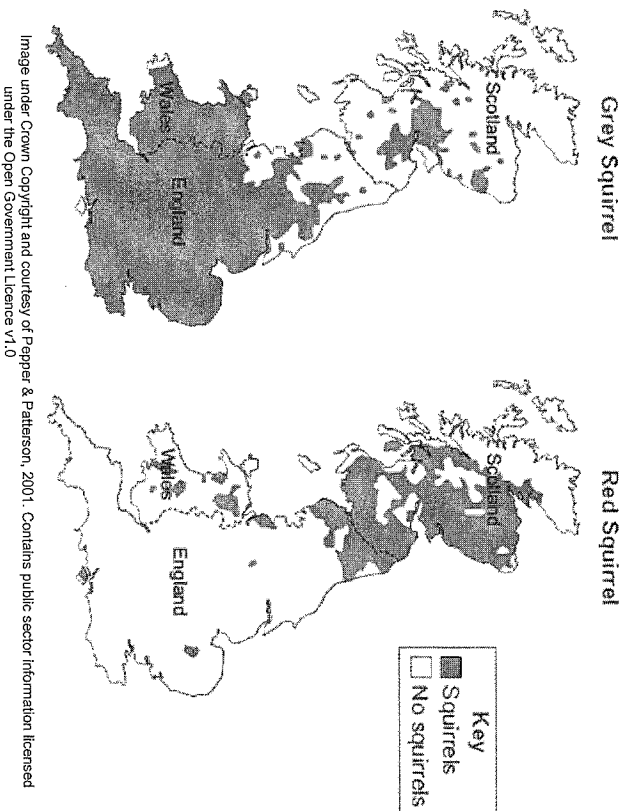
(a) Look at the data for the three countries. Estimate which country has the greatest proportion of its area suitable as a habitat for squirrels.

Support your answer with relevant figures.

.....

.....

(b) The maps show the distribution of grey squirrels and red squirrels in England, Scotland and Wales.



Scientists suggested that the distribution of grey squirrels and red squirrels is linked to the type of trees in woodlands.

(i) The information for England and Scotland supports this suggestion.
 How?

.....

.....

(1)

(ii) Give one piece of evidence that contradicts this suggestion.

.....

(1)

(c) Red squirrels are native to the UK.
 Grey squirrels were introduced to the UK from the USA over 100 years ago.

Table 2 gives information about the two types of squirrel.

	Grey squirrel	Red squirrel
Population in UK	2.5 million	140 000
Main food types	Seeds, nuts, tree bark, birds' eggs, young birds	Cones from coniferous trees, nuts, tree bark, berries
Health	Can become immune to parapox virus	Cannot become immune to parapox virus
Reproduction	Up to 9 young, twice a year	Up to 6 young, twice a year
Survival rate of young in mixed populations	41 %	14 %
Length of life	2 – 4 years	Up to 7 years

In most parts of the UK the population of grey squirrels is increasing, but the population of red squirrels is decreasing.

Suggest why.

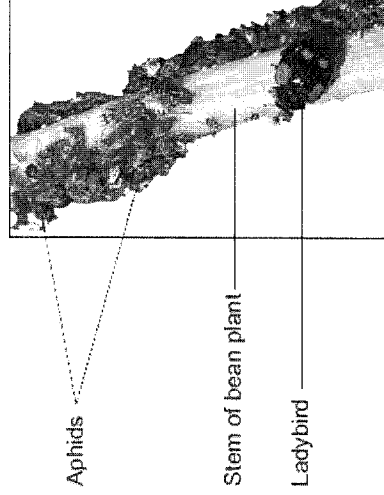
Use information from Table 2.

.....

(3)
 (Total 7 marks)

Q4. Students investigated a food chain in a garden.

The students found 650 aphids feeding on one bean plant.
 Five ladybirds were feeding on the aphids.



Photograph supplied by Hemera/Thinkstock

(a) (i) Draw a pyramid of biomass for this food chain.
 Label the pyramid.

(2)

(ii) The biomass in the five ladybirds is less than the biomass in the bean plant.

Give two reasons why.

.....

.....

(2)

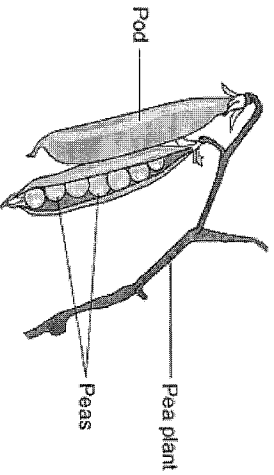
(b) The carbon in dead bean plants is returned to the atmosphere via the carbon cycle.

Describe this part of the carbon cycle.

.....

(4)
 (Total 8 marks)

Q5. Peas grow in pods on pea plants.



A gardener grew four varieties of pea plants, A, B, C and D, in his garden.

The gardener counted the number of peas in each pod growing on each plant.
 The table shows his results.

Variety	Range of number of peas in each pod	Mean number of peas in each pod
A	2-6	4
B	3-7	5
C	3-8	6
D	6-8	7

(a) Give **one** environmental factor and **one** other factor that might affect the number of peas in a pod.

Environmental factor.....
 Other factor.....

(2)

(b) The gardener thinks that he will get the largest mass of peas from his garden if he grows variety **D**.

Why is the gardener **not** correct?
 Suggest **one** reason.

.....

(1)

(c) It is important that carbon is cycled through living things.

After he has picked the peas, the gardener puts the dead pea plants onto a compost heap.

Over the next few months, the carbon in the carbon compounds from the pea plants is returned to the air.
 Describe how.

.....

.....

.....

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.....

.....

(4)
(Total 7 marks)

Q6. The picture shows a zebra fish.

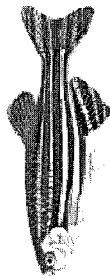


Illustration © Emily S. Damstra

Zebra fish are small freshwater fish that usually have black and silver stripes. Zebra fish can tolerate a wide range of environmental conditions.

(a) Scientists have genetically modified zebra fish to act as pollution indicators. The genetically modified zebra fish have a gene transferred from a jellyfish. The gene allows the stripes of the zebra fish to change colour.

Describe how the scientists produced the genetically modified zebra fish.

.....

.....

.....

.....

.....

.....

(3)

(b) Some scientists are worried about the production of genetically modified zebra fish. Suggest reasons why.

.....

.....

.....

.....

(2)
(Total 5 marks)

Q7. Charles Darwin proposed the theory of natural selection.

(a) What is meant by natural selection?

.....

.....

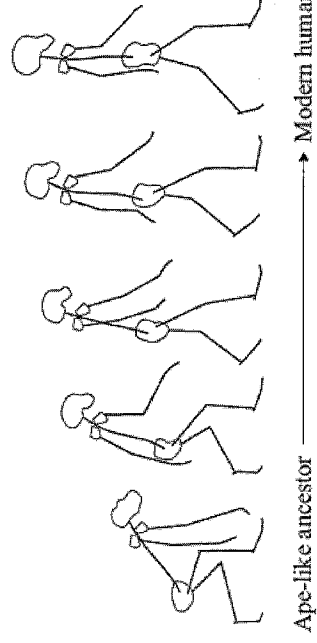
.....

.....

(2)

(b) The drawings show stages in the evolution of the human skeleton.

All the drawings are to the same scale.



Use information from the drawings to describe two trends in the evolution of the

human skeleton.

1

.....

2

.....

(2)

(c) Darwin said that humans had evolved from ape-like ancestors.

Many people disagreed with him at the time.

Give **two** reasons why.

1

.....

2

.....

(2)

(d) Lamarck's theory of evolution stated that useful changes which occur in an organism during its lifetime will be inherited by its offspring.

Give **one** way in which Darwin's theory differs from Lamarck's.

.....

.....

(1)
(Total 7 marks)

Past Exam Mark Scheme

M1. (a) Y - spinal cord / central nervous system / CNS
do **not** accept spine
ignore nerve / nervous system / coordinator
ignore grey / white matter

1

W - receptor / nerve ending
ignore sensory / neurone / stimulus

1

X - effector / muscle
allow gland

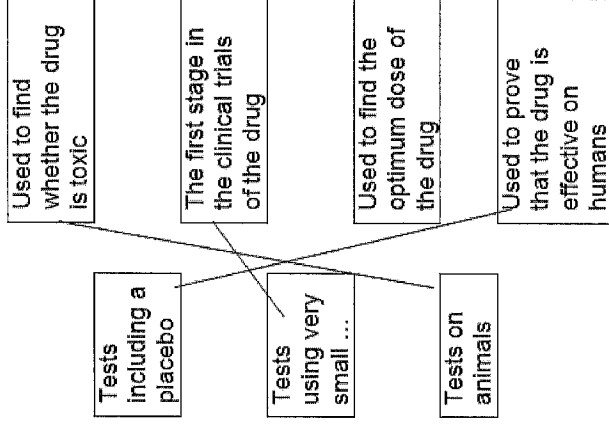
1

(b) any **two** from: eg
accept reverse argument for each marking point

- reflex action quicker
- effect of reflex action over shorter period
- hormone involves blood system and reflex involves neurones / nerve cells
ignore nervous system / nerves
- reflex involves impulses and hormone involves chemicals
- reflex action affects only one part of the body
ignore involves brain
ignore outside / inside stimuli

[5]

A B



M2. (a) 1 mark for each correct line
mark each line from left hand box
two lines from left hand box cancels mark for that box

3

(b) any **three** from:
Students have been informed that the headline is not justified

- reference to reliability, eg only a small number of mice tested or trial too short or investigation not repeated
- reference to control, eg mice given caffeine not coffee or 6 cups (equivalence) is more than 1 dose
- (and) the effect on mice might not be same as on humans
allow only tested on mice
- (also) text suggests that the treatment improves memory loss (rather than delays it)
accept text suggests disease cured
- or mice already have memory loss or experiment only showed improvement in memory

or does not show **delays** Alzheimer's
or experiment not done on old mice
allow reference to the fact that mice engineered to have it

3 [6]

- have more young each year / litter
- young more likely to survive (in mixed populations)

3 [7]

M3. (a) Scotland

1

any one from

- Scotland 15 to 20% / about 1/5th to 1/7th but England and Wales / the others are less / lower / reasonable estimated figures
- $\frac{13.4}{79}$ is greater than England / $\frac{11.4}{130}$ and Wales / $\frac{2.8}{21}$

1

M4.

(a) (i)

triangular pyramid with 3 layers
may be as blocks or as triangle
ignore food chains and arrows

1

layers appropriately labelled:
bean / plant

aphid.

ladybird
labelled in food chain order must **not** contradict correct
pyramid
allow correctly labelled inverted pyramid for 2 marks

1

- (b) (i) broadleaf woodlands have more grey squirrels **or** broadleaf woodlands have less red squirrels
allow converse referring to conifers

1

- (ii) Wales has more conifers and / but more grey squirrels
or
Wales has less broadleaf and / but more grey squirrels
allow converse for red squirrels

1

- (c) any **three** from:
answers must be comparative they = grey squirrels
grey squirrels
allow converse arguments for red squirrels

- have wider range/ more types of food
- are resistant to parapox (virus) but reds are not
ignore reference to other disease

- (ii) any **two** from:
(for aphid / ladybird)
ignore energy
- not all digested / faeces
 - loss in urine
 - loss of CO₂
ignore loss of CO₂ from bean plant
 - not all eaten
if none of first 3 points given then allow waste (materials) / excretion for 1 mark

2

- (b) microorganisms / microbes / bacteria / fungi / decomposers / detritivores / named
do **not** accept germs
allow mould
ignore aphids

1

(c) microorganisms / bacteria / fungi / decomposers / detritus feeders / named 1

decay / breakdown / digest / decompose / rot (bean plant)
ignore eat 1

decompose / rot / break down / decay / digest
ignore feed / eat 1

respiration (of microorganisms etc / aphids)
allow burning / combustion 1

(these organisms) respire
do **not** allow respiration by pea (plants) 1

carbon dioxide released (from respiration of microorganisms etc / aphids)
allow carbon dioxide released / produced (from burning / combustion)
ignore other parts of the carbon cycle
ignore formation of fossil fuels 1

(decay / respiration / microorganisms etc) releases carbon dioxide
do **not** allow combustion / fossilisation 1

[8]

[7]

M5.(a) any correct named physical environmental condition, e.g. light / water / rain / temperature / minerals / nutrients / space (between plants)
ignore carbon dioxide / climate / weather / sun / pollution 1

M6. (a) (jellyfish) gene(s) cut out 1

ref to enzymes (at any stage) 1

genes / inheritance
ignore 'variety'

(gene) transferred to zebra fish at early stage of development / embryo / egg
ignore removal of zebra fish genes 1

OR

any correct named biotic factor e.g. predation / disease 1

(b) any **two** from:
ignore unethical / religious / unnatural

(b) mass of crop also depends on number of pods (per plant) / size / mass of each pea
ignore number of plants 1

- could transfer gene to other (fish) species

- effects on food chains
accept effects on other species / humans who eat them

- effects on zebra fish themselves, eg may out compete non GM zebra fish 2

[5]

M7. (a) any **two** from:

- survival of fittest
allow examples
- amplification of fittest ie has adaptations to survive
allow examples
- go on to breed **or** genes / characteristics passed on to next generation
NB best adapted organisms survive gains 2 marks

1
[71]

(b) any **two** from eg:

- increased height
ignore unqualified change eg 'the skull changes shape'
- increased erectness
allow description of modern human characteristic eg 'modern humans stand up straight'
- shorter arms
- legs straighter
- larger skull
allow description of ape-like characteristics eg ape-like ancestor walked on four legs
- larger pelvis **or** changing shape described
- humans walk on two legs / feet

2

(c) any **two** from:

- religious objections
- insufficient evidence
ignore no evidence
accept could not prove
- mechanism of heredity not known
did not know about genes / chromosomes / DNA / mutations

- did not like the thought of being descended from apes

2

(d) Darwin's theory depends on differences in genes at birth / inborn variation / mutation

allow Darwin's theory depends on genetics
ignore reference to time

1
[71]