

Class:8	Subject: Science	Topic: Microorganisms: Friend and Foe
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SUMMARY SHEET		
Learner Previous Knowledge	Living things can exist in different habitats and environments.	
Target Knowledge for this Topic	Know what microorganisms are; Types of microorganisms Investigate about the various types of microorganisms; Advantages and disadvantages of microbes	
Learning Goals		
<i>More Complex Learning Goal-</i> Students will be able to compare and contrast different types of microbes.		
<i>Target Learning Goal-</i> Students will be able to describe how and why microbes are either useful or harmful for humans.		
<i>Simpler Learning Goal-</i> Students will be able to state what microorganisms are and list the different types of microbes in their environment.		
Period No.	Lesson Objectives	Teaching Learning Materials Required
1	Define microbes/microorganisms and illustrate their observation.	- Board and markers - Reference sheet 1 - Permanent slides of different microbes
2	Find out how microbes are useful to humans.	- Board and markers - Worksheet 1
3 and 4	- Explain the disadvantages of microbes. - Describe different methods of food preservation	- Board and markers - Worksheet 2 - A4 sheets [One per group]
5	Describe the Nitrogen Cycle	- Board and markers - Worksheet 3

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Period 1

Lesson Objectives

At the end of this lesson students will be able to:

- Define microorganism and list different types of microorganisms

Teaching Learning Materials required

- Board and markers
- Reference sheet 1
- Permanent slides of different microbes

Details of Teaching Learning Experience

Seating Arrangement: - In groups of 4 or 5

Note for facilitator – Keep ready few slides of different microbes and microscopes for the observation.

Lesson Beginning <u>Time:</u> 10 min <u>Purpose:</u> • Generate interest	<u>Discussion</u> • Introduce the topic to the class by seeking response for the question "What is the meaning of 'micro' "? They may find out the meaning from their dictionary if they wish. • Ask students now to relate it with the word 'organisms' and define the term 'microorganisms' in their own words. Let each group speak aloud their definition which they have framed. • Assign one microscope to each group. Set up the microscopes near windows where there is ample sunlight. First, demonstrate how to use the microscope correctly by adjusting it for focusing; adjusting the lens for best angle for light and keeping the slide correctly. Subsequently ask the students to adjust their microscopes.
Lesson Middle <u>Time:</u> 20 min. <u>Purpose:</u> • Develop conceptual understanding	• Ask the students to open their lab manuals and take out the experiment related to the chapter. • Ask them questions such as: ○ What can you say about the size of the organisms that you just observed? ○ Given their microscopic size, where do you expect these microorganisms to be present? • Let there be a whole class discussion now where the groups must share their answers with each other and ensure that the class arrives at a common consensus.

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	Discuss different microbes with the help of reference sheet 1.
Lesson End <u>Time:</u> 5 min <u>Purpose:</u> - Finish up - Homework Distribution	<u>Finish up</u> - Clear any doubts that students may have. <u>Homework Assignment</u> - Find out about the useful microbes from encyclopedia, internet or from some elder person.

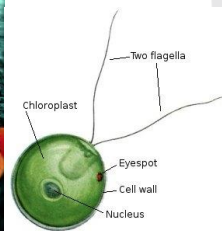
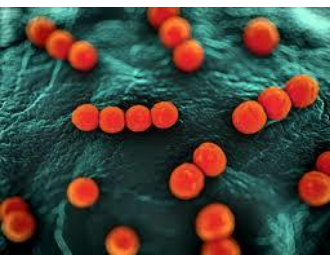
Reference sheet 1

Information

1. A microorganism or microbes is the smallest and simplest form of living being, which can be seen only with the aid of a microscope. However, some microbes such as the fungi can be seen with the magnifying glass.
2. Microbes exist in different shapes, sizes and varieties and they may occur singly or in colonies. They exist in all kinds of conditions and are found in all elements of our surrounding.
3. Microbes are classified into 4 major groups: bacteria, fungi, protozoa and algae.
4. Viruses possess the characteristics of living and nonliving things. They are microscopic particles that can infect the cells of a living thing. They are not cells and do not have a cell membrane or other components of living cells. They can only replicate themselves by infecting a host cell and therefore cannot reproduce on their own.
5. When living organisms die, their body is broken down into simplest substances by the microorganisms. Thus they help in natural recycling.



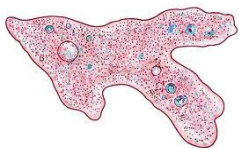
BACTERIA Chlamydomonas



Spirogyra



ALGAE

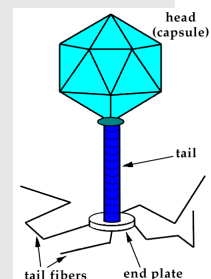


Amoeba



Paramecium

PROTOZOA

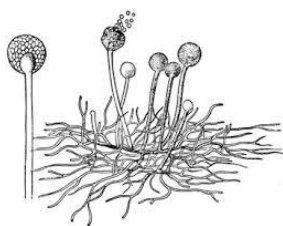


VIRUS

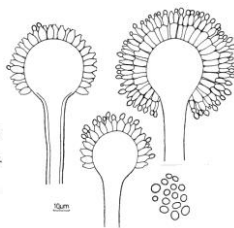
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Penicillium



Bread Mould



Aspergillus

FUNGI

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Lesson Plan 2

Lesson Objectives

At the end of this lesson students will be able to:

- Find out how microbes are useful to humans.

Teaching Learning Materials required

- Board and markers
- Worksheet 1

Details of Teaching Learning Experience

Seating Arrangement: - In groups of 4

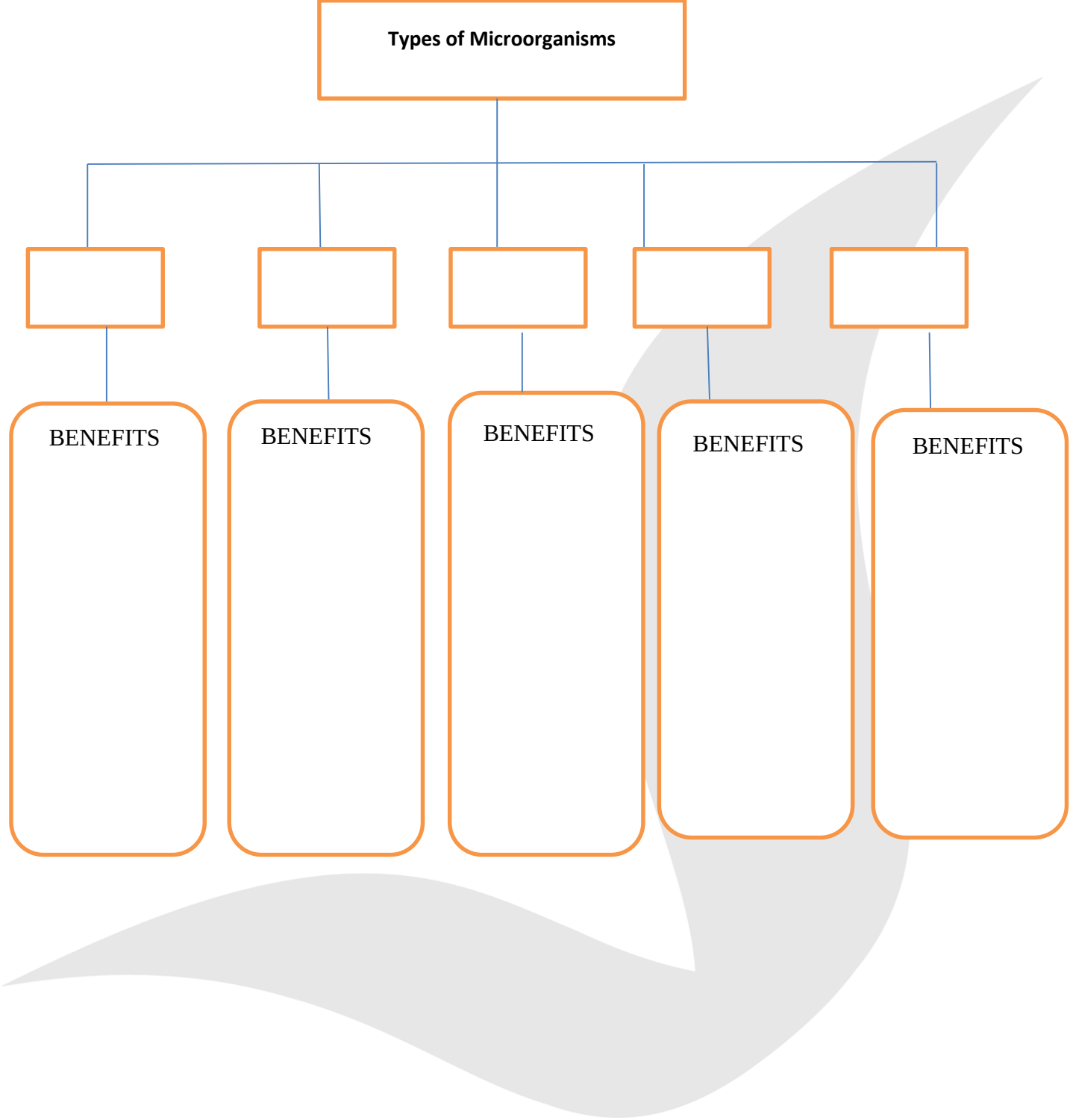
Lesson Beginning <u>Time:</u> 5 min. <u>Purpose:</u> Generate interest	<u>Recap</u> • Recap the previous day's topic by asking students to name the categories of microorganisms. ○ Where do you find microorganisms? ○ What kind of environment is most suitable to yeast? • Collate their answers on the board. • Distribute worksheet 1 to all the groups.
Lesson Middle <u>Time:</u> 25 min. <u>Purpose:</u> Develop conceptual understanding	<u>Group Discussion</u> • Ask the groups to refer to the homework given in previous class and collate information on how microorganisms are beneficial. • Ask them to discuss first and put together their information. • They must now fill in the answer in the annexure. • Let each group share their answers with the rest of the class. Let the whole class decide on the answers with common consensus.
Lesson End <u>Time:</u> 5 min <u>Purpose:</u> • Finish Up • Homework Distribution	<u>Finish up</u> • Clear any doubts that students may have. <u>Homework Assignment</u> • Find out how microorganisms are harmful to us.

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Worksheet 1

Skill: Comprehension

1. Fill in the graphic organizer with your data.



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Lesson Plan 3 and 4

Lesson Objectives

At the end of this lesson students will be able to:

- Describe different methods of food preservation
- Explain the disadvantages of microbes.

Teaching Learning Materials required

- Board and markers
- Worksheet 2
- A4 sheets [One per group]

Details of Teaching Learning Experience

Seating Arrangement: - In groups of 4 or 5

Lesson Beginning <u>Time:</u> 5 min. <u>Purpose:</u> Recap the previous learning	<u>Recap</u> • Ask the students to share the graphic organizer that they made in their previous class. • Take consensus from the students and ensure that all the advantages of various microbes have been collated. ○ Ask them if they have heard the word 'germs'. ○ What do they understand from it? ○ Is germ different from microbe? • Ask the students to consult their dictionary and find the meaning of germs. Ask them to state the difference between 'germs' and 'microorganisms'?
Lesson Middle <u>Time:</u> 50 min. <u>Purpose:</u> Develop conceptual understanding	<u>Discussion</u> • Distribute worksheet 2 to all students. • Let the students put forth their views on harmful microbes with reference to the homework given in previous class. Let them discuss the answers first within their own group and then attempt the questions 1-2 in the worksheet.

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	• Have a whole class discussion now where all the groups will participate and share their answers. Let the class arrive at a common consensus. • Ask them to read topic of food preservation and attempt question 3-6 of the worksheet. • Have a whole class discussion now where all the groups will participate and share their answers. Let the class arrive at a common consensus.
Lesson End <u>Time:</u> 15 min <u>Purpose:</u> • Consolidate learning	<u>Consolidate learning</u> • Ask each group to draw two different geometrical shapes on a piece of A4 sheets. On one, they can include benefits of microbes and on the other they can write the disadvantages of microbes. • Let the groups exchange their work among themselves and do peer assessment. • Let the class arrive at a consensus with respect to the response for each situation

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Worksheet 2

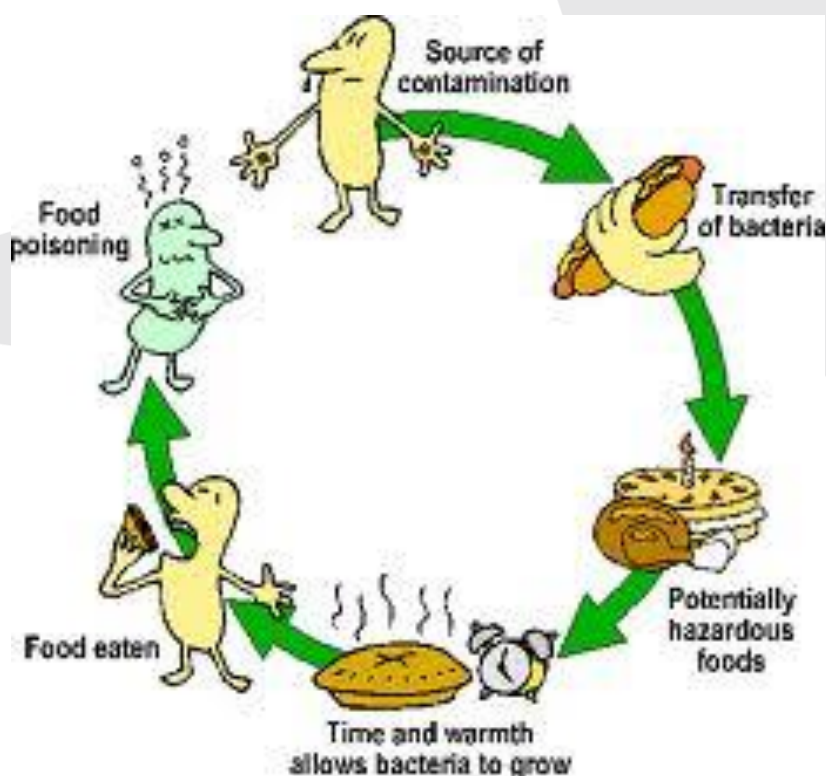
Skill: Analytical Thinking

1. In which of the following pictures are the microbes at work? How are the microbes contributing in the situations in these pictures?



2. Rashmi says that communicable diseases spreads microbes. Is she correct? Justify.

3. Observe this picture and write a short paragraph telling what you understood from it.

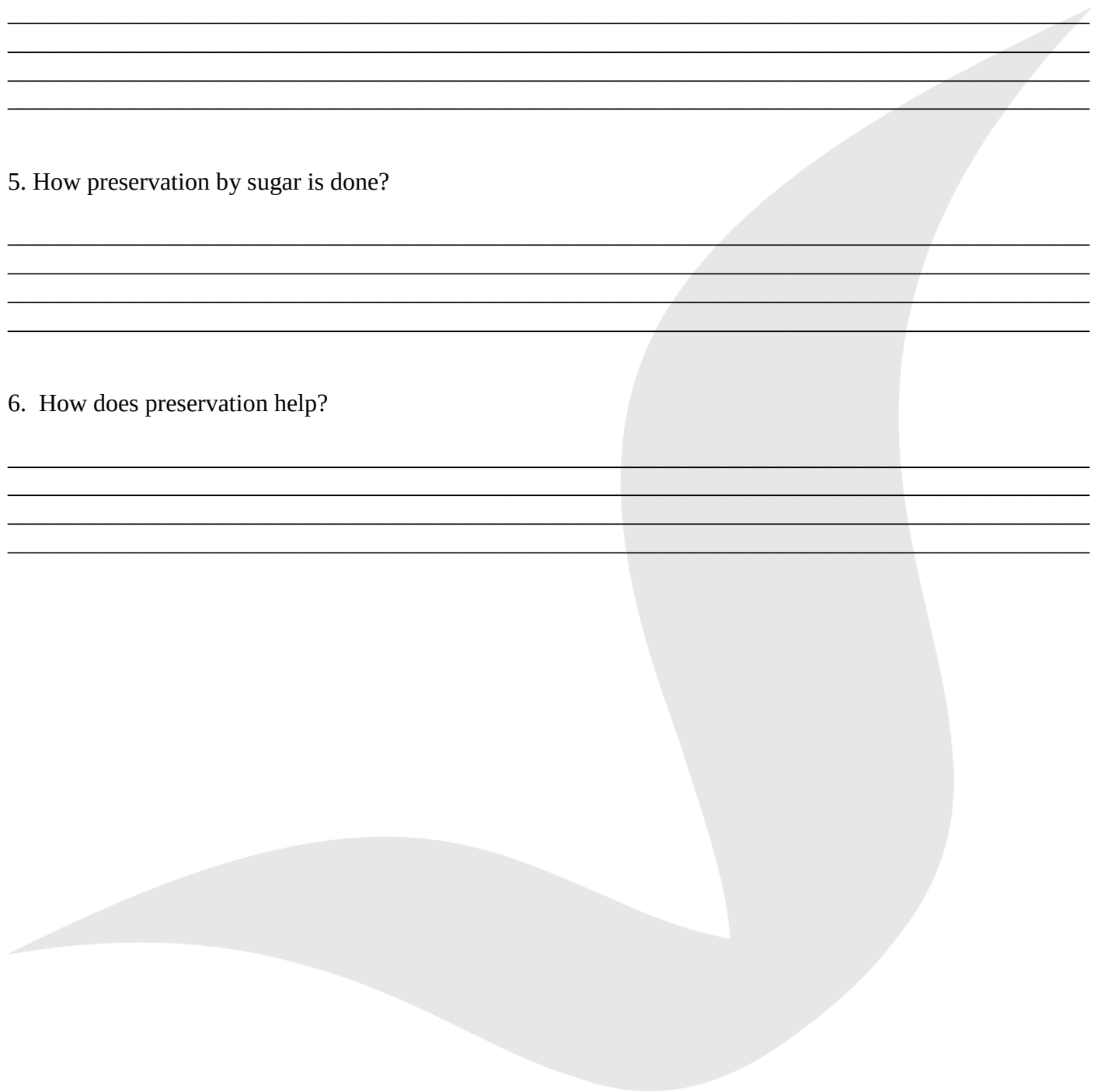


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4. Name any three ways of food preservation

5. How preservation by sugar is done?

6. How does preservation help?



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Period 5

Lesson Objectives

At the end of this lesson students will be able to:

- Describe the Nitrogen Cycle.

Teaching Learning Materials required

- Board and markers
- Worksheet 3

Details of Teaching Learning Experience

Seating Arrangement: - In groups of 4-5

Lesson Beginning <u>Time:</u> 5 min <u>Purpose:</u> Activate prior knowledge	<u>Introduction to the Topic</u> • Ask the students how deforestation affects the most basic resource of living things i.e. air. • Pose questions such as: ○ How does atmospheric oxygen get affected by cutting of trees? ○ As trees become less which gas will become more in concentration? • Now to introduce the topic ask: ○ Which gas forms the highest component of air? ○ In all the life processes that you learnt until now, do you use nitrogen directly? ○ Do you think nitrogen is useful to organisms? ○ Since nitrogen is not used by living things directly, do you think it will get affected by disturbance in ecosystem due to human activities? • Collate the responses and arrive at a common consensus.
Lesson Middle <u>Time:</u> 25 min. <u>Purpose:</u> • Develop conceptual understanding	• Distribute worksheet 3 to all the students. • Discuss nitrogen cycle with reference to figure 2.10 of the book. • Let the groups now discuss attempt the answers of the worksheet and discuss among them. • Let there be a whole class discussion on Nitrogen cycle now.

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	• Ask representative of each group to write one component of nitrogen cycle on the board consecutively one after the other till the cycle is complete. • Ensure that all the students are on the same page with respect to the topic.
Lesson End <u>Time:</u> 5 min <u>Purpose:</u> • Finish Up	<u>Finish Up</u> • Clear any doubts if the students have.

Worksheet 3**Skill: Comprehension****1. Based on the videos that you have seen, fill in the blanks in the given passage.**

Our atmosphere has _____% nitrogen gas. Certain _____ present in the soil and in water fix the nitrogen from the atmosphere and convert it into compounds of nitrogen. Roots of _____ plants with root nodules help in converting nitrogen from air into nitrogen compounds. When animals die, the _____ in the soil convert the _____ waste into _____ compounds. When an animal dies the bacteria decompose the body and _____ is released in air. Thus the percentage of nitrogen in the atmosphere remains _____.

2. What is the form of nitrogen that plants can use?

3. Observe the picture. Based on it, explain in your own words how the amount of nitrogen remains constant in the atmosphere.