ZIAUDDIN UNIVERSITY
EXAMINATION BOARD

Biology
XI
Student Resource

Contents

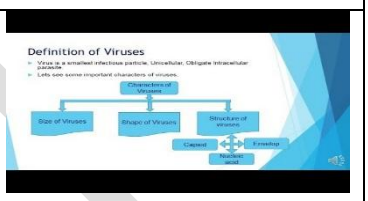
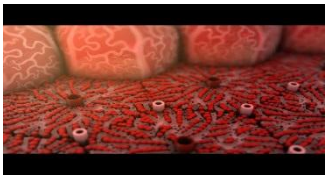
Section 2: BIODIVERSITY

It Includes

5. A cellular life
6. Prokaryotes
7. Diversity among Animals

Cellular Life

Acellular Life

Chapter	Student learning outcomes	Understanding	Reference web material
The variety of life	Student will be able to differentiate between five kingdom of classification. Be able to describe lytic and lysogenic cycle of bacteriophage virus Know about cause and control of diseases caused by virus .	Describe taxonomy, homology, cytology and genetics. Explain the five kingdom classification of Whittaker & Margolis & Schwartz Describe characteristics, structure, classification and life cycle of virus. Explain cause, symptoms and control of diseases caused by viruses.	 Structure and classification of virus  The lytic and lysogenic cycle  Hepatitis

Chapter Review

Whittaker proposed that organisms should be broadly divided into kingdoms, based on certain characters like the structure of the cell, mode of nutrition and reproduction. According to this system, there are five main kingdoms. They are:

Kingdom MoneraKingdom ProtistaKingdom Fungi

Kingdom AnimaliaKingdom Plantae

Margulis and Schwartz modified the Whittaker classification. According to this system, there are five main kingdoms. They are:

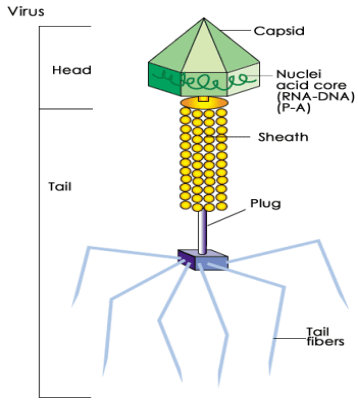
Kingdom Prokaryotae(Monera) Kingdom Protoctista (Protista)

Kingdom FungiKingdom AnimaliaKingdom Plantae

Kingdoms are divided into subgroups at various levels.

Kingdom → Phylum → Class → Order → Family → Genus → Species

Viruses



Viruses are infectious agents with both living and nonliving characteristics. They can infect animals, plants, and even other microorganisms. Viruses that infect only bacteria are called bacteriophages and those that infect only fungi are termed mycophages. There are even some viruses called virophagesthat infect other viruses.

Charecteristics of virus

1. Viruses are ultra-microscopic, non-cellular living particles,

2. They are ultra-microscopic and can only be visualized under electron microscope.

3. They do not increase in size.

4. They can pass through filters, through which bacteria cannot pass.

Bacteriophage virus

Bacteriophage viruses areany of a group of viruses that infect bacteria.

Life Cycles Of Bacteriophages

During infection a phage attaches to a bacterium and inserts its genetic material into the cell. After that a phage usually follows one of two life cycles, lytic (virulent) or lysogenic (temperate).

Transmission of virus

A virus exists only to reproduce. They can spread through:

touch

exchanges of saliva, coughing, or sneezing

sexual contact

contaminated food or water

insects that carry them from one person to another

Viral diseases

Viruses cause many human diseases.

These include:

Smallpox

The common cold and different types of flu

Measles, mumps, rubella, chicken pox.

Hepatitis

Polio

Rabies

HIV, the virus that causes AIDS

Dengue fever

The immune system produces special antibodies that can bind to viruses, making them non-infectious. The body sends T cells to destroy the virus.

Most viral infections trigger a protective response from the immune system, but viruses such as HIV and neurotropic viruses have ways of evading the immune system's defenses.

Treatment and drugs

Bacterial infections can be treated with antibiotics, but viral infections require either vaccinations to prevent them in the first place or antiviral drugs to treat them.

Sometimes, the only possible treatment is to provide symptom relief.

Antiviral drugs have been developed largely in response to the AIDS pandemic.

These drugs do not destroy the pathogen, but they inhibit their development and slow down the progress of the disease.

Reference Pages

https://alevelbiology.co.uk/notes/the-five-kingdoms-classification-system/

https://www.livescience.com/53272-what-is-a-virus.html

https://www.britannica.com/science/virus

https://www.sparknotes.com/biology/microorganisms/viruses/section1/

http://www.yourarticlelibrary.com/micro-biology/viruses-definition-characteristics-and-other-details-with-figure-micro-biology/26672

Lesson plan

Objectives

Students will be able to:

- Describe the structure and shape of viruses.
- Distinguish the differences between lytic and lysogenic cycles.
- Explain the mechanism of transduction.
- Identify and describe several viral diseases and ways to defend against them.

2. Performance standard

The students are expected to follow attentively to the lecture and video presentation and take down informative notes throughout the lesson. They should be able to fulfill all of the objectives at the end of the lesson and answer at least 70% of the questions correctly on the virus quiz.

Resources, materials and supplies needed for video presentation

Supplementary materials,

handouts

Virus notes (will turn in later)

Virus quiz

Teacher Does	Probing Questions	Student Does
3. Anticipatory Set Learning Experience(s) Begin by asking how many of the students have gotten sick this pass year and what kind of diseases they had.	How many of you have gotten sick this past year?	Most everyone will raise their hands.
Then ask how many were prescribed medication to treat their illnesses.	And how many have taken medicine/antibiotics to get better/treat your illnesses?	Most everyone will raise their hands.
After asking the last question, introduce today's topic as "Intro to Viruses".	Can you think of reasons how you got sick and what caused your illnesses?	Various responses: (I got sick from others; it was really cold outside; from viruses; from bacteria; etc.)

Virus Quiz

1. Viruses reproduce by

A. Attacking a host cell and then waiting for the cell to die.

B. Splitting in half once they enter a host cell and later growing.

C. Using the process of meiosis. D. Using the host cell's DNA to create new viruses.

2. A virus is unique in that it

A. Contains DNA. B. Contains RNA.

C. Reproduces in a short time.D. Cannot reproduce outside a living cell.

3. The protein coat that envelopes the viral genetic material is known as a:

A. VironB. HeadC. CapsidD. Case

4. A virus that attacks a bacterial cell is called a:

A. Provirus. B. Bacteriophage.C. Bacillus.D. Spirillum.

5. Which type of viral infection literally takes over and quickly destroys the host cell?

A. Lytic cycle. B. Lysogenic cycle.

C. Antibiotic cycle.D. Conjugation cycle.

Reference Pages

https://www.alimentarium.org/en/knowledge/role-digestion

https://www.britannica.com/science/digestion-biology

http://www.ibdclinic.ca/what-is-ibd/digestive-system-and-its-function/why-is-digestion-important/https://socratic.org/questions/what-are-all-the-components-of-the-digestive-system

https://courses.lumenlearning.com/ap2/chapter/digestive-system-processes-and-regulation/

https://www.education.com/worksheet/article/what-is-digestion/

https://www.medicinenet.com/digestive_disease_myths_pictures_slideshow/article.htm

https://my.clevelandclinic.org/health/articles/7040-gastrointestinal-disorders

https://www.niddk.nih.gov/health-information/digestive-diseases/digestive-system-how-it-works

Student Assessment

Q. 1Fill in the blanks:

a. The main steps of digestion in humans are _____, _____, _____, _____ and _____.
b. The largest gland in the human body is _____.
c. The stomach releases hydrochloric acid and _____ juices which act on food.
d. The inner wall of the small intestine has many finger-like outgrowths called _____.

Answers :a. Ingestion, digestion, absorption, assimilation and egestion.

b. Liver. c. Gastric d. Villi.

Q2. Encircle the correct answer

1. Which of the following is the largest gland?

a) Liver

b) Thymus

c) Pancreases

d) Thymus

View Answer

2. Part of bile juice useful in digestion is _____

a) Bile pigments

b) Bile salts

c) Bile matrix

d) All of the mentioned

View Answer

3. Bile helps in _____

a) Digestion of proteins

b) Breaking down of nucleic acids

c) Emulsification of fats

d) Phagocytosis

View Answer

4. Name the digestive juice that lacks enzyme but helps in digestion.

a) Bile juice

b) Pancreatic juice

c) Ptyalin

d) Pepsin

View Answer

5. Stores liver's digestive juice until they are needed by the intestines.

a) Pancreas

b) Gall bladder

c) Villi

d) Stomach

View Answer

6. RBC's are broken down in abnormally large amounts in _____

a) Cirrhosis

b) Viral hepatitis

c) Hemolytic jaundice

d) Obstructive jaundice

View Answer

7. When starch is broken down by pancreatic amylase _____ is formed:

a) Glucose

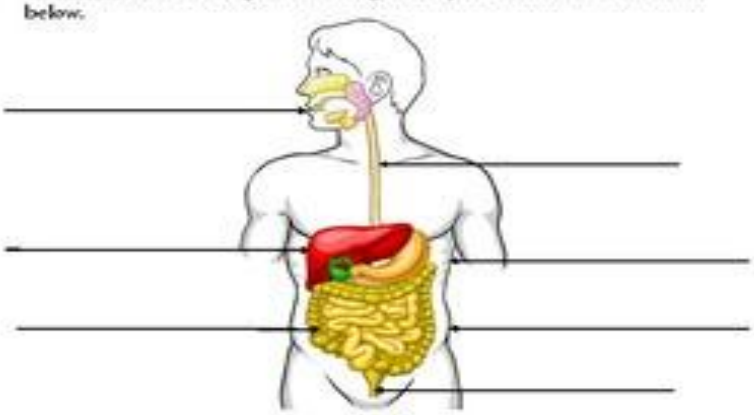
b) Maltose

c) Peptides

d) Amino acids

Name: _____ Date: _____

Directions: Label the organs of the digestive system and fill out the chart below.



Organ	Function/Job
Mouth	
Stomach	
Large Intestine	
Small Intestine	
Esophagus	
Liver	
Rectum	

COMPLETE THE FOLLOWING WORKSHEET

ANSWER THE GIVEN QUESTION:

How does food move through your digestive tract?

What is the process of digestion step by step?

What are the 2 types of digestion?

Describe GIT disorders in detail?

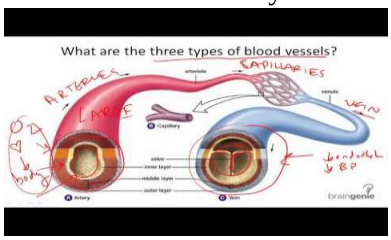
Write the dental formula of human.

Lesson plan

https://www.education.com/lesson-plan/all-about-the-digestive-system/

http://www.umanitoba.ca/outreach/crystal/Grade%205/Cluster%201/5-1-06%20-%20Digestive%20System%20%20-%20Lesson.doc

Circulation

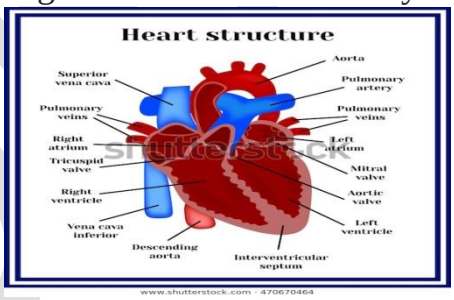
Chapter	Student learning outcomes	Understanding	Reference web material
CIRCULATION	Student will be able to describe the Components of blood and disorders Structure and function of heart Differentiate between vein, artery and capillary. Cardiac diseasesS	describe the composition and functions of blood describe disorders of blood (leukaemia, thalassaemia and oedema) describe the structure and function of heart (cardiac cycle, heartbeat, S.A. node, A.V. node, artificial pace maker) describe the cause of blue babies differentiate among artery, vein and capillary define blood pressure describe lymphatic system, lymph vessels and lymph node; list functions of lymphatic system.	 Human circulatory system  How human circulatory work  Blood vessel and its function

		describe the causes, effects and preventions of atherosclerosis hypertension, thrombus formation, coronary thrombosis, embolus, myocardial infarction and stroke	

Chapter Review

CIRCULATION

the movement of blood through the vessels of the body induced by the pumping action of the heart



About Circulation • The systemic circulation provides the functional blood supply to all body tissue. It carries oxygen and nutrients to the cells and picks up carbon dioxide and waste products. • Systemic circulation carries oxygenated blood from the left ventricle, through the arteries, to the capillaries in the tissues of the body. From the tissue capillaries, the deoxygenated blood returns through a system of veins to the right atrium of the heart.

Characteristics of circulatory system • Circulating fluid ¬ Blood ¬ Transports useful and waste materials • Pumping device ¬ Heart ¬ Move through body by muscular contractions of heart • Blood vessels ¬ 3 main types of blood vessels: arteries, veins and capillaries • Valves ¬ Present in some blood vessels ¬ Prevent backflow ¬ Ensure blood flows in 1 direction only

Parts of the Blood

Red Blood Cells: Red cells, or erythrocytes , are relatively large microscopic cells without nuclei. In this latter trait, they are similar to the primitive prokaryotic cells of bacteria. Red cells normally make up 40-50% of the total blood volume. They transport oxygen from the lungs to all of the living tissues of the body and carry away carbon dioxide. The red cells are produced continuously in our bone marrow from stem cells at a rate of about 2-3 million cells per second. Haemoglobin is the gas transporting protein molecule that makes up 95% of a red cell. Each red cell has about 270,000,000 iron-rich haemoglobin molecules. People who are anaemic generally have a deficiency in red cells, and subsequently feel fatigued due to a shortage of oxygen. The red colour of blood is primarily due to oxygenated red cells. Erythrocytes are Biconcave, disc shaped cells without nucleus

• Transport oxygen from the lungs to all parts of body

• Contain a red pigment called hemoglobin which combines with oxygen molecules to form oxyhemoglobin

• Carry carbon dioxide from body cells to lungs • RBC are produced in bone marrow • Lifespan: 120 days

• When RBC are worn out, they are destroyed in liver and spleen

• Produced from bone marrow cells •

White Blood Cells (leucocytes) Life span of WBC depends on type of WBC. It varies from a few hours to a few months • Play a vital role in body's defense against diseases – Produce antibodies • WBC can squeeze through walls of blood capillaries into the space among the cells to destroy the bacteria

• WBC are much larger than RBC and they each have a nucleus • Usually irregular in shape, colourless and do not contain hemoglobin

• White blood cells (WBCs), also called leukocytes or leucocytes, are the cells of the immune system that are involved in protecting the body against both infectious disease and foreign invaders. All leukocytes are produced and derived from a multipotent cell in the bone marrow known as a hematopoietic stem cell. Leukocytes are found throughout the body, including the blood and lymphatic system. • All white blood cells have nuclei, which distinguishes them from the other blood cells, the enucleated red blood cells (RBCs) and platelets. • The number of leukocytes in the blood is often an indicator of disease, and thus the WBC count is an important subset of the complete blood count.

Platelets (thrombocytes)

• Play an important role in blood clotting

• Platelets, also called thrombocytes, are a component of blood whose function (along with the coagulation factors) is to stop bleeding by clumping and clotting blood vessel injuries. Platelets have no cell nucleus: they are fragments of cytoplasm that are derived from the megakaryocytes of the bone marrow, and then enter the circulation. These inactivated platelets are biconvex discoid (lens-shaped) structures, 2–3 μm in greatest diameter. Platelets are found only in mammals, whereas in other animals (e.g. birds, amphibians) thrombocytes circulate as intact mononuclear cells. • On a stained blood smear, platelets appear as dark purple spots, about 20% the diameter of red blood cells The smear is used to examine platelets for size, shape, qualitative number, and clumping. The ratio of platelets to red blood cells in a healthy adult is 1:10 to 1:20.

Diseases in the Blood • If you are ill the doctor may ask you to have a blood test. • Some people are born

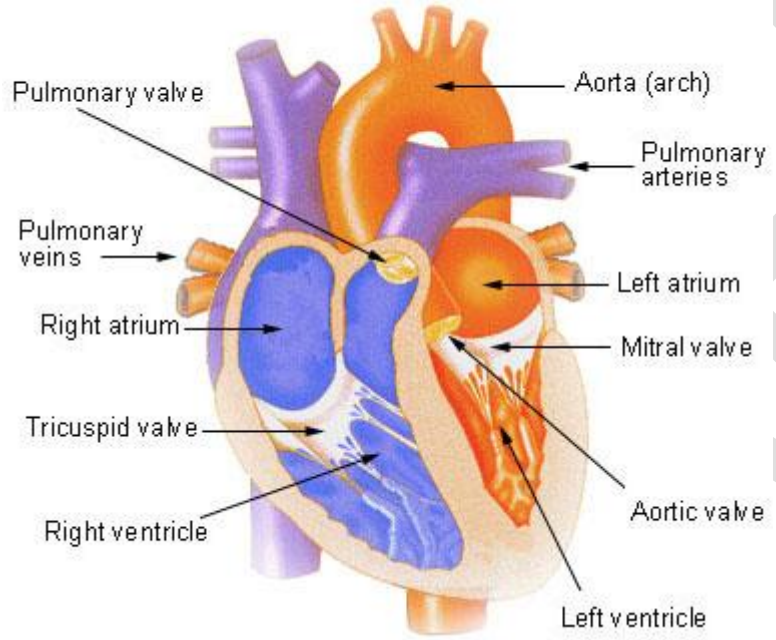
with sickle cell anaemia. • In this disease the blood cell curves into a C shape. • When a person has malaria, the centre of the blood cell bloats creating a dark patch there.

Structure of the Heart

The human heart is a four-chambered muscular organ, shaped and sized roughly like a man's closed fist with two-thirds of the mass to the left of midline.

The heart is enclosed in a pericardial sac that is lined with the parietal layers of a serous membrane. The visceral layer of the serous membrane forms the epicardium.

Internal View of the Heart



Layers of the Heart Wall

Three layers of tissue form the heart wall. The outer layer of the heart wall is the epicedium, the middle layer is the myocardium, and the inner layer is the endocardium.

Chambers of the Heart

The internal cavity of the heart is divided into four chambers:

Right atrium

Right ventricle

Left atrium

Left ventricle

The two atria are thin-walled chambers that receive blood from the veins. The two ventricles are thick-walled chambers that forcefully pump blood out of the heart. Differences in thickness of the heart chamber walls are due to variations in the amount of myocardium present, which reflects the amount of force each chamber is required to

generate.

The right atrium receives deoxygenated blood from systemic veins; the left atrium receives oxygenated blood from the pulmonary veins.

Valves of the Heart

Pumps need a set of valves to keep the fluid flowing in one direction and the heart is no exception. The heart has two types of valves that keep the blood flowing in the correct direction. The valves between the atria and ventricles are called atrioventricular valves (also called cuspid valves), while those at the bases of the large vessels leaving the ventricles are called semilunar valves.

The right atrioventricular valve is the tricuspid valve. The left atrioventricular valve is the bicuspid, or mitral, valve. The valve between the right ventricle and pulmonary trunk is the pulmonary semilunar valve. The valve between the left ventricle and the aorta is the aortic semilunar valve.

When the ventricles contract, atrioventricular valves close to prevent blood from flowing back into the atria. When the ventricles relax, semilunar valves close to prevent blood from flowing back into the ventricles.

Pathway of Blood through the Heart

While it is convenient to describe the flow of blood through the right side of the heart and then through the left side, it is important to realize that both atria and ventricles contract at the same time. The heart works as two pumps, one on the right and one on the left, working simultaneously. Blood flows from the right atrium to the right ventricle, and then is pumped to the lungs to receive oxygen. From the lungs, the blood flows to the left atrium, then to the left ventricle. From there it is pumped to the systemic circulation.

Blood Supply to the Myocardium

The myocardium of the heart wall is a working muscle that needs a continuous supply of oxygen and nutrients to function efficiently. For this reason, cardiac muscle has an extensive network of blood vessels to bring oxygen to the contracting cells and to remove waste products.

The right and left coronary arteries, branches of the ascending aorta, supply blood to the walls of the myocardium. After blood passes through the capillaries in the myocardium, it enters a system of cardiac (coronary) veins. Most of the cardiac veins drain into the coronary sinus, which opens into the right atrium.

CARDIAC CYCLE

The cardiac cycle refers to the alternating contraction and relaxation of the myocardium in the walls of the heart chambers, coordinated by the conduction system, during one heartbeat. Systole is the contraction phase of the cardiac cycle, and diastole is the relaxation phase. At a normal heart rate, one cardiac cycle lasts for 0.8 second.

CLASSIFICATION & STRUCTURE OF BLOOD VESSELS

Blood vessels are the channels or conduits through which blood is distributed to body tissues. The vessels make up two closed systems of tubes that begin and end at the heart. One system, the pulmonary vessels, transports blood from the right ventricle to the lungs and back to the left atrium. The other system, the systemic vessels, carries blood from the left ventricle to the tissues in all parts of the body and then returns the blood to the right atrium. Based on their structure and function, blood vessels are classified as either arteries, capillaries, or veins.

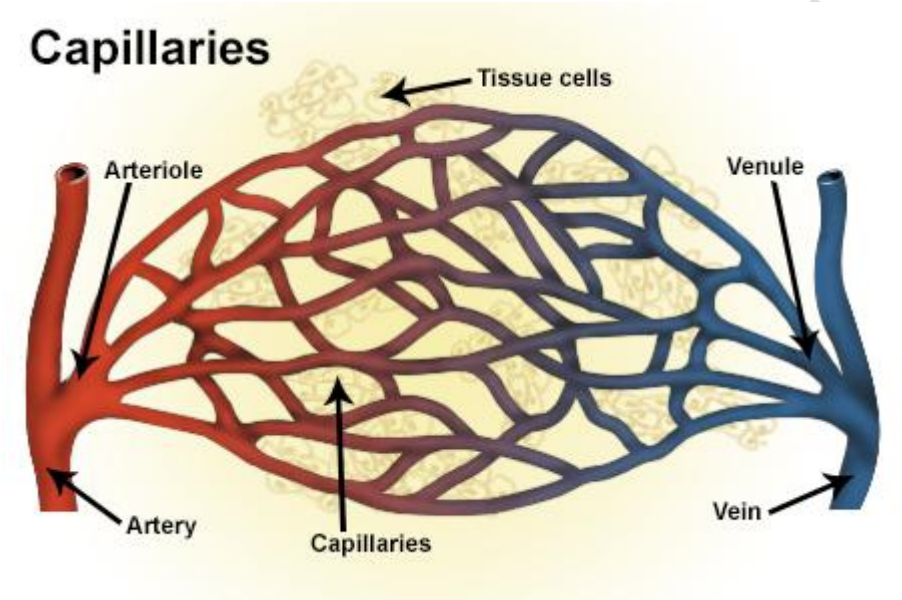
Arteries

Arteries carry blood away from the heart. Pulmonary arteries transport blood that has a low oxygen content from the right ventricle to the lungs. Systemic arteries transport oxygenated blood from the left ventricle to the body

tissues. Blood is pumped from the ventricles into large elastic arteries that branch repeatedly into smaller and smaller arteries until the branching results in microscopic arteries called arterioles. The arterioles play a key role in regulating blood flow into the tissue capillaries. About 10 percent of the total blood volume is in the systemic arterial system at any given time.

Capillaries

Capillaries, the smallest and most numerous of the blood vessels, form the connection between the vessels that carry blood away from the heart (arteries) and the vessels that return blood to the heart (veins). The primary function of capillaries is the exchange of materials between the blood and tissue cells.



Capillary distribution varies with the metabolic activity of body tissues. Tissues such as skeletal muscle, liver, and kidney have extensive capillary networks because they are metabolically active and require an abundant supply of oxygen and nutrients. Other tissues, such as connective tissue, have a less abundant supply of capillaries. The epidermis of the skin and the lens and cornea of the eye completely lack a capillary network. About 5 percent of the total blood volume is in the systemic capillaries at any given time. Another 10 percent is in the lungs.

Smooth muscle cells in the arterioles where they branch to form capillaries regulate blood flow from the arterioles into the capillaries.

Veins

Veins carry blood toward the heart. After blood passes through the capillaries, it enters the smallest veins, called venules. From the venules, it flows into progressively larger and larger veins until it reaches the heart. In the pulmonary circuit, the pulmonary veins transport blood from the lungs to the left atrium of the heart. This blood has a high oxygen content because it has just been oxygenated in the lungs. Systemic veins transport blood from the body tissue to the right atrium of the heart. This blood has a reduced oxygen content because the oxygen has been used for metabolic activities in the tissue cells.