Biology

Biology in X standard deals with the wonderful activities in our own body .Units 1 – 5 deals with how does human body functions and what are the diseases that affect it .Units 6 & 7 discuss about the inheritance of characters on the basis of genetic structures and the application of genetic engineering which is used to make desired changes in an organism for the well being of humanity .Unit 8 deals with the origin of life on earth and the emergence of biodiversity on the earth on the basis of theories and scientific evidences

Chapter 1

SENSATION AND RESPONSES

Diversified activities in human body is controlled and coordinated by the nervous system. This unit deals with the structure and functions of nervous system and the diseases affecting the nervous system

Study Notes

Structure of a neuron

Dendrite: Branches of Dendron- Part that receives impulses from adjacent neuron.

Dendron: Short filament from the cell body- Carries impulses from dendrites to the cell body.

Axon: Longest filament from the cell body- Carries impulses from the cell body to outside.

Axonite: Branches of axon- Carries impulses to the synaptic knob.

Synaptic knob: Tip of axonite- Secretes neurotransmitter.

Myelin sheath- A lipid containing membrane encircled on the axon. In brain and Spinal cord it is formed of Oligodendrocyte. In Myelin sheath in the nerves it is formed of Schwann cells.

Different types of nerves

Sensory nerve (formed of sensory nerve fibres) Carries impulses from various parts of the body to the brain and the spinal cord.

Motor nerve (formed of motor nerve fibres) Carries impulses from brain and spinal cord to various parts of the body.

Mixed nerve (formed of sensory nerve fibres and motor nerve fibres) Carries impulses to and from the brain and spinal cord.

Brain

Cerebrum: The largest part of the brain- numerous fissures and folds are seen- The grey coloured outer part of cerebrum is called Cortex and the white coloured inner part

is called Medulla- centre of thought, intelligence, memory and imagination- evokes sensations- controls voluntary movements.

Cerebellum: The second largest part of the brain- seen behind the cerebrum as two flaps- fissures and grooves are present- coordinates muscular activities and maintains equilibrium of the body.

Medulla oblongata: The rod shaped medulla oblongata is seen below the cerebrum, located near the cerebellum- controls involuntary actions like heart beat, breathing etc.

Thalamus: Situated below the cerebrum.- acts as relay station of impulses

to and from the cerebrum- analyses impulses from various parts of the body and sends the important ones to the cerebrum.

Hypothalamus: Situated just below the thalamus- plays a major role in the maintenance of homeostasis.

Alzheimer's: Loss of memory, inability to recognize friends and relatives, inability to do routine works.

Parkinsons: Loss of body balance, irregular movement of muscles, shivering of the body, profuse salivation. Destruction of specialised ganglions in the brain. Production of dopamine, a neurotransmitter in the brain gets reduced.

Epilepsy: Epilepsy due to continuous muscular contraction, frothy discharge from the mouth, clenching of the teeth following which the patient falls unconscious, Continuous and irregular flow of electric charges in the brain.

Model Questions

1.Pick the odd and write the common features of others

Cerebrum, Cerebellum, Central Canal, Medulla Oblongata

2. Identify the disease from the symptoms given below.

Loss of memory, Inability to do routine work.

a) Epilepsy b) Alzheimer's c) Parkinsons d) Rheumatism

3. Complete appropriately

Motor nerve : carries impulses from brain and spinal cord to various parts of the body.

..... : carries impulses from various parts of the body to the brain and the spinal cord.

4. Observe the illustration and answer the questions

Continuous and irregular flow of electric charges in the brain.

X

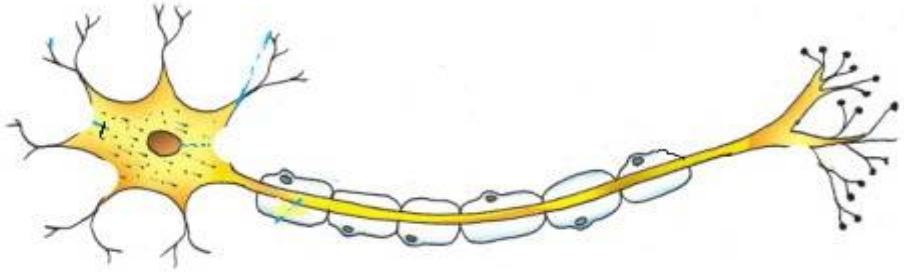
destruction of specialised ganglions in the brain

Y

a) Identify the diseases of X and Y ?

b) Write a symptom of the disease affected with Y

5.Observe the diagram and recognize the parts indicated.



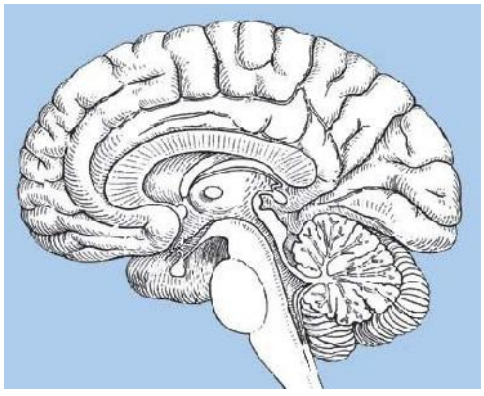
a) The part which receives impulses from the near by neurons

b) The part which is covered by myelin sheath

c) The part from where neurotransmitters are secreted

d) The substance that formed the myelin sheath

6. Observe the diagram and recognize the parts indicated



a) The second largest part in the brain

b) The part which controls involuntary actions

c) Relay station for impulses

d) Centre which controls involuntary actions

Answer key

1. Central Canal - All others are parts of the brain

2 b) Alzheimer's

3 Sensory nerve

4 a) X- Epilepsy Y- Parkinson's

b) Loss of body balance, irregular movement of muscles, shivering of the body, profuse salivation.

5. a. Dendrite, b. Axon, c. Synaptic knob, d. Schwann cell

6. a. Cerebellum, b. Medulla oblongata, c. Thalamus, d. Cerebrum

Chapter 2

WINDOWS OF KNOWLEDGE

This chapter deals with our five sense organs and their functions. But as far as SSLC 2021 concerned you are asked to focus on the eye, tongue and nose only. Knowing how to draw and label the structure of eye, important parts of eye, their features and their functions are included in the study area. You should know about the Rod cells and Cone cells, the pigments in these receptors, and the functions are to be studied. The stages of taste and smell detection are also included in the focus area.

Study Notes

Cornea: The projected transparent anterior part of the sclera which refracts light rays to focus on the retina.

Iris: The part of the choroid seen behind the cornea. Presence of the pigment melanin gives the iris a dark colour.

Pupil: The aperture seen at the centre of the iris. The size of this aperture increases and decreases depending on the intensity of light

Lens: Elastic transparent convex lens, connected to ciliary muscles by thread like ligaments.

Yellow spot: The part of the retina where plenty of photoreceptors are present. It is the point of maximum visual clarity.

Blind spot: The part of the retina from where the optic nerve begins. Here there is no vision as photoreceptors are absent.

Optic nerve: Transmits impulses from photoreceptors to the visual centre in the brain

Photoreceptors: Rod cells and cone cells are the two kinds of photoreceptors in the retina.

Rod cells: Rod shaped cells, contain the visual pigment rhodopsin. Since they are activated even in dim light, we are able to see objects in dim light.

Cone cells: Conical shaped cells, contain a pigment called photopsin. There are three types of cone cells in our eyes, which help us to detect three primary colours of light – red, green and blue. So, cone cells provide us with colour vision

Visual pigments: Rhodopsin and photopsin are the two kinds of visual pigments. These pigments are formed from a protein named opsin and retinal which is a derivative of

Vitamin A. Photopsin is also called iodopsin. In the presence of light, the pigments present in photoreceptors dissociate. This chemical change leads to the formation of impulses.

Night blindness: The deficiency of Vitamin A results in the low production of retinal. This in turn prevents the resynthesis of rhodopsin. In this condition, objects cannot be seen clearly in dim light and this disease is called night blindness.

Colour Blindness: Some Persons cannot distinguish green and red colour due to the defect of cone cells. This condition is called colour blindness. Persons with colour blindness are not selected for military or for jobs like that of a driver, pilot etc because they cannot identify signals.

Xerophthalmia: The conjunctiva and cornea become dry and opaque due to prolonged deficiency of Vitamin A. This causes xerophthalmia and leads ultimately to blindness.

Detection of taste- Stages

- Substances responsible for taste dissolve in saliva,
- They stimulate the chemoreceptors
- Impulses are generated.
- These impulses reach the brain through the respective nerves
- Experience taste.

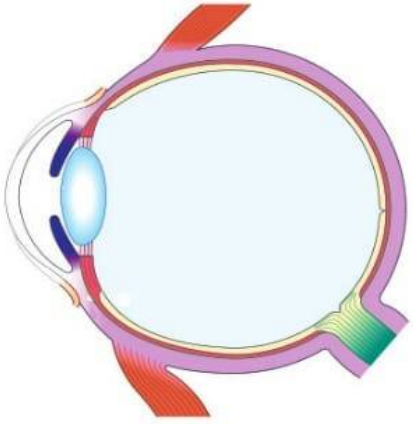
Detection of smell- Stages

- Aromatic particles diffuse in the air and enter the nostrils.
- These aromatic particles dissolve in the mucus inside the nostrils.
- They stimulate the olfactory receptors
- Impulses are generated.
- These impulses reach the brain through the olfactory nerve
- Experience smell

Question models

1. Copy the diagram of the eye and label the following parts.

a. Refracts light rays to focus on the retina.



b. The size of this aperture increases and decreases depending on the intensity of light

c. Here there is no vision as photoreceptors are absent.

2. Complete the table appropriately.

Part	Features	Function
…..a…..	The transparent anterior part of the sclera.	refracts light rays to focus on the retina
Iris	The part of the choroid seen behind the cornea.	…..b…..
Retina	…..c…..	Image is formed here
Optic nerve	The nerve from the eye	…..d…..

3 Some statements are given below. Prepare a table and give suitable headings to the columns

Helps to see objects in dim light.

Contain a pigment called photopsin

Rod shaped cell

Provide us with colour vision.

Contain a pigment called rhodopsin.

Conical shaped cell

4. Symptoms of certain diseases are given.

a. objects cannot be seen clearly in dim light .

b. cannot distinguish green and red colours

c. the conjunctiva and cornea become dry and opaque..

1. Which disease is indicated in a?
2. What is the reason for disease b?
3. What precaution do you take for the prevention of disease c?

5. Prepare a flow chart using the given words.

Sense of sight, Cornea, Brain, Aqueous fluid, Light, vitreous fluid, Photoreceptors, Lens, impulses, Optic nerve, Retina,

6 Detection of taste- Stages

A Substances responsible for taste dissolve in saliva,

⇩

B They stimulate the chemoreceptors

⇩

C Impulses are generated.

⇩

D Impulses are transmitted through the respective nerves

⇩

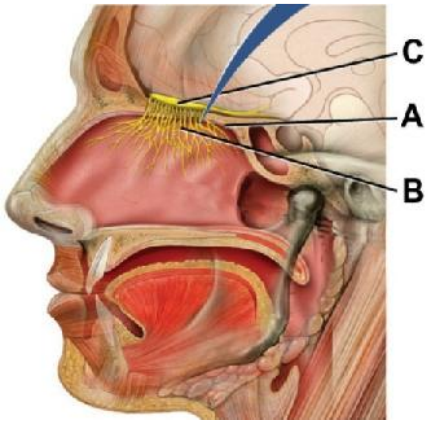
E These impulses reach the brain

⇩

F Experience taste.

What changes would you make, if the word ‘taste’ in this flowchart is replaced with smell?

7. Observe the figure. Find out how the following parts help in the detection of smell?



A. Mucus gland, B. olfactory receptors, C. olfactory nerve

Answer key:

1 Cornea. b. Pupil, c Blind spot

2 a Cornea

b The size of the pupil is regulated by the action of circular muscles and radial muscles in the iris

c The inner layer which has photoreceptors.

d Transmits impulses from photoreceptors to the visual centre in the brain

3

Rod cell	Cone cell
Contain a pigment called rhodopsin.	Contain a pigment called photopsin
Rod shaped cell	Conical shaped cell
Helps to see objects in dim light.	Provide us with colour vision.

4. 1) Night blindness

2) Due to the defect of cone cells

3) Include necessary materials like leafy vegetables that can provide vitamin A.

5. Light ⇢ Cornea ⇢ aqueous fluid ⇢ Lens ⇢ vitreous fluid ⇢ Retina ⇢ Photoreceptors ⇢ impulses ⇢ Optic nerve ⇢ Brain ⇢ Sense of sight

6 A Aromatic particles dissolve in the mucus inside the nostrils

B They stimulate the olfactory receptors.

C Impulses are generated.

D Impulses are transmitted through the olfactory nerve.

E These impulses reach the brain

F Experience smell

7 A. Dissolve the aromatic particles diffuse in the air.

B Generate impulses.

C Impulses are transmitted to the brain

Chapter 3

CHEMICAL MESSAGES FOR HOMEOSTASIS

Like nervous system endocrine system also is an organ system that controls and co-ordinates body functions. This system includes endocrine glands and its secretions called hormones. Hormones act as chemical messages that regulate cellular activities while Pheromones are chemical substances that are secreted by certain animals to the surroundings to facilitate communication.

Study Notes

Human Endocrine glands

Endocrine glands	Hormones	Functions
Pancreas	• Insulin	• Converts glucose into glycogen • Cellular uptake of glucose
	▪ Glucagon	▪ Converts the glycogen to glucose. ▪ Synthesizes glucose from aminoacids
Thyroid	Calcitonin	Lowers the level of calcium in blood.
Parathyroid	Parathormone	Increases the level of calcium in blood
Pituitary	Growth hormone	Promotes the growth of the body.

Diabetes: The condition when the level of glucose before breakfast is above 126mg/100ml of blood.

Reason --Decreased production of insulin,inability of cells to utilize the insulin produced

symptoms--Increased appetite and thirst and frequent urination

Gigantism.

Increases production of somatotropin during the growth phase, it leads to the excessive growth of the body. This condition is called Gigantism.

Dwarfism

Decreases production of somatotropin during the growth phase leads to stunted growth

Acromegaly

The condition caused by the excessive production of somatotropin after the growth phase. It is characterised by the growth of the bones on the face, jaws, and fingers

Pheromones.

chemical substances that are secreted by certain animals to the surroundings to facilitate communication are called pheromones.

Uses of Pheromones.

1.attracting mates

2.Informing the availability of food

3.Determining the path of travel

4.Signalling dangers

Animals	Pheromones.
Musk deer	Muscone
Civet cat	Civeton
Female silk worm moth	Bombykol

Artificial pheromones are used for pest control in agricultural fields.

Plant hormones

Plant hormones control and coordinate life activities in plants.

These are also called plant growth regulators.

Plant hormones	Functions
1. Cytokinin	Cell growth, cell division, cell differentiation.
2.Auxin	Promoting the growth of terminal buds, fruit formation.
3.Gibberellin	sprouting of leaves, facilitate germination
4.Ethylene	Ripening of leaves and fruits
5.Abscisic acid	Dormancy of embryo, dropping of ripened leaves and fruits.

Model questions.

1.Identify the word- pair relationship and fill in the blank.

Parathormone : Parathyroid gland

Glucagon : .....

2. Functions of Plant hormones are given, analyse the box given below and complete the table suitably.

Cytokinin	Auxin

Fruit formation, Dropping of ripened leaves and fruits, Cell division, Break down of stored food, Growth of terminal buds, Cell differentiation

3. Given in the table below is to growth hormone. Complete the table suitably.

Disease	Condition of Hormone.	Symptoms
Gigantism	----------a----------	Excessive growth of the body
-------b----------	Deficiency of growth hormone during growth phase.	Stunted growth
Acromegaly	excessive production of Somatotropin after the growth phase.	--------c----------

4. Analyse the box given below and complete the table suitably

Cytokinin, Muscone, Calcitonin, Gibberellin, Parathormone, Civeton .Ethylene, Bombykol, Insulin

Hormone	Pheromones	Plant hormones

5.The normal level of two components of human blood given in the table. Analyze them and answer the questions

A	9-11 mg/100ml
B	70-110 mg/100ml

1. Identify A and B.

2. Name the hormones which maintains the normal level of A.

3. Write the disease caused by the excess level of B?

6. Find out the correct statement related to hormones among the following.

a)Hormones are the secretions of endocrine glands.

b) Hormones act only on target cells

c) Hormones reach the target cells through special tubes

d) Hormones are transported through the blood.

1. a, b, c are true

2. a, c, d are true

3. a, b, d are true

4. b, c, d are true

7.Find the odd and write the peculiarities of others.

Auxin, Ethylene, Cytokinin, Gibberellin

8.Chemicals help honey bees and termites to live in colonies.

1, Which chemical helps them to live in colonies?

2, How this chemical can be used in the agricultural sector?

3, Write four functions of this chemicals

Answer key

1.Pancreas

2.

Cytokinin	Auxin
Cell division Cell differentiation	Fruit formation Growth of terminal buds

3. a.excessive production of somatotropin during the growth phase

b.Dwarfism

C.excessive growth of the bones on the face, jaws and fingers.

4.

hormone	Pheromones	Plant hormones
calcitonin ,parathormone, Insulin	bombykol,muscone,civeton	Cytokinin,Gibberellin, Ethylene

5. 1. A- Normal blood calcium level, B- Normal blood glucose level

2. Calcitonin, Parathormone

3. Diabetes

6. a,b,d are true

7. Ethylene, others are stimulate plant growth

8. 1, Pheromones

2. Artificial Pheromones are used for pest control in agricultural fields

3.Attracting mates, Informing the availability of food,

Determines the path of travel, Signalling dangers.

Chapter 4

KEEPING DISEASES AWAY

This chapter deals with some important diseases of human beings. The chapter explains the mode of their spread, the pathogen they cause and the important control measures we need to be taken. It is better to avoid diseases than treating them.

Study Notes

Tuberculosis

Tuberculosis is a disease caused by a bacteria Mycobacterium tuberculosis. It mainly affects the lungs. But kidneys, bones, joints, brain etc. are also affected by this disease.

Symptoms-Loss of body weight, fatigue, persistent cough

Mode of transmission-When the patient speaks, coughs or sneezes, the pathogens spread into the air and thereby to others.

Treatment-By antibiotics. BCG is the vaccine against the disease

AIDS

Acquired Immuno Deficiency Syndrome(AIDS) is a disease caused by a virus called the Human Immuno deficiency Virus(HIV).This virus attacks Lymphocyte, a type of white blood cell. The virus enters the Lymphocytes and multiplies there using the genetic mechanism of the host. This gradually destroys Lymphocytes. Since Lymphocytes are providing immunity to our body the reduction in their number reduces the immunity of the body. In such a situation various other pathogens enter in our body and cause diseases. This make the condition of AIDS more fatal.

Mode of transmission-AIDS spreads through the following ways

- Through sexual contact with HIV infected person.
- From HIV infected mother to foetus.
- By sharing needle and syringe contaminated with HIV components.
- Through the reception of blood and organs contaminated with HIV

AIDS does not spread by……

- Touch, shaking hands, coughing, sneezing etc.

- Through insects like mosquitoes, houseflies etc.
- Staying together and sharing food
- Using the same toilet
- Taking bath in the same pond

Remember….. AIDS patients are also human beings. No need to be scared of them. They need our attention and care.

Malaria

Malaria is caused by a protozoa the Plasmodium. Protozoans are unicellular eucaryotes.

Pathogen-Plasmodium

Mode of transmission-Through a vector the female Anopheles mosquito

Symptoms-High fever with shivering and profuse sweating are the major symptoms. Headache, vomiting, diarrhoea, anaemia etc. are other symptoms.

Precaution- Since the disease is spreading through mosquitoes avoid mosquito bite. Use mosquito nets. Prevent the breeding of mosquitoes. Observe dry day once in a week.

Genetic Diseases

Genetic diseases are caused by defects in the genes that control the cellular activities. Haemophilia, sickle cell anaemia etc. are examples.

Haemophilia

Cause- The defect of a gene that controls the production of a protein which is needed for blood clotting.

Symptoms- Blood do not clots in wounds. This leads to excess blood loss even from minor wounds.

Treatment- No complete cure is possible since it is a genetic disease. Temporary relief by identifying and injecting the deficient protein.

There are social organisations which work for Haemophilia patients. They volunteer to provide care to patients and spreads awareness to public about the disease

Cancer

Cause-Uncontrolled division of cells and their spread to other tissues. When the normal cells loss the control system of cell division, they get transformed into cancer cells. The following factors may lead to this situation

A protozoa called plasmodium, Excess blood is lost even through minor wounds, Malaria, Haemophilia, losing body weight ,fatigue ,cough etc., AIDS, Mycobacterium tuberculosis

Disease	**Cause**	**Symptom**
……(a)……..	Defect of a gene that produce a protein needed for blood clotting	……(b)……..
……(c)……..	……(d)…….	High fever with shivering and profuse sweating, headache, vomiting, diarrhoea and anaemia
Tuberculosis	……(e)…….	……(f)……

17. When health workers surveyed an area they found the presence of Anopheles mosquitoes. If so

a) What disease may spread in that area?

b) What precautions should be taken to prevent the spread of the disease?

18. Vinu prepared a table about some diseases. But unfortunately, he misplaced some contents. Please help Vinu to correct it.

- Radiations
- Environmental factors
- Smoking
- Some virus
- Hereditary factors etc.

The disease may become complicated when the cancer cells spread to various parts of the body through blood and lymph.

Treatment-Surgery, chemotherapy, radiation therapy etc. Early diagnosis of the disease is crucial in the treatment since as the disease advances, it spread to more parts.

Cancer patients suffer a lot of pain .So palliative care is very important in cancer treatment. Love and care is also important as medicine and food for cancer patients.

Model Questions

1. "Early diagnosis of the disease is crucial in the treatment of cancer" Why?

2. What is cancer?

3. Cancer is formed when normal cells transform to cancer cells. What make normal cell to transform cancer cells?

4. A boy has disease by which he loses excess blood even through minor wounds.

a) Name the disease

b) If he has an accident and got a bleeding wound what temporary relief measures should be done?

5. A unicellular eukaryote is

a) Bacteria b)Fungi c)Protozoa d)Virus

6. If we avoid mosquito bite we can avoid

a) AIDS b)Malaria c)Cancer d) Tuberculosis

7 AIDS------Virus like that

Malaria------.....

8. In an area people have the following symptoms

High fever with shivering and profuse sweating , headache, vomiting, diarrhoea and anemia

a) Name the disease and how it spreads?

b) To prevent the spread of this disease what precautions should be taken?

9. How HIV infects Lymphocytes?

10. When the AIDS advances the condition of our body becomes worser. How?

11 From the given list, select the ones which are the ways of spreading AIDS

a) Through sexual contact with HIV infected person.

b) Through insects like mosquitoes, houseflies etc.

c) Staying together and sharing food

d) From HIV infected mother to foetus.

e) By sharing needle and syringe contaminated with HIV components.

f) Using the same toilet

12. Hemophilia is related with Heredity. Like that Tuberculosis is related with

a) Bacteria b)Virus c)Protozoa d)None of these

13. BCG is a vaccine against

a) COVID-19 b)Malaria c)AIDS d) Tuberculosis

14. How do tuberculosis spread?

15. Manu is losing body weight and has fatigue ,cough etc. When he consulted a doctor, the doctor prescribed some antibiotics. Doctor told Manu it is a bacterial disease and it may affect different body parts. If so….

a) What will be the disease?

c) Which bacteria cause it?

c) What body parts may be affected by the disease?

16. Complete appropriately. Use the words in the box.

Name of disease	Pathogen/Cause
Malaria	Mycobacterium tuberculosis
Cancer	HIV
Tuberculosis	Plasmodium
AIDS	Defect of a gene
	Uncontrolled cell division

Answer key

1.When the disease advances it spread to more and more parts of the body .It make the treatment of cancer difficult. So early diagnosis of the disease is crucial in the treatment of cancer.

2.Cancer is the uncontrolled division of cells and their spread to other tissues

3.Radiations

Environmental factors

Smoking

Some virus

Hereditary factors etc.

4. a) Haemophilia

b) Identify the deficient protein which is absent in his blood needed for blood clotting, and inject it. This is the temporary relief measure

5 c)Protozoa

6 b)Malaria

7 a) Protozoa

8. a) These are the symptoms of Malaria. Malaria spread through female Anopheles mosquitoes.

b) To prevent the spread of this disease the following precautions should be taken

Avoid mosquito bite.

Use mosquito nets while sleeping

Prevent the breeding of mosquitoes.

Observe dry day once in a week.

9. The virus enters the Lymphocytes and multiplies there using the genetic mechanism of the host. This gradually destroys Lymphocytes.

10. The HIV enters the Lymphocytes and multiplies there using the genetic mechanism of the host. This gradually destroys Lymphocytes. Since Lymphocytes are providing immunity to our body the reduction in their number reduces the immunity of the body. In such a situation various other pathogens enter in our body and cause diseases. This make the condition of AIDS more fatal.

11. a)Through sexual contact with HIV infected person.

d)From HIV infected mother to foetus.

e)By sharing needle and syringe contaminated with HIV components.

12 a) Bacteria

13 d)Tuberculosis

14. When the patient speaks, coughs or sneezes, the pathogens spread into the air and thereby to others.

15. a)Tuberculosis

b) Mycobacterium Tuberculosis

c) It mainly affects the lungs. But kidneys, bones, joints, brain etc. are also affected by this disease.

16. (a) Haemophilia

(b)Excess blood is lost even through minor wounds

(c)Malaria

(d)A protozoa called plasmodium

(e)Mycobacterium tuberculosis

(f)losing body weight ,fatigue, cough etc.

17. a)Malaria

b)Avoid mosquito bite, prevent breeding of mosquitoes, observe dry day once in a week

18.

Name of disease	**Pathogen/Cause**
Malaria	Plasmodium
Cancer	Uncontrolled cell division
Tuberculosis	Mycobacterium tuberculosis
AIDS	HIV

Chapter 5

SOLDIERS OF DEFENSE

Defense is the ability of the body to prevent the entry of pathogens and to destroy those that have already entered the body. Our body is well equipped with a variety of defense mechanisms. A mechanism that protects us from all pathogens without considering their characteristic features like non-specific defense mechanism and specific defense mechanism where the blood cells that specifically identify and destroy pathogens that enter the body are the parts of defense mechanisms.

Study Notes

1. Non specific defence mechanisms are classified in to 3 categories

➔ Body coverings (skin, mucous membrane)

➔ Body secretions (mucus, saliva, tears, urine, sweat, sebum, ear wax, HCl)

➔ Body fluids (Blood and lymph)

2.Skin is the protective covering of the body which prevents the entry of germs

➔ Topmost layer of the skin is known as Epidermis

➔ Keratin protein present in the epidermis prevents the entry of germs

➔ Sebum produced by the sebaceous gland makes the skin oily

➔ The sweat produced by the sweat gland is having disinfectant property

3. Phagocytosis is the process of engulfing and destroying of germs

➔ The cells that are engaged in this process are called phagocytes

➔ The white blood cells, namely monocytes and neutrophils are phagocytes

4. Fever is an important defense mechanism of our body at the time of entry of germs

➔ Fever is a condition when the body temperature rises above the normal level

➔ Fever is a symptom

➔ If the rise in body temperature persists for a long time, it may badly affect the internal organs including the brain

➔ It is advisable to treat after diagnosing the exact reason

5. Immunization is the artificial method to make the defense cells alert against the attack of pathogens

➔ Vaccines are the substances used for artificial immunization

➔ The components of vaccines act as antigens that stimulate the defense mechanism of the body

6. Medicines that are used to destroy bacteria are called antibiotics

➔ Antibiotics are extracted from microorganisms like bacteria, fungi, etc.

➔ They can be used externally and internally

➔ It was Alexander Fleming who first discovered antibiotics

7. The transfer of blood from one person to another is called blood transfusion

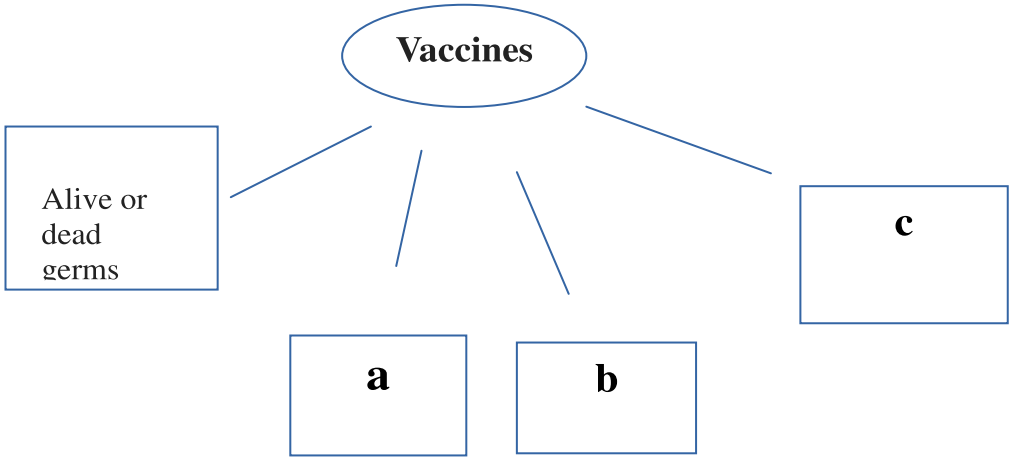
➔ The major blood groups are A, B, AB and O

➔ Blood grouping is performed on the basis of A, B antigens seen on the surface of RBC

➔ Blood groups are called as positive or negative based on another antigen, antigen D (Rh factor) seen on the surface of RBC

Model Questions

1. Complete the illustration



2. Though antibiotics are effective medicines, their regular use creates many side effects. Do you agree with this statement? Why?

5. Prepare a poster on the greatness of donating blood

6. Everyone cannot receive blood from all blood groups. Why?

7. Complete the table

Blood groups	Antigens	Antibodies
A +ve	i.....	**b**
B -ve	**B**	ii.....
AB +ve	**A, B, Rh**	iii.....
O -ve	iv.....	**a, b**

Answer Key

1. a. Neutralised toxins

   b. Cellular parts of the pathogens

   c. Neutralised germs

2. Regular use develops immunity in pathogens against antibiotics

   Destroys useful bacteria in the body.

   Reduces the quantity of some vitamins in the body.

3. a. Engulfs the pathogen in the membrane sac

   b. The enzyme in the lysosome destroys the pathogen

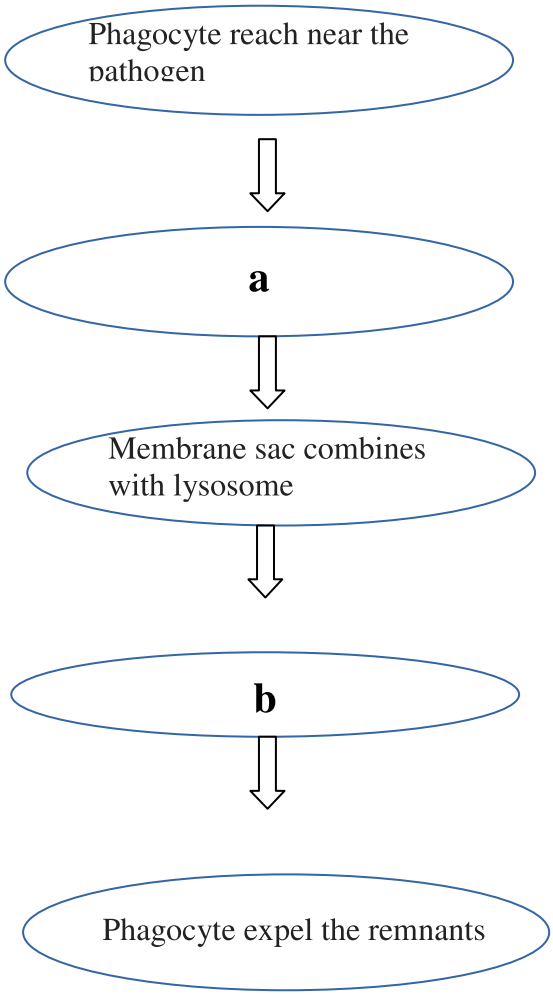
4. a. Stomach

   b. Lysozyme

   c. Keratin

   d. Sebaceous gland

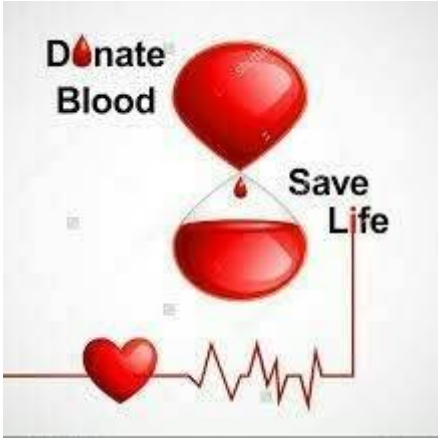
3. Complete the stages of Phagocytosis



4. Complete the table

Nose	Mucus
a.....	HCl
Tears	b.....
Epidermis	c.....
d.....	Sebum

5



6. On receiving unmatching blood, the antigen present in the donor's blood and the antibody present in the recipient's blood will react with each other and form a blood clot.

7. i. A, Rh factor

ii. a

iii. Nil

iv. Nil

Chapter 6

UNRAVELLING GENETIC MYSTERIES

This unit discuss the reasons for inheritance of characters and the genetic structure in animals.

Study Notes

Structure of DNA - The double helix model of DNA (James Watson and Francis Crick)

A structure with two long strands made up of sugar and phosphate, and rungs with nitrogen bases

Nucleotide contains Sugar molecule , Nitrogen base and Phosphate molecule

Four types of nitrogen bases - Adenine , Thymine, Cytosine and Guanine

Combination of nucleotides in DNA molecule -Adenine A -- T Thymine Guanine G-- C Cytosine

Structure of RNA - Single stranded – Nucleotide with Ribose sugar , Nitrogen bases and Phosphate molecule

, Four types of nitrogen bases - Adenine , Uracil , Cytosine and Guanine (Uracil instead of Thymine in DNA)

Action of Genes -

mRNA forms from DNA and reaches out of the nucleus

mRNA reaches ribosome

tRNA brings different kinds of amino acids to ribosome.

Based on the information in mRNA, protein molecule is synthesized by adding amino acids.

Determination of sex of achild

Mechanism that determines whether a child is male or female - from father

44 Somatic chromosomes and 2 Sex chromosomes

Male 44 + X Y Female 44 + XX

XY chromosomes of the father determine whether the child is male or female.

Child with XX sex chromosomes is female and one with XY sex chromosomes is male.

Model questions

1.Which of the following are the correct nitrogen base pairs in DNA molecule ?

a) Adenine and Guanine

b) Adenine and Thymine

c) Cytosine and Thymine

d) Guanine and Cytosine

2.Make pairs of nitrogen bases appropriately as in a DNA molecule .

Thymine - Guanine – Uracil - Adenine - Cytosine

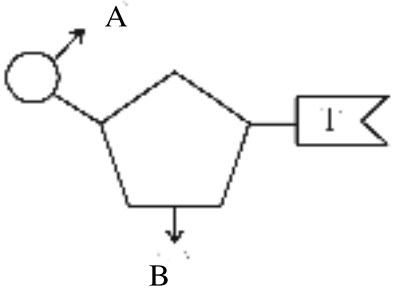
3. Pick the odd one out

.a) Phosphate molecule b) Sugar molecule c)Nitrogen base d) Amino acid

4. Sex of a child is determined by

a) Ovum b) Sperm c) Somatic chromosomes d) Alleles

5. Observe the diagram and answer the questions



a) What does the diagram indicates?

b) Identify the parts labelled as A and B

6. Tabulate the following items related to Nucleic Acids appropriately

a) Ribose sugar b) Shape of double helix c) Uracil d) Single strand, e) Deoxyribose sugar f) Thymine

DNA	RNA

7. Prepare a flow chart of Protein synthesis using the given steps .

a) tRNA brings different kinds of amino acids to ribosome.

b) mRNA reaches out of the nucleus

c) mRNA forms from DNA

d) Based on the information in mRNA amino acids are added

e) mRNA reaches ribosome

f) Protien molecule is synthesised

Answer key

1. b) Adenine - Thymine , d)Guanine - Cytosine

2. Thymine - Adenine , Guanine –Cytosine

3. Amino acid - all others are part of DNA molecule

4.b) sperm

5.a) Nucleotide in DNA molecule

b) A – Phosphate molecule , B – Sugar molecule

6.

DNA	RNA
e) Deoxyribose sugar b) Shape of double helix f) Thymine	a) Ribose sugar d) Single strand c) Uracil

7. c) mRNA forms from DNA --- b) mRNA reaches out of the nucleus e) mRNA reaches ribosome a) tRNA brings different kinds of amino acids to ribosome f) Protein molecule is synthesised

Chapter 7

GENETICS FOR FUTURE

Genetic engineering is the technology of controlling traits of organisms by bringing about desirable changes in the genetic constitution of organisms. The basis of this is the discovery of the fact that genes can be cut and joined.

Study Notes

1. Enzymes are used to cut and join genes.
   - The enzyme restriction endonuclease is used to cut genes (genetic scissors)
   - The enzyme ligase is used for joining (genetic glue)

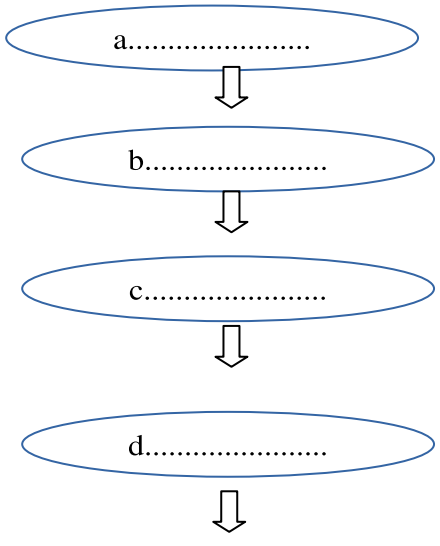
2. A gene from one cell is transferred to another cell by using suitable vectors.
   - Plasmids in bacteria are generally used as vectors

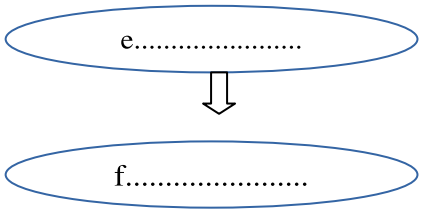
3. The technology of testing the arrangement of nucleotides is DNA profiling.
   - Alec Jeffreys discovered the technique of DNA testing
   - Just like the difference in the fingerprint of each person, the arrangement of nucleotides in each person also differs. Hence this technology is also called DNA finger printing

Model Questions

1. Stages of human insulin production through genetic engineering are given below. Rearrange them in proper order

- This bacterium is allowed to multiply in a culture medium to produce inactive insulin
- Human insulin gene is ligated with the isolated plasmid, which is used as the 'vector'
- Active insulin is produced from this
- Insert this ligated plasmid in to another bacterial cell
- From human DNA, cut the gene responsible for the production of insulin
- Plasmid (circular DNA) is isolated from a bacterium





2. What are the possibilities of DNA finger printing?

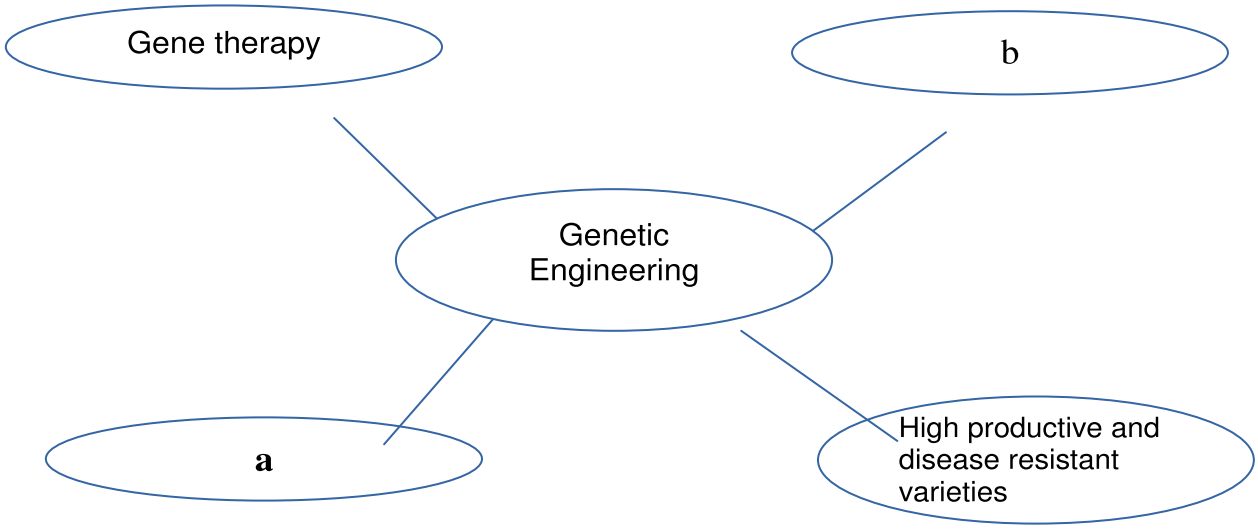
3. Complete the table

Ligase enzyme	a……..
b……	Genetic scissors
Vectors	c……..
Alec Jeffreys	d…….

4. What is the basic principle of DNA profiling.

5. How is it possible to bring about desirable changes in an organism.

6. Complete the given illustration about the scope of genetic engineering.



Answer Key

1. a. From human DNA, cut the gene responsible for the production of insulin

b. Plasmid (circular DNA) is isolated from a bacterium
c. Human insulin gene is ligated with the isolated plasmid, which is used as the 'vector'

Chapter 8

THE PATHS TRAVERSED BY LIFE

This chapter deals with the origin of life and the theories of evolution. The focus area for examination only includes the Chemical evolution theory and Charles Darvin's Theory of Natural selection.

Study Notes

Chemical Evoution Theory.

The more predominant theory, on the origin of life on earth is the Chemical evolution theory. The hypothesis that evolved into the theory of chemical evolution is that life originated as a result of the changes that occurred in the chemical substances in seawater, under specific conditions on primitive earth.

Chemical reactions lead to the origin of Primitive cell

Atmosphere of primitive earth was filled with gases like hydrogen, nitrogen, carbon dioxide, methane, ammonia, water vapour,hydrogen sulphide etc.The peculiarity was that there was no free oxygen. Condensation of water vapour present in the atmosphere and the resulting incessant rain led to the formation of oceans. Utilizing energy from sources like thunder and lightning, ultraviolet radiations, volcanic eruptions the gases were joined together to form simple organic molecules like amino acids, monosaccharide, nitrogen bases, fatty acids etc. Simple organic molecules again reacted together to form complex organic molecules, like protein, polysaccharide, nucleotides, lipids etc.Finally nucleic acids and lipid layer are also formed. They joined together to form a primitive cell.

Charles Darvin's Theory

Every species produces more number of offsprings than that can survive on earth, there by occurring a struggle for existence. Those with favourable variations survive in this struggle for existence leads to Natural selection.

Question models

1. Find out the relationships in the word pair and fill in the blanks.

a. Nitrogen bases - Simple organic molecule; …….. - Complex organic molecule.

b. Amino acids -.....; Monosaccharide - Polysaccharide

2. Find out the odd one, and give the common features of the others.

d. Insert this ligated plasmid in to another bacterial cell
e. This bacterium is allowed to multiply in a culture medium to produce inactive insulin
f. Active insulin is produced from this

2. To find out hereditary characteristics.

To identify real parents in cases of parental dispute.

To identify persons found after long periods of missing due to natural calamities or wars.

To identify the real culprit among the suspected persons from the place of crimes.

3. a. Genetic glue

b. Restriction endonuclease

c. Plasmid

d. DNA Finger printing

4. Just like the difference in the fingerprint of each person, the arrangement of nucleotides in each person also differs.

5. Genetic modification in organisms is done by cutting or joining specific genes. By this way, we can make desirable changes in an organism.

6. a. Genetically modified organisms like human insulin producing organisms

b. DNA Finger printing

hydrogen, nitrogen,oxygen, carbon dioxide.

3 The atmosphere of primitive earth was favourable for the origin of life. Comment.

4. The peculiarities of beaks help the finches in their survival. Evaluate with examples.

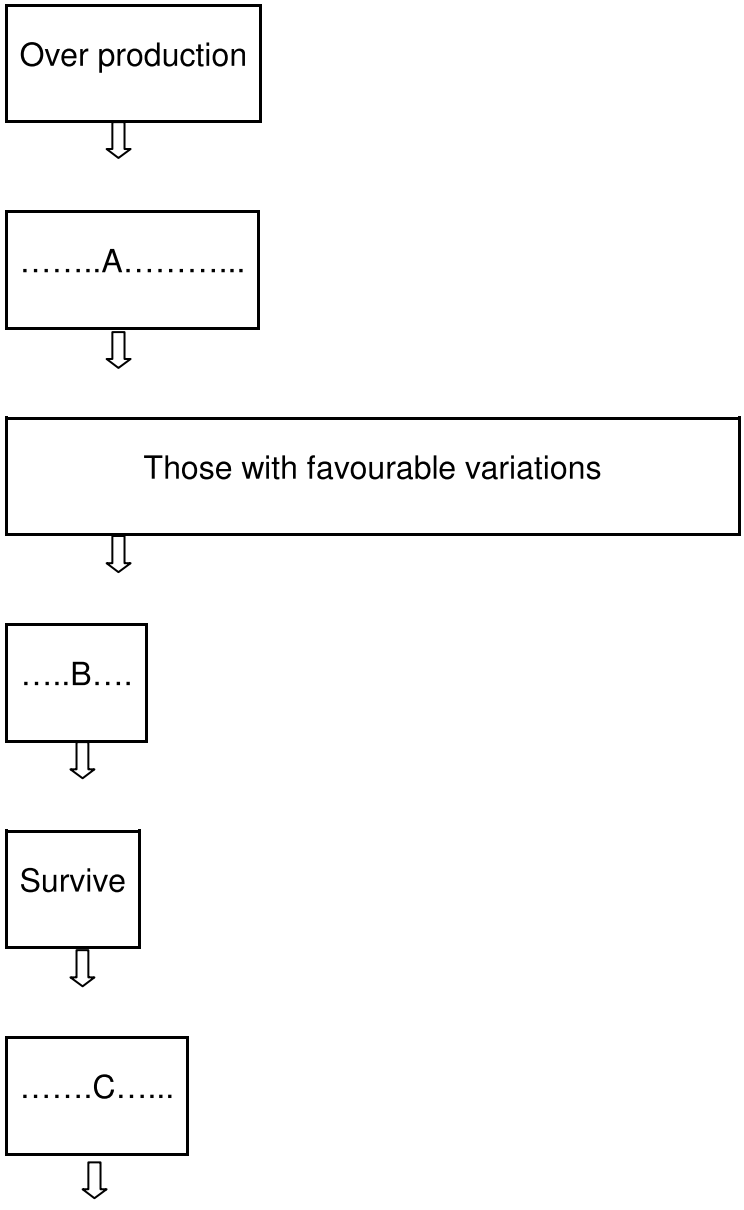
5 “The selection done by nature, leads to the diversity of species that we see around us” How overproduction of organisms becomes a reason for this explanation by Darwin?

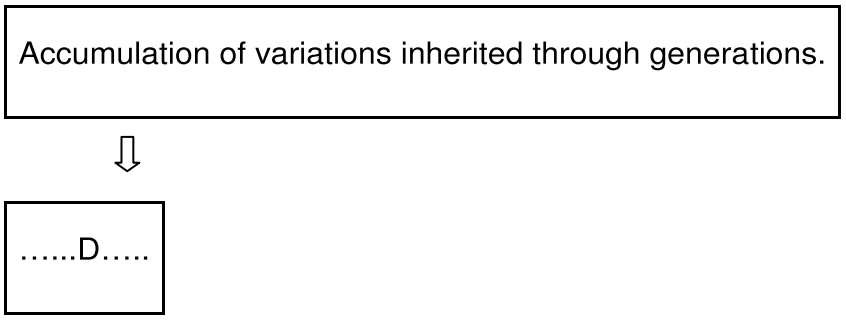
6 Differentiate Neo Darwinism from Darwinism?

7 Which are the resources for which organisms compete with?

8 Which kind of variations help to form species that are different from their ancestors?

9 Complete the flowchart





Answer key

1. a. Nucleotides b. Protein

2 Oxygen, others are the gases present in the atmosphere of primitive earth

3 Atmosphere of primitive earth was filled with gases like hydrogen, nitrogen, carbon dioxide, methane, ammonia, water vapour,hydrogen sulphide etc.There was no free oxygen.

4 Insectivorous finches have small beaks. Those that feed on cactus plants have long and sharp beaks. Woodpecker finches that used sharp beaks to pick small twigs for feeding on worms from the holes in tree trunks. The ground finches that feed on seeds with large beaks.

5 Every species produces more number of offsprings than that can survive on earth

This leads to a struggle for existence.

Those with favourable variations survive in the struggle for existence.

Others are eliminated.

Variations that are inherited through generations and repeated differently help to form species that are different from their ancestors.

6 Though Darwin identified that continuous variations occurred in organisms, he could not explain the reasons for these variations. During his period there was no idea regarding genes,chromosomes etc. Darwinism was revised in the light of new information from the fields of genetics, cytology, geology and paleontology. This modified version of Darwinism is known asNeo Darwinism

7 Food, space and mates

8 Variations that are inherited through generations and repeated differently

9. A Struggle for existence, B Natural selection, C Favourable variations are transferred to the next generation, D- Origin of new species