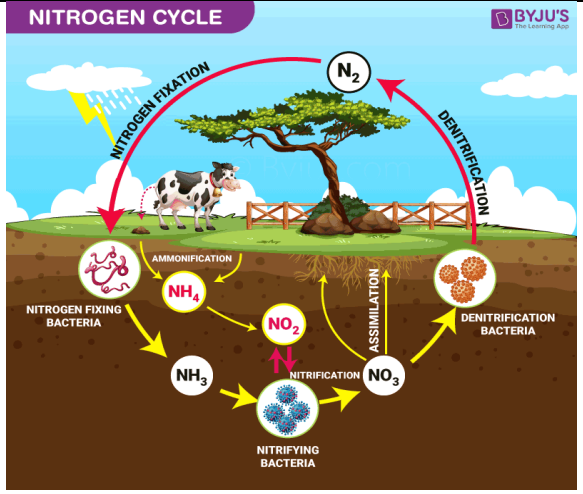
BASIC 9

WEEKLY LESSON PLAN – WEEK 3

Strand:	Cycles		**Sub-Strand:**	Earth Sciences	
Content Standard:	B9.2.1.1 Demonstrate an understanding of the Nitrogen cycle as a repeated pattern of change in nature, and how it relates to the environment.				
Indicator (s)	B9.2.1.1.1 Explain the process of the nitrogen cycle as a repeated pattern in nature		**Performance Indicator:** Learners can apply the knowledge acquired from nitrogen cycle in farming.		
Week Ending	27-09-2024				
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:**	• Ability to construct knowledge from a non-linear hyper-textual navigation • Demonstrate a thorough understanding of a generalized concept and facts specific to task or situation	

DAY/DATE	**PHASE 1 : STARTER**	**PHASE 2: MAIN**	**PHASE 3: REFLECTION**
MONDAY	Discuss meanings of keywords and terminologies in the lesson with the Learners. **Keywords;** • Nitrogen • Circulation • Nuclear • Protein • Denitrification • atmosphere • ultraviolet • assimilated	1. With the aid of a diagram, explain the nitrogen cycle. 2. Assist learners to explain the term "nitrogen fixation". 3. Discuss with the Learners on the chemical reaction of nitrogen fixation. 4. Learners brainstorm to identify the stages of nitrogen cycle. 5. Assist Learners to explain why the nitrogen cycle is a repeated pattern in nature. Nitrogen Cycle is a biogeochemical process through which nitrogen is converted into many forms, consecutively passing from the atmosphere to the soil to organism and back into the atmosphere. It involves several processes such as nitrogen fixation, nitrification, denitrification, decay and putrefaction.	Learners in small groups to discuss and report to the class on the relationship between the nitrogen cycle and the environment. **Exercise;** 1. Draw the nitrogen cycle. 2. Explain the following; i. Nitrogen cycle ii. Nitrogen fixation



Nitrogen gas exists in both organic and inorganic forms. Organic nitrogen exists in living organisms, and they get passed through the food chain by the consumption of other living organisms.

Nitrogen Cycle Explained – Stages of Nitrogen Cycle

Process of the Nitrogen Cycle consists of the following steps – Nitrogen fixation, Nitrification, Assimilation, Ammonification and Denitrification. These processes take place in several stages and are explained below:

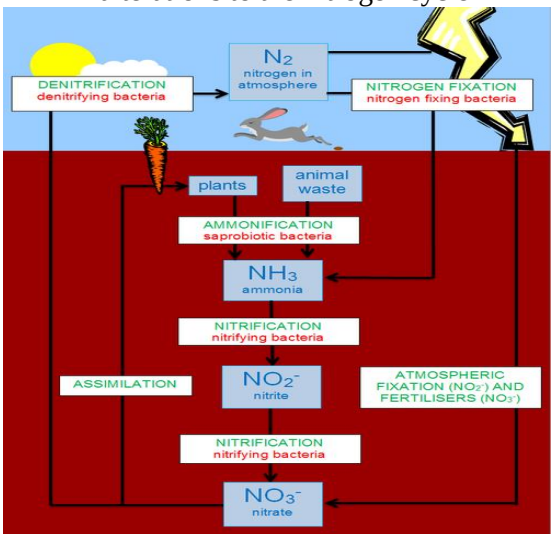
Nitrogen Fixation Process

It is the initial step of the nitrogen cycle. Here, Atmospheric nitrogen (N_2) which is primarily available in an inert form, is converted into the usable form -ammonia (NH_3).

During the process of Nitrogen fixation, the inert form of nitrogen gas is deposited into soils from the atmosphere and surface waters, mainly through precipitation.

The entire process of Nitrogen fixation is completed by symbiotic bacteria, which are known as Diazotrophs. *Azotobacter* and *Rhizobium* also have a major role in this process. These bacteria

		consist of a nitrogenase enzyme, which has the capability to combine gaseous nitrogen with hydrogen to form ammonia. Nitrogen fixation can occur either by atmospheric fixation- which involves lightening, or industrial fixation by manufacturing ammonia under high temperature and pressure conditions. This can also be fixed through man-made processes, primarily industrial processes that create ammonia and nitrogen-rich fertilisers	
THURSDAY	Review Learners knowledge on the meaning of nitrogen fixation.	1. Assist learners to identify and explain 3 types of Nitrogen Fixation. 2. Learners brainstorm to explain the difference assimilation, ammonification, denitrification. 3. `Using a Poster, describe how the process of the nitrogen cycle occurs in the same manner in the marine ecosystem 4. Discuss with the Learners on the importance of nitrogen fixation. ***steps that explain the Nitrogen Cycle process.*** • Nitrogen Fixation • Assimilation • Ammonification • Nitrification • Denitrification **Ammonification;** Ammonification occurs during the decomposition of organic matter, where ammonifying bacteria convert organic nitrogen into inorganic components like ammonia or ammonium ions. **Nitrification;** Nitrification is a process that converts ammonia into nitrate by bacteria. Initially, the ammonia is converted to nitrite (NO_2^-) by the bacteria *Nitrosomonas*, or *Nitrococcus*, etc., and then to nitrate (NO_3^-) by *Nitrobacter*.	Through questions and answers, conclude the lesson. **Exercise** Describe the process of nitrogen cycle.

		Denitrification; Denitrification is the process of converting the nitrate back into molecular nitrogen by bacterias such as *Pseudomonas, Thiobacillus, Bacillus subtilis* etc. What is the function of nitrifying bacteria? Nitrifying bacteria are a small group of aerobic bacteria, which are mainly involved in the conversion of ammonia into nitrates. **Which part of the plant is involved in nitrogen fixation?** The process of nitrogen fixation is carried out naturally in the soil within nodules in the plant's root systems.	
FRIDAY	Discuss with the Learners on how nitrates are converted to nitrogen.	1. Demonstrate on performing an experiment on how to convert nitrate to nitrogen. 2. Assist Learners to practice converting nitrate to nitrogen. 3. Learners brainstorm to identify the ecological implications of human alterations to the nitrogen cycle  -The nitrogen cycle is a repeating cycle of	Through questions and answers, conclude the lesson. **Exercise;** With the aid of a diagram, describe how nitrate is converted to nitrogen.

		processes during which nitrogen moves through both living and nonliving things: the atmosphere, soil, water, plants, animals and bacteria. -There are five stages within the organic process , and that we will now discuss each of them in turn: fixation or volatilization, mineralization, nitrification, immobilization, and denitrification. In this image, microbes in the soil turn nitrogen gas into what is called volatile ammonia so the fixation process is called volatilization. -Leaching is where certain sorts of nitrogen (such as nitrate, or NO3) becomes dissolved in water and leaks out of the soil, potentially polluting waterways.	

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