CLASS 8th

SUBJECT:-SCIENCE

MICRO-ORGANISMS:-FRIEND AND FOE

Section-A

Basic Description of the chapter	
Name of the School: -	Govt. Adarsh Sr. Sec. School, Kot Dhandal (Gurdaspur)
Name of the teacher: -	Mrs. Monika Vijan (Principal), Mrs. Vandana Gupta (TGT Science)
CLASS	8th
SUBJECT: -	Biology
Chapter: -	MICRO ORGANISMS (FRIEND AND FOE)
No. of periods required:-	08

Section-B

Objectives/Expected learning outcomes

B1-Concepts

1. Micro-organisms
2. Classification of Micro-organisms
3. Bacteria
4. Fungi
5. Protozoa
6. Algae
7. Virus
8. Habitat of Micro-organisms
9. Usefulness of micro-organisms
10. Diseases caused by Micro-organisms
11. Food Preservation
12. Nitrogen-fixation
13. Nitrogen-Cycle

B-2:- Usefulness in daily life

- Students will learn

1. Uses and harms of Micro-organisms
2. How micro-organisms help in making curd, bread, medicines etc.
3. Usefulness of micro-organisms in improving soil fertility
4. Diseases cause by micro-organisms
5. Methods of food-preservation

- Without learning this concept they will not understand

1. What converts milk into curd?
2. Who discovered vaccine and how it works?
3. How do diseases spread from one person to another?
4. How can we preserve food for a longer period?
5. How nitrogen makes soil fertile?

This knowledge is helpful in Baking and Brewing industry, Microbiology, Medicines, Leather Industry and Agriculture.

B-3 Life Skills

- How to establish relationship with daily life by knowing this concept?

1 To differentiate whether Micro-organisms are friend or foe .

2 To be able to preserve food by different methods.

3 To get skilled in making different food items by knowing about fermentation.

- Team-Spirit
- Public Speaking
- Analytical and Research Skill
- Creative story writing
- Story-telling

B-4 Vocabulary:-

Sr. No.	Word in English	Meaning in Punjabi
1.	Micro-organism	
2.	Soil-fertility	
3.	Fermentation	
4.	Vaccination	
5.	Cholera	
6.	Tuberculosis	
7.	Pathogens	
8.	Communicable Diseases	
9.	Pasteurization	
10.	Leguminous Plants	

Section-C

P.K. Testing

1. Why does food get spoiled if kept for long duration?
2. Why do we catch cold quickly if we get in close-contact with an infected person?
3. What converts milk into curd?
4. What do we see on the moist bread slice kept in open for two to three days?
5. Why do we add baking soda/yeast while preparing cake or biscuits?
6. Why are small children provided with Polio drops after regular intervals?
7. How can we preserve fruits and vegetables for a longer time?
8. Why do we boil milk before using it?
9. Why are we advised to keep the food items covered?
10. Which food items are rich in proteins?

Section –D: - Period wise breakup of the chapter

Period	What to be covered
1.	Introduction of the chapter through some activity, P.K. testing, talking to the students regarding their observations in daily life activities like setting of milk into curd, seeing black thread like mass on moist bread, spoiling of leather articles in rainy season and getting infected by eating wrong food-stuffs.
2.	Micro-organisms and its classification
3.	Brief explanation of Bacteria, Fungi, Protozoa, Algae and Viruses
4.	Uses of Micro-organism, harmful effects of the Micro-organisms
5.	Common human diseases and plant diseases caused by Micro-Organisms
6.	Various methods of food preservation
7.	Nitrogen Fixation and Nitrogen Cycle
8.	Recap/Problem-solving exercises

Section-E:- Micro planning of the Periods or Minute to Minute break-up of periods. Sub Section E1. (Minute to Minute break-up of periods.)

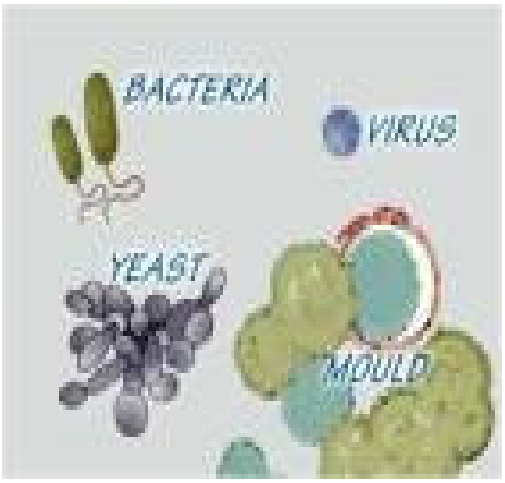
Concept	Time	Indicating/Guiding Script
Introduction of the chapter through P.K.Testing	10 mins	Teacher will ask the questions as mentioned in Section C. The teacher will show bread slice with fungal growth on it, some spoiled leather articles, fermented dough and a piece of spongy cake and ask the students what information they get from this.(Annexure:GA1)   
Talking to the students about presence of Micro-organisms	15 mins	Perform Activity "The World of Micro-organisms" where students see the temporary and permanent Slides of Various micro-organism (for details refer to Annexure:-GA2)
Discussion about the habitat of Micro-organisms	10 mins	Teacher will explain the students that Micro-organisms may survive under all types of environment ranging from ice-cold climate to hot springs and desserts to marshy lands.
Recapitulation	5 mins	Teacher will ask the following question to assess what the students have learnt:- 1. What makes bread soft and spongy? 2. What spoils food stuff kept in open? 3. What are micro-organisms? 4. Where do micro-organisms live?

Annexure Name	**GA1**
Name of the Activity	"Let's see"
Objectives	1. Introducing the concept of Micro-organisms. 2. To develop Analytical skill among the students
Type of the activity	Individual
Material Required	Rotten bread slice, leather belt or shoe with fungal growth, fermented dough and a piece of spongy cake.
Details of the activity	Teacher will enter into the class with above mentioned articles and ask the students to observe them carefully and reason out for what they observed.
Explanation of the Activity	Students will understand the role of Micro-organisms in daily life.

Annexure Name	**GA2**
Name of the activity	The world of Micro-organisms
Objective	1. To develop drawing skill among the students. 2. To develop analytical skill among the students.
Type of the activity	Group
Material Required	Beaker, Moist soil, water, micro-scope, glass slide and permanent slides of Amoeba, Paramecium etc.
Detail of the activity	Teacher will ask the students to collect some moist soil from the garden and put it in a beaker. They will be asked to add some water to this. The students will be asked to take some sample of this water and put a drop of it on a glass slide and observe it under a microscope. They will be asked to draw what they observe. Then they will be shown the permanent

	slide of Amoeba, Paramecium and Spirogyra.
Diagrams described in the Activity	Amoeba, Paramecium and Spirogyra
Explanation of the Activity	The students will know about the presence of Micro-organisms all around.

Sub Section E.2:- Minute to minute break up of period 2

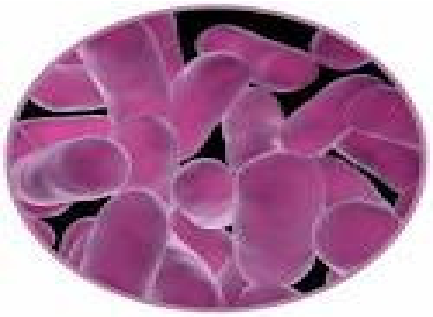
Concept	Time	Indicating/Guiding Script
Knowledge about Micro-Organisms	10 mins	1. The teacher will introduce the students about various micro-organisms.  2. Teacher will ask the students the names of any of the micro-organisms if they know. 3. A few students may give some response. 4. After this the teacher will write the classification of micro-organisms on the board and ask the students to read them aloud. It will help them to improve their pronunciation and vocabulary.
Career Options	10 mins	1. Teacher will talk about various career options which may require the knowledge of this chapter. 2. This knowledge is helpful to become Pathologists, Microbiologists, Researchers, Lab technicians and Engineers in food and medicine industry.
Activity “Swell Lab”	10 mins	Teacher will perform the activity “Swell Lab” (for details refer to Annexure GA3).It will help the students to know that yeast reproduces rapidly and produces Carbon dioxide during respiration.

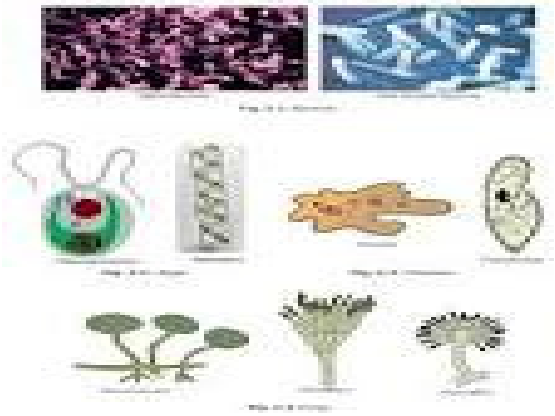
		Bubbles of the gas will fill the dough and increase its volume. It finds application of yeast in baking industry.  
Recapitulation/Home Assignment	10 mins	Teacher will ask the following questions to assess the students:- 1. Name different kinds of micro-organisms. 2. Which bacteria help to convert milk into curd? This question cannot be asked in this period but in the next period. 3. Which gas is produced when yeast respire? Home assignment: - Teacher will ask the students to bring at least one baked food item preferably homemade. She will divide a part of it to the whole class. It will inculcate sharing habit among students.

Annexure Name	**GA 3**
Name of the activity	Swell Lab
Objective	1. Introducing the concept of Production of Carbon dioxide when

	yeast respires. 2. To develop scientific approach among the students.
Type of Activity	Group
Materials required	Wheat flour, yeast powder, plate/bowl and water
Detail of the activity	Teacher will ask the students to take 4-5 teaspoons of wheat flour in a bowl; a pinch of yeast powder is added to this and students are asked to knead it with the help of some water. After 2-3 hours the dough will swell up. This will help the students to understand that swelling of dough is due to Carbon dioxide gas which is produced when yeast reproduce and multiply.

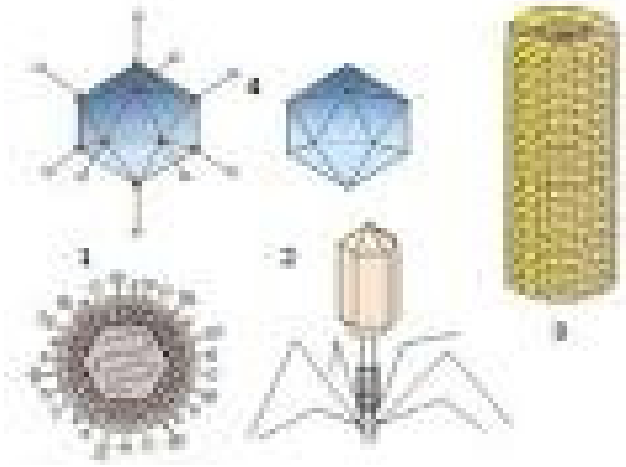
Sub Section E.3 (Minute to minute break up of Period 3)

Concept	Time	Indicating/Guiding Script
Introduction of Bacteria,,fungus, protozoa, algae and viruses	20 mins	Teacher will show various samples/slides to give a clear cut differentiation between different categories of micro-organisms (for details refer to Annexure GA4)
Explanation about habitat/various effects of micro-organisms	15 mins	After showing sample/slides of each category of Micro-organism, teacher will give a brief explanation about each of the kind. 1. Bacteria are present almost everywhere around us. They are responsible for diseases like Typhoid and Tuberculosis, but a few bacteria like Lacto bacillus helps in formation of curd.  2. Fungi mainly causes skin diseases in humans. They also spoil leather articles and can be seen easily in the form of bread mould and mushroom and edible form of fungi.  3. Protozoa are responsible for diseases like dysentry and Malaria.



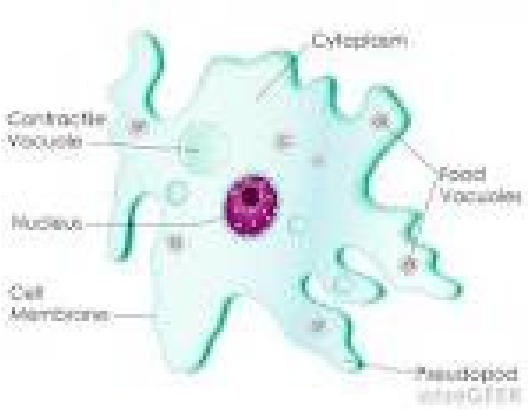
4. Algae contain green pigment chlorophyll and rapidly grow in ponds, ditches, moist walls etc. during rainy season.

5. Viruses are non-living outside the hosts but become living when enter inside a host. Many diseases are caused due to virus. Examples are common cold, Influenza, Cough, Polio, Chicken Pox etc.



Recapitulation	5 mins	Teacher will ask the following questions to assess the students:- 1. Name any two bacterial diseases. 2. Name any two viral diseases. 3. Name any two fungal diseases. 4. Name any two Protozoa diseases. 5. What makes algae look green? 6. Which bacteria help to convert milk into curd?

Annexure Name	**GA 4**
Name of the activity	'Observing Micro world'
Type of activity	Individual
Materials required	A sample of curd, stale bread slice, pond water with algal growth and permanent slides of amoeba, paramecium and virus.
Detail of the activity	Teacher will make temporary slides with a drop of each of curd, bread mould or pond water. She will place the slides under the microscopes and asks the students to observe them one by one. She will also keep the permanent slides of amoeba, paramecium and virus for the observation of students.
Pictures described in the activity	Teacher will also draw the diagrams of different micro-organisms on the board so that students can clearly identify each of them.

Outcomes of the activity	 **Amoeba**  **Paramecium**  **Virus** Students can easily identify different kinds of micro-organisms.

Sub section –E.4: Minute to minute breakup of period 4.

Concept	Time	Indicating/ Guiding script
Uses of micro-organisms	15 mins.	Teacher will explain the usefulness of micro-organism in our lives. • They help to clean the environment. • They increase soil fertility by fixing atmospheric nitrogen. • They help in making curd and bread. • They help in the production of alcohol and wine. • They help in making medicines (antibiotics) like penicillin, tetracycline, streptomycin etc. • They help in production of vaccines.
Harmful effects of micro-organisms	20mins.	Teacher will explain about the harmful effects of micro-organisms as many of them are responsible for causing diseases in plants and animals. Disease causing micro-organisms are called pathogens. Viruses are mainly responsible for spreading communicable diseases through air, water, food and physical contact. Housefly is the main carrier of disease causing microbes. However mosquitoes and cockroaches also spread many diseases. Teacher will also guide the students about preventive measures to keep them away from disease. They will also be warned about harms caused by stagnant water which becomes the breeding place for female anopheles mosquito and female aedes mosquito which spread malaria and dengue respectively. Students will be motivated to fill all the ditches in the school premises and outside it. They will also be motivated to do the same at their home too. It will inculcate the spirit of team work among the students.

Some hints for the teacher for period 4

Hint 1: Teacher will explain the role of decomposers which help in cleaning the environment.

Hint 2: Teacher will guide the students about role of vaccination in preventing an individual from various diseases. They will also be guided to teach the illiterate villagers about the importance of vaccination.

Sub section E.5: Minute to minute breakup of period 5.

<table>
<tr><th>Concept</th><th>Time</th><th colspan="4">Indicating/Guiding script</th></tr>
<tr><td rowspan="2">Human diseases caused by micro-organisms</td><td rowspan="2">15 mins</td><td colspan="4">Teacher will explain about the various diseases caused in human beings, causative agents, modes of transmission and general preventive measures. Before starting with the explanation teacher will ask the students to name a few diseases and how are they caused.

Teacher will write on the board in tabular form to give a list of microbial diseases.</td></tr>
<tr><td><u>Human diseases</u>
i. Tuberculosis
ii. Measles
iii. Chicken pox
iv. Polio</td><td><u>Causing Agent</u>
Bacteria
Virus
Virus
Virus</td><td><u>Mode of transmissions</u>
Air
Air
Air/contact
Air/water</td><td><u>Preventive measures</u>
Complete isolation of the patient.

Vaccination at suitable age.

 
Measles
 
Chicken Pox
  </td></tr>
</table>

					Polio
		v. Cholera vi. Typhoid vii. Hepatitis A	Bacteria Bacteria Virus	Water/food Water water	• Personal hygiene  • Good sanitary habits  • Drinking clean water.  • Vaccination at suitable age.

					
		viii. Malaria	Protozoa	Mosquito	• Use of mosquito net and repellents.  • Not allowing water to stand in the surroundings • Spraying insecticides and kerosene oil to prevent breeding of mosquitoes.
Plant diseases caused by micro-organisms	15 mins	Plant diseases	Micro-organism	Mode of transmission	
		1. Citrus canker 2. Rust of wheat 3. Yellow vein mosaic of bhindi.	Bacteria Fungi Virus	Air Air, seeds Insects	

				 **Citrus canker**  **Rust of wheat**  **Yellow vein mosaic of bhindi**
Recap/Home-assignment	10 Mins.	Teacher will ask the students to make a list of human, animal and plant diseases caused by microorganisms. They will be asked to prepare a brief report on this.		

Hint for teacher for period 5:

Teacher can plan a visit to a nearby hospital or dispensary where the students can see the patients with different ailments and get aware about the measures to keep themselves away from such diseases. It will also help them to identify a diseased person in their locality by looking at the symptoms.

Sub section. E6: Minute to minute breakup of period 6

Concept	Time	Indicating/ Guiding script
Introducing the concept of the food preservation	15 mins.	Teacher will perform an activity 'Increasing shelf life of fruits and vegetables' (for details refer to Annexure GA5) Teacher will explain the students about need of preservation.
Methods of food preservation	15 mins.	Teacher will explain about the various methods of food preservation as follows: 1. Preservatives like sodium benzoate and sodium metabisulphite can be added to jams and squashes to check their spoilage.  **Jam**  **Squash** 2. Meat, fish and amla, raw-mangoes etc. can be preserved for a longer time by adding common salt.  **Fish coated with salt**

		 **Mango pickle** 3. Jams and jellies can be preserved by adding sugar. 4. Oil and vinegar also prevent spoilage of vegetables, fruits, fish, meat etc. 5. Heat and cold treatments like pasteurization can be done for preserving milk.  6. Air tight containers also prevent the attack of microbes. 
Career options	10	Teacher will talk about various career options which may require the knowledge of this concept. It is helpful for the students to become

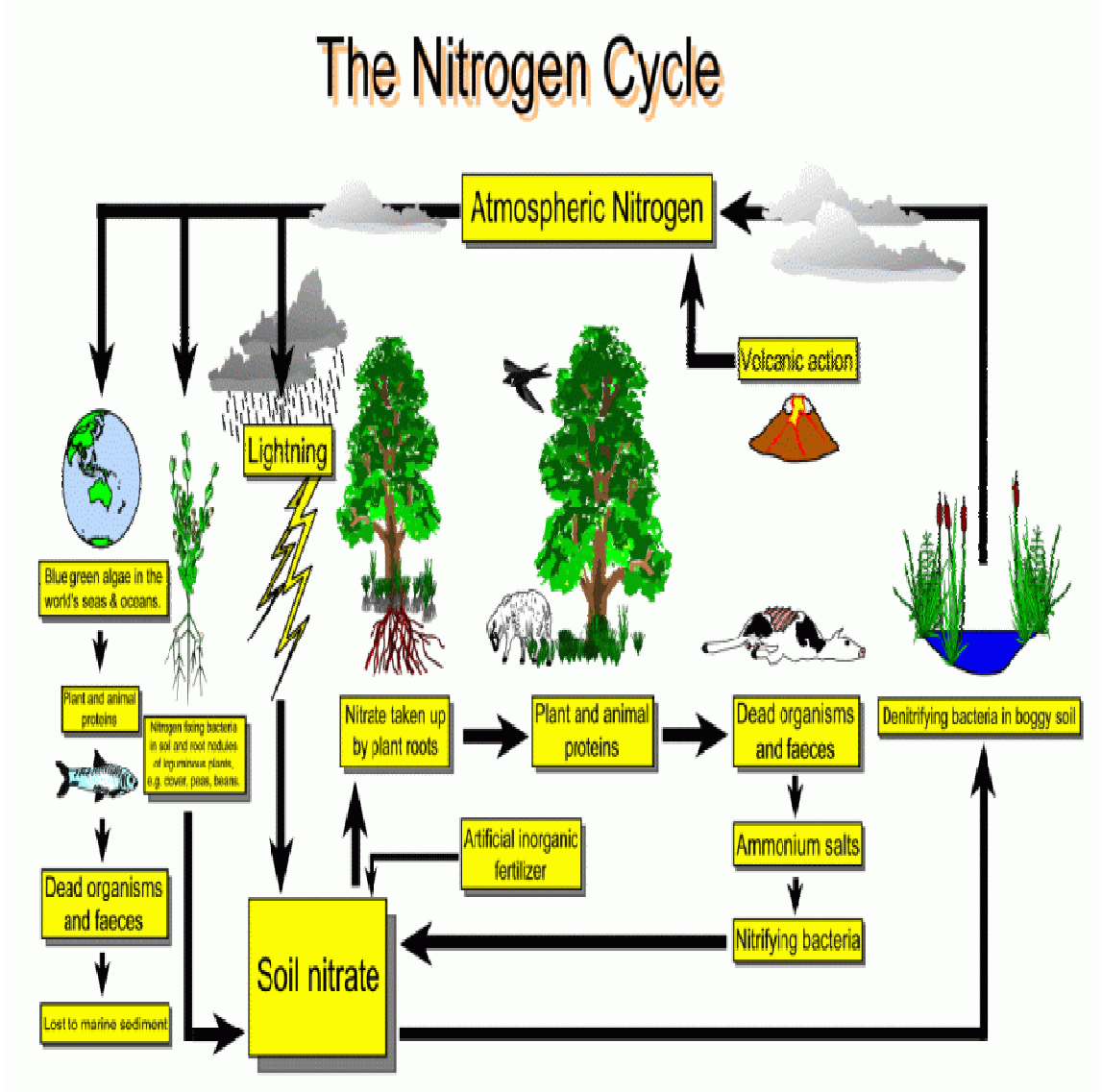
	mins.	researchers, technologist, food inspectors etc.

Hints for teachers for period 6:

Teacher can plan a visit to nearby milk plant where students can learn about the technique of pasteurization.

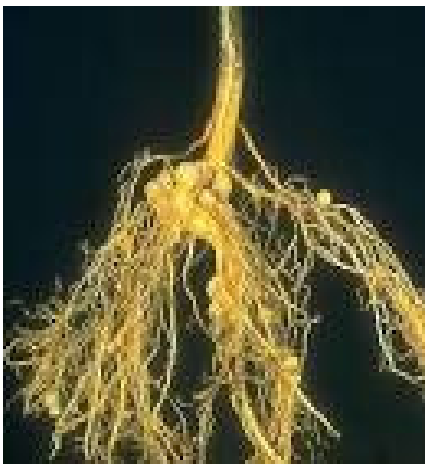
Annexure Name	**GA 5**
Name of the activity	Increasing shelf-life of fruits and vegetables.
Type of the activity	Group
Objective	To make the students learn about various methods of food preservation which can help them later in choosing a career.
Materials Required	Mango pickle, jam, jelly, squash, pasteurized milk and salt covered fish.
Detail of the activity	Teacher will show all these samples to the students and ask about a particular ingredient in each which helps it to stay fresh for a longer period.
Outcomes of the activity	The students will learn about various materials which can be used to preserve food. It will help them to apply this knowledge in making James, jellies, pickles etc. at home.

Sub section E7: Minute to minute breakup of period 7

Concept	Time	Indicating/ Guiding script
Introduction of concept of nitrogen fixation	15 mins.	Teacher will perform an activity based on role of root , nodules.(for details refer to annexure GA6) Teacher will explain the students about rhizobium bacteria present in the root nodules of leguminous plant which help to fix atmospheric nitrogen.
Nitrogen cycle	20 mins.	Nitrogen is one of the essential constituents of all living organisms as part of proteins, chlorophyll and nucleic acids and vitamins. Teacher will draw the process of nitrogen in the form of nitrogen cycle for better understanding of students. 

Hints for teacher of period 7:

- Teacher will also explain the students about importance of growing leguminous plants in fields which helps to increase soil-fertility.
- They will be motivated to follow the practices of mixed cropping and crop rotation.

Annexure Name	**GA 6**
Name of the activity	Knotted roots
Type of the activity	Group activity
Objective	• To make the students aware of nitrogen fixation. • To help them know the importance of leguminous plants.
Material required	Uprooted pea/gram plant, forceps.
Detail of the activity	Teacher will explain the students about the presence of rhizobium bacteria by showing round nodules present on the roots of uprooted plants.
Picture related to the activity	**Diagram of root nodules** 
Outcome of the activity	Students will be able to guide their farmer parents or other villagers about the importance of growing leguminous plants in their fields to increase the fertility of soil.

Sub section E8: minute to minute breakup of period 8

Concept	Time	Indicating/ Guiding script
Doubt clearing session	15 mins.	Teacher will ask the students to get their doubts clarified. It will also help to increase the confidence of the students, their speaking skill and reasoning ability. This will also help to reduce the communication gap between teacher and the taught.
Recapitulation	25 mins.	Teacher will ask the following questions to assess what the students learnt: i. What are micro-organisms? ii. Name the different kinds of micro-organisms. iii. Name a few diseases caused by bacteria, fungi virus and protozoa. iv. Where can we find micro-organisms? v. Name the bacteria which help to convert milk into curd. vi. Define fermentation? vii. Who discovered penicillin? viii. Who discovered the vaccine for small pox? ix. What are communicable diseases? x. Name the diseases caused by mosquitoes. xi. Name a few plant diseases caused by micro-organisms. xii. What causes food poisoning? xiii. What is pasteurization? xiv. Name the bacteria which help to fix atmospheric nitrogen. xv. What do you mean by nitrogen cycle?

Section –F The Content

1. Page no. 15-30, chapter 2 NCERT class VIII science Text book.
2. For activities (Annexure GA1-GA6)
3. Interesting and useful online resources:
    a) https://www.youtube.com/watch?v=8KLufFAFC9w
    b) https://www.youtube.com/watch?v=XuZQUEFD52I
    c) https://www.youtube.com/watch?v=fRWpRl-wLwM
    d) https://www.youtube.com/watch?v=1EkehFkhWf4
    e) https://www.youtube.com/watch?v=7D0eIsuZC3w

Section - G

Refer to annexure GA1-GA6

Section- H

Assessment Tool for Students

1. What are the major groups of micro-organisms?
2. Write any ten lines on usefulness of micro-organisms?
3. Write a paragraph on harmful effects of micro-organisms?
4. What are communicable diseases?
5. Why are we advised to wash fruits and vegetables before use?
6. Why are the farmers advised to grow leguminous crops in their fields?
7. Why should we maintain personal as well as social hygiene?
8. What is the contribution of Louis Pasteur in the field of science?
9. What is 'Pulse Polio Program'?
10. Name a few diseases for which vaccination is available.
11. Why crop mixing and crop rotation should be done in field?
12. What is mode of transmission for following diseases:- (a) Tuberculosis (b) Typhoid (c) Malaria.
13. What should be done to prevent the growth of mosquitoes in our locality?
14. Give two examples from daily life in which microbes are useful to us.
15. Name the carrier of malaria parasite.
16. Name the causing agent of Hepatitis A.
17. Name the most common carrier of communicable disease.
18. Which micro organism is used for the production of alcohol?
19. Name the medicines used as antibiotic for human being which are prepared from micro-organisms.
20. Why are children vaccinated?
21. What is the full form of AIDS?
22. Name the virus causing AIDS.
23. Give two examples of algae.
24. Name two leguminous plants?
25. Which micro-organism is more harmful between bacteria or virus?

Section- I

Assessment Tool for teachers:-

1) How a teacher can inculcate good sanitary habits among students?

2) What is a proper method to aware the children about harmful effects of microbes?

3) How the correlation of usefulness of microbes in our daily life can be established by a teacher?

4) How the teacher can aware his students about the swine flu?

5) How a teacher can motivate the students about the cleanliness of the environment?

6) How the teacher can contribute in swach bharat abhiyan by taking the students along with?

7) How the students can be made aware about the preventive measures to keep themselves away from the patients?

8) How the students can be explained the need of food preservation?

9) How the students can be made aware about the preventive measures for AIDS?

10) How a teacher can explain about different modes of transmission of microbial diseases?