

AQA Biology B1

*Stamp &
QR code collection*

中国人民邮政

A healthy DIET contains the right balance of carbohydrates (for energy), fats (for energy and insulation), proteins (for growth and repair), mineral and vitamins (for keeping healthy).



If a person's diet is not balanced they might become malnourished. This includes becoming underweight, develop deficiency diseases such as rickets or scurvy, conditions such as diabetes type 2 or becoming obese. Being obese could lead to arthritis, high blood pressure, blood clots, stroke or heart attacks.

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भारत INDIA 100

METABOLIC RATE is the speed at which chemical reactions in the cells of the body are carried out. It is affected by how much exercise you do, your age, gender, the proportion of muscle to fat in your body (the more muscle the higher the metabolic rate) and your genetic make-up.

1986

Worldwide

CHOLESTEROL is a plaque like substances that builds up in the walls of the arteries. This build up slows down the flow of blood and a blood clot could form.

If the clot forms in an artery that delivers oxygenated blood to the heart, a heart attack might ensue. Eating a diet high in saturated fats raises blood cholesterol levels.

Inherited factors also determine how much cholesterol builds up.

up to 20 grams



GOOD AND BAD CHOLESTEROL

There are two types of cholesterol: low-density lipoprotein (LDL) which builds up in the artery Walls and high-density lipoprotein (HDL) which removes LDL from the walls of the arteries.

56^P



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EUROPA

0.90€

STATINS are drugs that have been developed to reduce blood cholesterol levels by stopping the liver from producing too much cholesterol and consequently lower the risk of heart diseases.



The danger is that people on the drug will not change their diet and exercise regime and continue with their unhealthy life style.



Exam questions



Exam answers

←
my-GCSEscience.com
video

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중도



Microorganisms that cause diseases are called **PATHOGENS**. Examples are bacteria, viruses and some fungi. Pathogens reproduce quickly and make us feel ill.

Bacteria produce toxins and sometimes destroy cells. Viruses enter cells, reproduce inside them and then destroy the cells.

조선우표 15원



BODY DEFENCES

백도

White blood cells produce antitoxins to counteract the toxins produced by bacteria.

Some white blood cells ingest pathogens and some produce antibodies. The pathogen's surface has structures called antigens. Different antibodies have different shapes that fits a pathogen's antigens. As antibodies attach themselves to the antigens, the pathogens are slowed down and can be surrounded and ingested by white blood cells.

Once the body has produced a specific type of antibody you are immune to that pathogen.

조선우표 15원

PREVENTING THE SPREAD OF DISEASES

Around 1850 a doctor called *Semmelweis* recognised that if doctors washed their hands before examining patients, fewer patients died. He thought that a disease could be passed from one person to another.

Hand gel dispensers are placed at ward entrances in hospitals today as the hand gel destroys pathogens and reduces the spread of diseases. This, together with better drugs and a better understanding about immunity, better sterilisation and isolation of patients means that the spread of diseases has been greatly reduced.



SLOVENSKO

TREATING DISEASES

0,40 €

To treat a bacterial infection the doctor can prescribe a course of specific antibiotics. An example is penicillin. Antibiotics cannot be used to kill viruses. As the viruses are found inside cells, and mutate frequently, they are inaccessible to the antibiotics. If you have flu (which is caused by a virus) you can only take medication to reduce the symptoms.



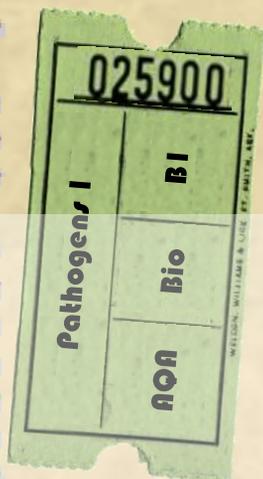
Diseases that spread quickly can cause either an **EPIDEMIC** or a **PANDEMIC**.

During an epidemic the disease spreads rapidly from one person to another within the same country.



During a pandemic the disease spreads quickly worldwide (in several countries). Frequent air travel can be responsible for a pandemic.

15
PRE
POST



Pathogens video



Vaccination video



HELVETIA
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Antibiotics video



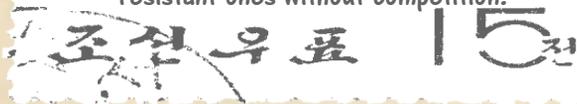
홍도

ANTIBIOTIC RESISTANCE- Superbugs



Due to gene mutation there might be a few bacteria who are resistant to antibiotics.

A doctor prescribes a course of antibiotics to kill the bacteria. The problem is that the bacteria who are resistant to antibiotics are not killed. All other bacteria are killed, leaving the antibiotic-resistant ones without competition.

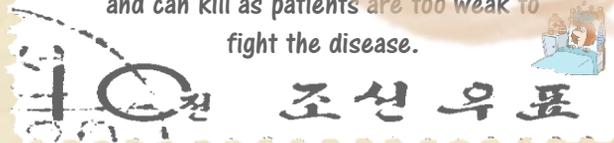


백도

The antibiotic-resistant bacteria can now multiply rapidly. (This is an example of natural selection)

To reduce the chance of antibiotic-resistant bacteria from forming, antibiotics should be used sparingly.

MRSA is resistant to most antibiotics and called a superbug. It can spread quickly in hospitals and can kill as patients are too weak to fight the disease.



VACCINATIONS

A small amount of dead or inactive pathogen is injected into the blood.



The white blood cells produce antibodies to destroy the pathogens.

If a vaccinated person is exposed to the live pathogen in the future the body can produce the antibodies quickly and destroy the pathogens before any harm is done.

The MMR vaccine is used to protect children against mumps, measles and rubella. It is worth vaccinating a large number of a population to prevent an epidemic/pandemic and protect people during their holidays to other countries.

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GROWING BACTERIA

PRE-INOCULATION: The Petri dish and agar are sterilised to kill any unwanted bacteria. This is achieved by passing the inoculation loop through a flame so that it becomes sterile.

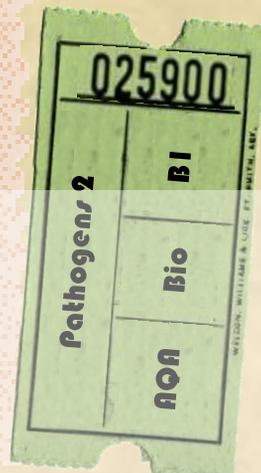
INOCULATION: The now sterile loop is dipped in a suspension of bacteria which are transferred to the agar (made of carbohydrates). The lid of the Petri dish is replaced quickly to prevent microbes from the air entering.

POST-INOCULATION: The Petri dish is sealed with tape to prevent microbes from the air entering and contaminating the culture. It is important to not seal the dish all the way to ensure oxygen can enter. Otherwise harmful anaerobic bacteria would grow. The Petri dish is then incubated at 25°C max to allow the bacteria to grow. Above 25°C pathogens might grow instead.



Due to GENE MUTATIONS, new infectious diseases appear all the time. Existing vaccinations don't work against the new strain of pathogen and as scientists try to develop the new vaccination, the new disease can spread rapidly as people are not immune yet.

Examples are HIV, swine flu, bird flu, flu.



Exam questions



HELVETIA 100



my-GCSEscience.com
Agar plates
Video

Exam answers



The human body has cells that detect changes in the environment (stimuli). These cells are called **RECEPTORS**. There are light receptors in eyes, sound receptors in the ears, receptors in the ears that help the body keep its balance, taste receptors on the tongue, smell receptors in the nose, pressure, pain and temperature receptors in the skin.



NEW ZEALAND 50

25 Kč ČESKÁ REPUBLIKA



NEURONES

Neurones are nerve cells that pass electrical impulses around the body. **SENSORY** neurones pass impulses from sensory receptors to **RELAY** neurones in the CNS. Relay neurones pass impulses to **MOTOR** neurones. Motor neurones pass impulses from relay neurones to **EFFECTORS** (muscles)

CHODSKÉ DUDY EUROPA

SYNAPSES

\$1.00

These are the gaps between two neurones.



When an impulse arrives at a synapse, chemicals are released which diffuse across the gap so the impulse can travel from one neurone to the next.

New Zealand

Reflexes

Receptors pick up a change in the environment. An impulse passes from the receptor along a sensory neurone to the CNS. From the CNS an impulse travels along the motor neurone to the effector (muscle, which contracts or gland which secretes hormones).

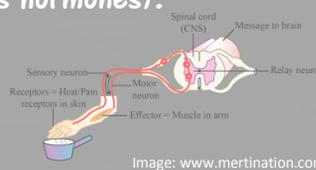


Image: www.mertination.com

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Coordination & Control I

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भारत INDIA

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THE PURPOSE OF THE NERVOUS SYSTEM

Reflexes happen over a very short period of time and can prevent serious injury.

Without receptor cells and impulses our body could be damaged permanently. For example, if you touch a hot surface but the information does not arrive at the CNS, skin could be damaged permanently.

1986



Exam questions



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 Video
 Nervous system



Exam answers

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The body co-ordinates many processes by sending chemical messengers called **HORMONES**. Hormones are released into the blood stream by glands to be transported by the circulatory system to their target organs. Examples of hormones are insulin, oestrogen, testosterone, FSH, LH, auxin (a plant hormone).



NEW ZEALAND 50



ČESKÁ REPUBLIKA 25 Kč

MENSTRUAL CYCLE

The pituitary gland (in brain) releases FSH (follicle stimulating hormone) -> egg matures in ovaries & ovaries secrete oestrogen -> lining of uterus thickens & FSH production stops & pituitary gland releases LH (luteinising hormone) to stimulate release of egg from ovaries & oestrogen production stops; if egg not fertilised the lining and egg are shed and the cycle starts again with the release of FSH.



Image: www.belara.com



\$1.00

UTERUS LINING

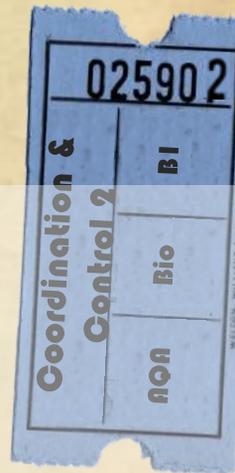
The surface area of the uterus lining increases to increase the chance of the fertilised egg (zygote) attaching. It thickens to form the placenta and the number of blood vessels increases to provide nutrients for the zygote.

New Zealand

CONTRACEPTIVE PILLS

Many contraceptive pills contain oestrogen and progesterone to inhibit the release of FSH. Without FSH the eggs in the ovaries do not mature and therefore ovulation does not occur. Prolonged use might lead to permanent infertility, weight gain, headaches, mood swings, breast cancer, STDs (if condoms are not used).

Progesterone-only pills have fewer side effects but have to be taken at a specific time every day to be effective.



भारत INDIA 100

IVF (In vitro fertilisation)

The woman is given FSH (to encourage the maturation of several eggs) and LH (to stimulate the release of the eggs). The eggs are removed from the ovaries and fertilised with sperm. Balls of cells (embryos) form which are placed into the woman's womb. IVF is expensive, has a low success rate, is stressful and can lead to multiple births which can cause harm to the woman during birth and often these babies are born with low birth weights.

1986

Menstrual cycle vid



Controlling fertility vid



Exam questions



Exam answers

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CONTROLLING THE HUMAN BODY



Our **BODY TEMPERATURE** is kept constant at around **37°C**, the optimum temperature for our enzymes to work. This is achieved through sweating and radiating heat from the skin.

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25 Kč

ČESKÁ REPUBLIKA

KIDNEYS

Our body needs **WATER** and **MINERAL IONS**. The amount of both these substances is controlled by the kidneys by changing the amount of water and ions excreted from the body in urine.



PANCREAS

This organ releases the hormone **INSULIN** to control the amount of **BLOOD GLUCOSE**.

CHODSKÉ DUDY EUROPA

AUXIN

\$1.00

Plants produce a hormone called **auxin**. This hormone controls growth.

A growth response to light is called **phototropism**.



A growth response to gravity is called **geotropism / gravitropism**.

New Zealand

AUXIN ACTION



Auxin builds up on the shady side of a shoot. The side with more auxin grows faster than the side exposed to the light. This makes the shoot bend towards the light. Shoots grow against gravity, roots towards gravity as auxin accumulates on the lower site of a root.

© www.science-aid.co.uk

Sun



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Coordination & Control 3

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PLANT HORMONES

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Gardeners use plant hormones to promote growth of plants. They dip the base of a plant cutting into a rooting hormone to make the cutting grow roots.



Other plant hormones can be used as weedkillers.

1986

Image: www.easy-grow.co.uk

Plant hormones vid



Hormones vid



Exam questions



Exam answers

USA FIRST-CLASS

What is a DRUG?



A drug is a substance that affects the chemical reactions in the body which is why someone can get addicted to the drug. When trying to stop taking the drug, withdrawal symptoms appear.

Recreational drugs are taken for pleasure or fun. Heroin, cocaine and nicotine are very addictive recreational drugs.

CENTENARIO DEL CINE

CUBA CORREOS 1995 75

DRUG ABUSE I



No drugs are without risks, whether they are prescribed drugs or recreational ones.

Cannabis for example can lead to mental illnesses such as paranoia, depression, schizophrenia or dementia. It can also lead to male infertility. Heroin and ecstasy have negative impacts on the heart and circulatory system.

CENTENARIO DEL CINE

CUBA CORREOS 1995 75

DRUG ABUSE II

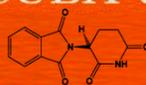
Because many people have access to legal drugs such as alcohol and nicotine, the overall impact of these on health is much greater than that of illegal drugs.

Athletes may use a performance enhancing drug. Most are prohibited by sporting regulations. Steroids stimulate muscle growth, stimulants boost heart rate.

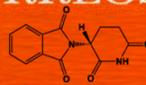
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CUBA CORREOS



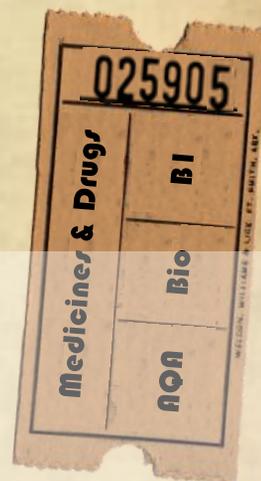
(S)-Thalidomide



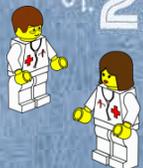
(R)-Thalidomide

THALIDOMIDE is a drug that was developed as a sleeping pill. When it was discovered that it also relieved the symptoms of morning sickness, it was prescribed to pregnant women despite not having been extensively tested.

Many thalidomide victims were born with severe limb abnormalities and the drug was banned. Nowadays it is used to treat leprosy. Drugs are tested more rigorously these days: **I**



PRE-CLINICAL TESTING: test for toxicity on human cells & tissues ;see if the drug works. The drug is then tested on animals to find potential doses and side effects.
PHASE I TESTING: starting with low doses, the drug is tested on healthy volunteers to check for side effects & interactions with other drugs.
PHASE II+ III TESTING: the drug is tested on ill patients to see if it treats the disease. If safe, the drug is tested on more patients to find the optimum dose. Some are given a **PLACEBO** (a dummy drug) for comparison. In a **DOUBLE-BLIND TRIAL** neither doctors nor the patients know who has been given the drug and who received the placebo.



СТ. 2
НАРОДНИ ПРКАККИ

Medical drugs vid



Exam questions



Recreational & PE drugs



Exam answers



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To survive and reproduce, organisms require different materials from their surroundings. The organisms often have to COMPETE for these resources.

Plants need to compete for light, space, water and nutrients from the soil. For this reason plants that disperse their seeds have a better chance of reproducing. Animals need to compete with each other for food, mates and space.

Features that help an animal survive in their habitat are called ADAPTATIONS. These include being camouflaged, having thorns, being poisonous and having warning colours (mimicry) to warn off predators.



Some organisms have adaptations that help them survive in high salt, high temperature or high pressure areas. They are called EXTREMOPHILES.

CENTENARIO DEL CINE

CUBA CORREOS 1995 75

Organisms that live in DRY ENVIRONMENTS have water storage tissues, an extensive root system and have a large surface area compared to their volume to lose excess heat easily.

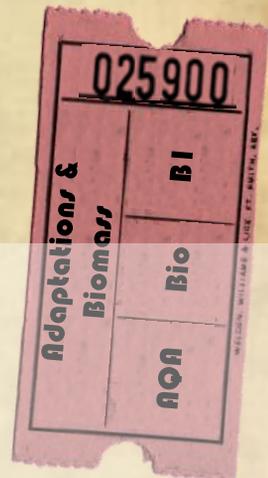
Organisms in ARCTIC habitats often have a thick fur coat, a lot of body fat, are camouflaged and have a small surface area compared to their volume to prevent heat loss.

2ND to



The range of different species in a habitat is known as BIODIVERSITY. Slight changes in the conditions within the habitat can reduce biodiversity; often these changes are due to pollution. Invertebrates are good water POLLUTION INDICATORS as they help determine the concentration of dissolved oxygen in water. LICHENS are good indicators of sulphur dioxide gas in air.

Canada 20



Green plants and algae absorb light energy which is converted to chemical energy during photosynthesis. Most of this energy is stored in the plant cells as biomass (carbohydrates, fats, proteins, other).



At each stage in a food chain the biomass is reduced. The amount of material and energy contained in the biomass is also reduced. Some material and energy is lost in waste (urine/faeces). Energy released during respiration is used for movement, to maintain body temperature, for cell activity and to keep the heart beating.

Eating just plants shortens the food chain and wastes less energy.

POLSKA 60 GR

Environmental change vid



Exam questions



Biomass vid



Exam answers



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Materials are constantly RECYCLED in nature. Organisms remove these materials from their environment and return them either in waste materials or when they die and decay.

Decay is due to microorganisms/maggots/worms/fungi breaking down/digesting the dead organisms .



Decay works fastest when the conditions are right. The four things needed for fast decay are MICROORGANISMS, WARMTH, MOISTURE and OXYGEN for aerobic respiration.

If the temperature is too high or too low, decay slows down or stops. This is why food is kept in the fridge and bottles are treated with steam to sterilise them. Canning, pickling or drying food all remove at least one of the four factors.



CENTENARIO DEL CINE

CUBA CORREOS 1995 75

COMPOST HEAPS are made of soil as well as dead plant material. The soil is needed as it contains the microorganisms that carry out the decay. Compost heaps get warm as heat is released when the microorganisms respire. There are holes in the side of a compost heap to allow oxygen to enter and excess heat to escape.

2ND



CARBON CYCLE I

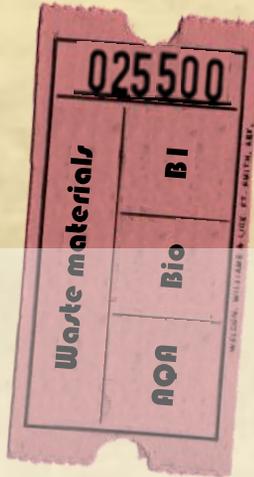


2ND

During photosynthesis, green plants and algae remove carbon dioxide from the air and convert it to carbohydrates, fats and proteins (for example enzymes).

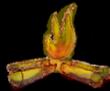
Green plants and algae also respire and release carbon dioxide back into the atmosphere.

When the plants are eaten by animals some of the carbon becomes part of fats and proteins that make up the animals' body.



XII OLYMPIC WINTER GAMES

CARBON CYCLE II



XII JEUX OLYMPIQUES D'HIVER

When the animals respire, some of the carbon is converted to carbon dioxide and returns to the atmosphere. When plants, algae and animals die they are decayed by microorganisms. When these respire, carbon dioxide is returned to the atmosphere. Combustion of plants also produces carbon dioxide.

Canada 20

Decay vid



Carbon cycle vid



Exam questions



Exam answers



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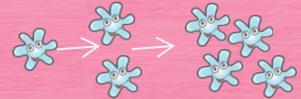
155 · POLSKA
2€

Inside every cell is the nucleus which contains 23 pairs of chromosomes. **CHROMOSOMES** are long sections of coiled up DNA. Sperm and egg cells (called gametes) contain 23 single chromosomes each. During fertilisation the 23 chromosomes are combined so the offspring has 23 pairs. This type of reproduction is called **SEXUAL REPRODUCTION**. It leads to variation as we all inherit different genes. The environments we grow up in also can cause variation.



ASEXUAL REPRODUCTION does not involve gametes. The offspring are **CLONES** of the parent organism and therefore genetically identical. There is no variation which can be a disadvantage as one disease could wipe out an entire species or population.

16^P



0,40 €



CLONING PLANTS

Gardeners clone plants in two ways. They either take **CUTTINGS** from older plants or remove a few cells from the plant which are cloned and then grown into new plants (this technique is called **TISSUE CULTURE**). Both techniques allow gardeners to produce thousands of identical plants quickly, all with the desired features.

SLOVENSKO

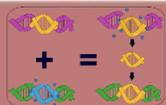
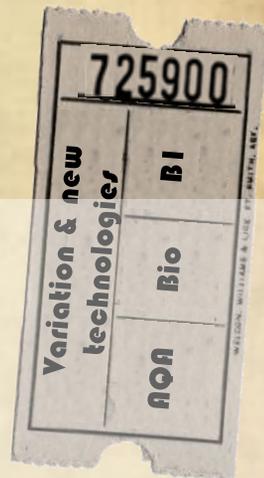
0,40 € **Animal cloning**

Method 1- embryo transplant: split apart cells from a developing embryo before the cells become specialised. Transplant the identical embryos into a host womb.



Method 2- adult cell cloning: The nucleus of an adult body cell (of the animal to be cloned) is removed and placed into an unfertilised egg cell that also had its nucleus removed. An electric shock is applied which causes the egg cell to divide and form a ball of cells (embryo). The embryo is then implanted into the host.

SLOVENSKO



GENETIC MODIFICATION



1st

ENZYMES are used to 'cut out' genes from the chromosomes of one organism. These genes can then be transferred to another organism.

In this way new genes are transferred to crop plants to make them **RESISTANT** to herbicides and pesticides. Crop **YIELD** is increased, as are profits.

Many people are against using GM foods as their health effects are unknown. There are also concerns that these modified genes transfer to wild plants and disrupt the food chain.

2010 FESTIVAL OF STAMPS

Sexual vs Asexual vid



Genetic engineering vid



Cloning vid



Exam Q & A



USA FIRST-CLASS

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Darwin's theory of **EVOLUTION** states that all present day organisms have evolved from simpler earlier life forms over millions of years.



His theory was not accepted for many years because it undermined the idea that God created all life; there was also insufficient evidence at the time and the mechanisms of inheritance were not yet known.

भारत INDIA



90 hL POST

Charles Darwin believed in **NATURAL SELECTION**.

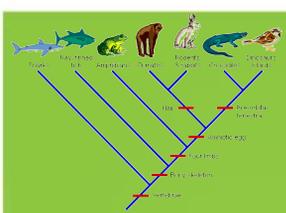
Due to gene mutations there is variation within a species. Organisms that are best adapted will survive, breed and therefore pass on their genes. Organisms not adapted will die.

LICHTENBERG

Jean-Baptiste **LAMARCK** believed that you either 'use it or lose it'. In other words, if you keep using a part of your body repeatedly, it would grow, develop and be passed on to your offspring.



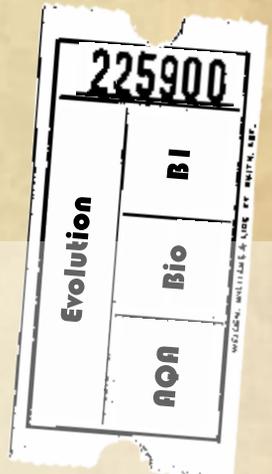
USA 20c



\$1.40

Studying and comparing organisms gives clues about evolution. **EVOLUTIONARY TREES** show how different types of organisms have evolved and help scientists **CLASSIFY** organisms.

New Zealand



POSTAGE

When asked to describe/explain how an animal has changed over time in an exam question, always:



- 1-State that there is variation due to gene mutation
- 2-State that those that are best adapted survive and breed
- 3-State that the advantageous genes have therefore passed from one generation to the next.

ONE PENNY B



Exam questions



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← my-GCSEscience.com
Evolution
Video

Exam answers



