SCIENCE 10 - Lesson 18

STUDENT LEARNING TARGET

WHAT AM I GOING TO LEARN?	HOW WILL I SHOW WHAT I KNOW?	HOW WILL I KNOW HOW WELL I AM DOING – WHAT ARE MY LOOK-FORS?
I AM GOING TO LEARN ABOUT: 1.THE NITROGEN CYCLE WHY: 1. TO HAVE AN UNDERSTANDING OF THE NITROGEN CYCLE AND ITS INFLUENCE IN ECOSYSTEMS	I WILL USE A PENCIL AND PAPER TO COMPLETE ANSWERS TO THE QUESTIONS ASKED AND /OR RESPOND ORALLY TO THE TEACHER	1. I HAVE ANSWERED THE QUESTIONS IN ASSIGNMENT 18.

WHAT MAKES A LAWN GREEN?

HOW CAN THE SOIL COMPOSITION AND FERTILITY OF A LAWN BE MODIFIED?

WHAT DO THE 3 NUMBERS ON FERTILZER BAGS MEAN?

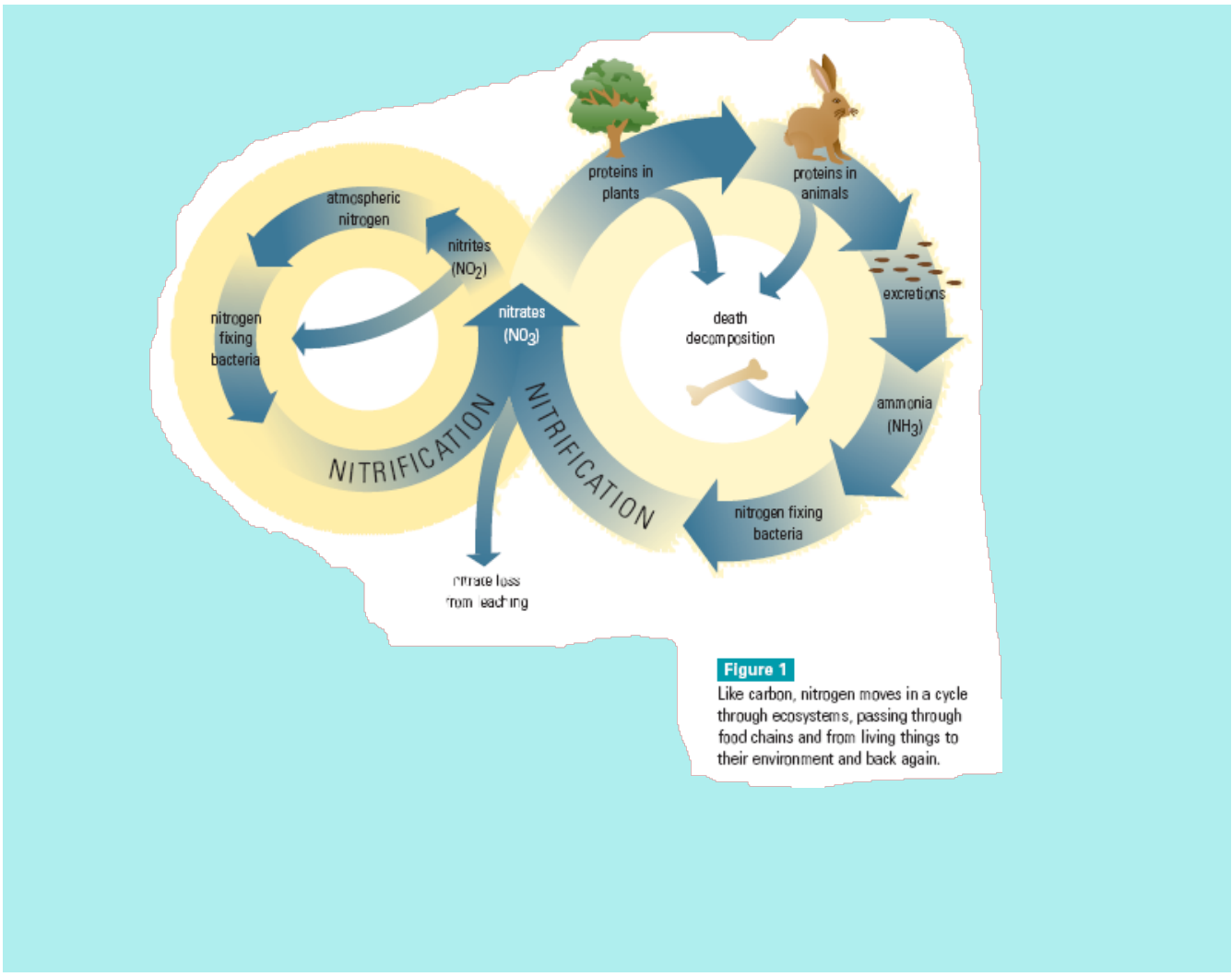
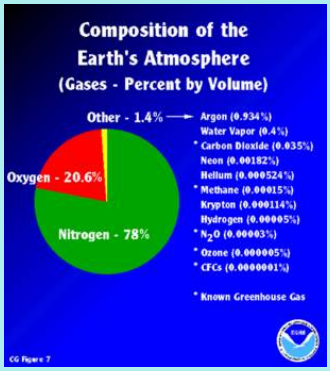


Figure 1
Like carbon, nitrogen moves in a cycle through ecosystems, passing through food chains and from living things to their environment and back again.

THE NITROGEN CYCLE

NITROGEN

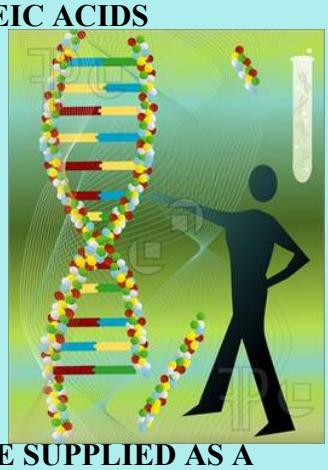
- COMPOSES NEARLY 79% OF THE EARTH'S ATMOSPHERE



- THE 4TH MOST ABUNDANT ELEMENT FOUND IN LIVING TISSUE AFTER OXYGEN, CARBON, AND HYDOGEN

- A VERY STABLE MOLECULE....REACTS ONLY UNDER LIMITED CONDITIONS

- FOUND IN ALL AMINO ACIDS, PROTEINS, AND NUCLEIC ACIDS



- REQUIRED FOR THE SYNTHESIS OF DNA

- IN ORDER TO BE USEFUL TO ORGANISMS IT MUST BE SUPPLIED AS A NITRATE ION (NO_3^-) THROUGH A PROCESS CALLED NITROGEN FIXATION

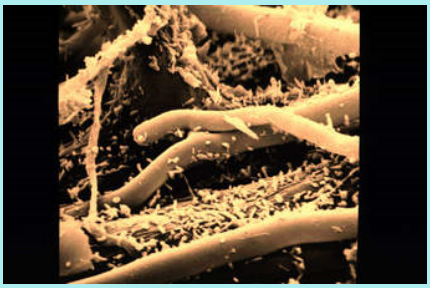
NITROGEN FIXATION

❖ TWO WAYS:

1) LIGHTNING

– ENERGY FROM LIGHTNING CAUSES NITROGEN GAS TO REACT WITH OXYGEN IN THE AIR, PRODUCING NITRATES

– NITRATES DISSOLVE IN RAIN OR SURFACE, ENTER THE SOIL, AND THEN MOVE INTO PLANTS THROUGH THE ROOTS



2) BACTERIA

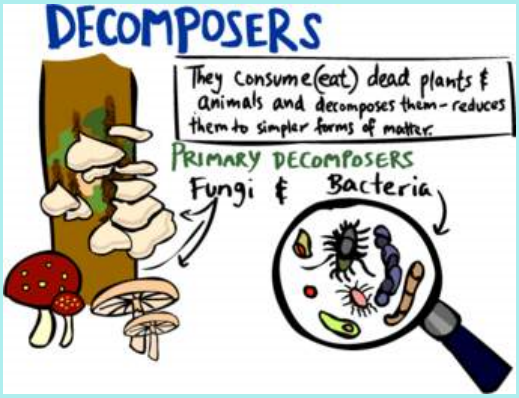
– FOUND MOSTLY IN SOIL, BUT ALSO IN SMALL LUMPS CALLED NODULES ON THE ROOTS OF LEGUMES (CLOVER, SOYBEANS, PEAS, ALFALFA)

– BACTERIA SUPPLIES THE PLANT WITH NITROGEN, AND THE PLANT SUPPLIES THE BACTERIA WITH SUGAR THEY NEED TO MAKE NITRATES

- MORE THAN ENOUGH NITRATE IS PRODUCED AND THE EXCESS MOVES INTO THE SOIL

❖ NITROGEN CAN ALSO BE RELEASED TO THE SOIL BY DECOMPOSERS

– DECOMPOSERS BREAK DOWN NITROGEN BEARING CHEMICALS INTO AMMONIA.



– OTHER BACTERIA CONVERT AMMONIA TO NITRITES

– OTHER BACTERIA CONVERT NITRITES TO NITRATES

– THESE BACTERIA REQUIRE OXYGEN TO FUNCTION

$NH_3 \longrightarrow NO_2 \rightarrow NO_3$

❖ OTHER BACTERIA THAT DO NOT REQUIRE OXYGEN WILL CONVERT NITRATES TO NITRITES, AND THEN NITRITES TO NITROGEN GAS WHICH GOES TO THE ATMOSPHERE

$NO_3 \rightarrow NO_2 \rightarrow N$

❖ THIS TAKES PLACE DURING VARIOUS STAGES OF THE DECAYING PROCESS AND IS CALLED DENITRIFICATION

$NO_3 \rightarrow NO_2 \rightarrow N_2$

❖ DENITIFICATION ENSURES THE BALANCE AMONG SOIL NITRATES, NITRITES, AND ATMOSPHERIC NITROGEN

❖ AERATING LAWNS HELPS TO REDUCE DENITRIFICATION BY EXPOSING DENITRIFYING BACTERIA TO OXYGEN

❖ THIS HELPS TO KEEP LAWNS GREEN BECAUSE THE GREEN CHLOROPHYLL IS A PROTEIN WHICH NEEDS NITRATES

❖ BOGS ARE AREAS WHERE THE SOIL IS VERY ACID OR WATER LOGGED (OXYGEN CONTENT IS LOW)

❖ THE DENITRIFICATION PROCESS SPEEDS UP IN BOGS BECAUSE OF THE LACK OF USEFUL NITROGEN.

THE NITROGEN CYCLE

SCIENCE 10 ASSIGNMENT 18

1. Watch the You Tube videos :

The Nitrogen Cycle

The Nitrogen Cycle (2)

Answer the following questions in complete sentences

1. **What is nitrogen?**
2. **Do we need nitrogen / Why is nitrogen important to organisms?**
3. **How do we get Nitrogen? Describe two ways Nitrogen gas is converted to usable nitrates for organisms.**
4. **How does Nitrogen go back to the air?**
5. **Nitrogen-fixing bacteria are found in the roots of plants like clover, bean plants and alfalfa. Explain how the bacteria benefit the plant and how the plant benefits the bacteria.**
6. **Why is it a good practice to aerate lawns?**

Attachments

- The Nitrogen Cycle
- The Nitrogen Cycle (2)