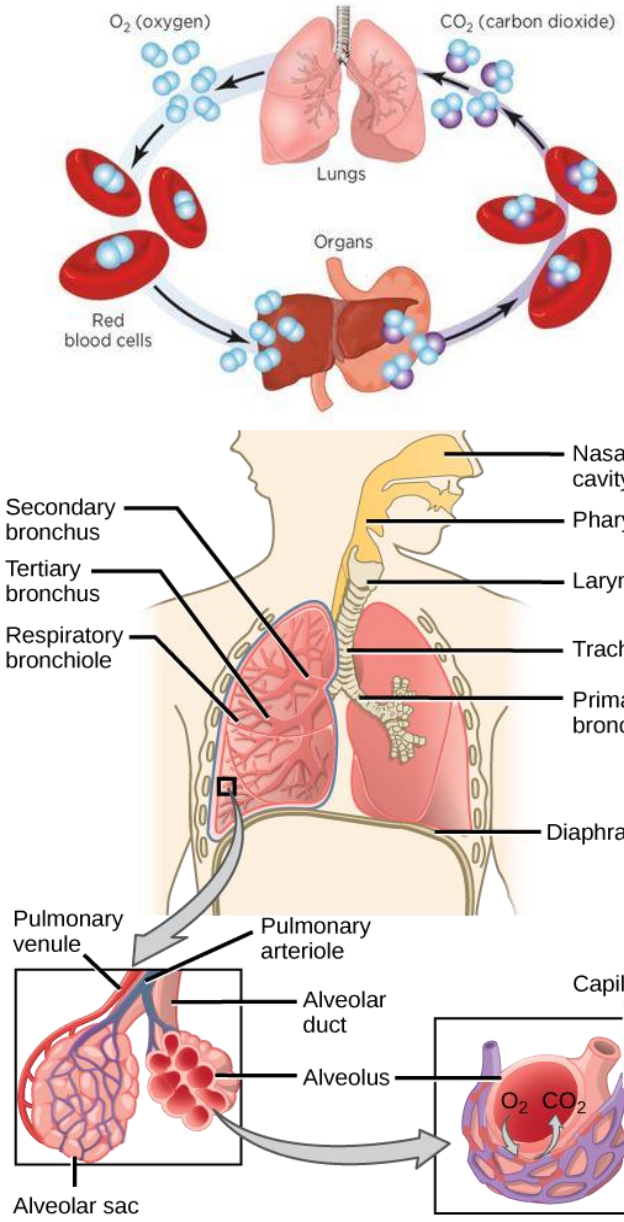
Strand:	Systems	**Sub-Strand:**	The Human body system

BASIC 9

WEEKLY LESSON PLAN – WEEK 8

Content Standard:	B9.3.1.1 Demonstrate understanding of the blood circulatory system, health problems associated with the system and its relationship with the respiratory system in humans				
Indicator (s)	B9.3.1.1.2 Explain the concept of respiration and show how the respiratory and circulatory systems complement each other. (Note that respiration is a chemical reaction that releases carbon dioxide (CO_2), water (H_2O) and energy from glucose and oxygen).		**Performance Indicator:** Learners can identify the functions of blood in the human body.		
Week Ending	01-11-2024				
Class	B.S.9	**Class Size:**		**Duration:**	
Subject	Science				
Reference	Science Curriculum, Teachers Resource Pack, Learners Resource Pack, Textbook				
Teaching / Learning Resources	Poster, video and Pictures		**Core Competencies:**	• Communication and Collaboration (CC), • Critical Thinking and Problem Solving	

DAY/DATE	**PHASE 1 : STARTER**	**PHASE 2: MAIN**	**PHASE 3: REFLECTION**
MONDAY	Discuss the meanings of terminologies and keywords in the lesson with the Learners. **Terminologies;** • Respiration • Reactants • Glucose • Organic substances • Carbon dioxide • Oxidation • Mitochondria	1. Assist Learners to draw and label the parts of the human respiratory system. 2. Briefly explain the concept of respiration. 3. Discuss with the Learners about the main steps of cellular respiration. 4. Learners brainstorm to identify the reactants of cellular respiration. Cellular respiration is a process that converts chemical energy into ATP. The reactants of cellular respiration vary at each stage, but initially, it requires an input of **glucose, ATP, and NAD+**. NAD+ is a universal electron acceptor that is crucial in the process of cellular respiration. FAD, a flavin nucleotide from vitamin B2, is another important universal electron acceptor that is often used in catabolic processes and are reduced into NADH and $FADH_2$, respectively. Glycolysis requires an input of glucose, two ATP, two ADP, and two NAD+. Reactants for pyruvate oxidation are pyruvate, NAD+, and coenzyme A (CoA). The three stages of aerobic cellular respiration are glycolysis, the Krebs cycle, and oxidative phosphorylation.	Reflect on the steps of cellular respiration. **Exercise;** Draw and label the parts of the respiratory system

		Fig 1. **Gas exchange in humans**  	
THURSDAY	Learners brainstorm to differentiate between pulmonary and systemic circulation.	1. Discuss with the Learners on how deoxygenated blood from circulation is oxygenated through inhalation for respiration to take place. 2. Assist Learners to identify the functions of blood in the human body. 3. Learners brainstorm to describe the role of red blood cell in transporting oxygen. 4. Discuss the purpose of respiration with the Learners. **The Purpose of Respiration;** The main purpose of respiration is to provide oxygen to the cells at a rate adequate to satisfy their metabolic needs. This involves transport of oxygen from the lung to the tissues by means of the circulation of blood. In antiquity and the medieval period, the heart was regarded as a furnace where the “fire of life” kept the blood boiling. Modern cell biology has unveiled the truth behind the metaphor. Each cell maintains a set of furnaces, the mitochondria, where, through	Through questions and answers, conclude the lesson. **Exercise;** 1. State 4 functions of blood in the human body. 2. Describe the role of red blood cell in transporting oxygen.

		the oxidation of foodstuffs such as glucose, the energetic needs of the cells are supplied. The precise object of respiration therefore is the supply of oxygen to the mitochondria. The supply of oxygen to the mitochondria at an adequate rate is a critical function of the respiratory system, because the cells maintain only a limited store of high-energy phosphates and of oxygen, whereas they usually have a reasonable supply of substrates in stock. If oxygen supply is interrupted for a few minutes, many cells, or even the organism, will die.	
FRIDAY	Discuss with the Learners on the meanings of the various types of respiration.	1. Learners brainstorm to distinguish between external and internal respiration. 2. Discuss the three stages of aerobic cellular respiration with the Learners. 3. Using a Poster displaying the phases of respiration in organisms, explain how respiration occur in the cytosol and around the plasma membrane. **Types of Respiration** 1. **Respiration** is the process of gas exchange between the air and an organism's cells. 2. Three types of respiration include internal, external, and cellular respiration. 3. **External respiration** is the breathing process. It involves inhalation and exhalation of gases. 4. **Internal respiration** involves gas exchange between the blood and body cells. 5. **Cellular respiration** involves the conversion of food to energy. **Aerobic respiration** is a cellular respiration that requires oxygen while **anaerobic respiration** does not **Aerobic cellular respiration** consists of three stages: glycolysis, citric acid cycle (Krebs Cycle), and electron transport with oxidative phosphorylation. • **Glycolysis** occurs in the cytoplasm and involves the oxidation or splitting of glucose into pyruvate. Two molecules of ATP and two molecules of the high energy NADH are also produced in glycolysis. In the presence of oxygen, pyruvate enters the inner matrix of cell mitochondria and undergoes further oxidation in the Krebs cycle. • **Krebs Cycle**: Two additional molecules of ATP are produced in this cycle along with CO_2, additional protons and electrons, and the high energy molecules NADH and $FADH_2$. Electrons generated in the Krebs cycle move across the folds in the inner membrane (cristae) that separate the mitochondrial matrix (inner compartment) from the intermembrane space (outer compartment). This creates an electrical gradient, which helps the the electron transport chain pump hydrogen	Through questions and answers, conclude the lesson. **Exercise;** 1. Differentiate between external and internal respiration. 2. State the stages of aerobic cellular.

		protons out of the matrix and into the intermembrane space. • **The electron transport chain** is a series of electron carrier protein complexes within the mitochondrial inner membrane. NADH and $FADH_2$ generated in the Krebs cycle transfer their energy in the electron transport chain to transport protons and electrons to the intermembrane space. The high concentration of hydrogen protons in the intermembrane space is utilized by the protein complex **ATP synthase** to transport protons back into the matrix. This provides the energy for the phosphorylation of ADP to ATP. Electron transport and oxidative phosphorylation account for the formation of 34 molecules of ATP	

Name of Teacher: **School:** **District:**