



## INDIAN SCHOOL AL WADI AL KABIR



<b>Class: VIII</b>	<b>Department: SCIENCE 2022 - 23</b>	<b>Date: 27-10-22</b>
<b>Worksheet No.: 10 With answers</b>	<b>Topic: MICROORGANISMS : FRIEND AND FOE</b>	<b>Note: A4 FILE FORMAT</b>
<b>NAME OF THE STUDENT:</b>	<b>CLASS &amp; SEC:</b>	<b>ROLL NO.</b>

### I. VERY SHORT ANSWER (1M)

1. Why are viruses considered to be on the borderline between living and non-living things?  
Hint: Viruses do not grow or reproduce by themselves, which makes them non-living.  
However, when a virus enters the living cell of an organism, it makes use of the resources in the host cell and starts reproducing.
2. Write any two ways in which microorganisms are useful and harmful to us.  
Hint: they help us to make curd, wine, acetic acid, etc. They help in cleaning the environment. They eat dead decaying parts of plants and animals and decompose them. They help in nitrogen-fixing.  
They cause diseases in animals and in humans.(such as anthrax, cholera, tuberculosis, typhoid).They also cause diseases in plants eg. Citrus canker, Rust of wheat etc.  
They spoil food and leather.
3. Define food preservation. What role does sugar play in the preservation of food?  
Hint: Food preservation is the method of preserving food from being spoiled by microbes. The role of sugar in food preservation is significant. By adding sugar to the food item, we reduce its moisture content, and hence, it stops the growth of the microorganisms.
4. What is the role of bacteria in increasing soil fertility?  
Hint: Some bacteria, which are present in the root nodules of leguminous plants or free-living bacteria fix the atmospheric nitrogen in the soil which is ultimately used up by the plants. Hence, they increase the fertility of the soil. For example, Rhizobium, Azotobacter, etc.
5. What is a vaccine?  
Hint: A vaccine is a special kind of medicine (or preparation) which provides immunity (or protection) against a particular disease.
6. Define communicable diseases. Give some examples.  
Hint: Communicable diseases are microbial diseases that can spread from an infected person to a healthy person through the air, water, or other physical contact; e.g., cholera , chicken pox, tuberculosis, common cold, etc.

7. What are biological nitrogen fixers?

**Hint:** Some bacteria and blue-green algae that are able to fix nitrogen from the atmosphere to enrich the soil with nitrogen and increase fertility, are known as biological nitrogen fixers.

8. Name two chemical preservatives added to food.

**Hint:** Sodium metabisulphite and sodium benzoate.

9. What are antibiotics? Name any two antibiotics.

**Hint:** Medicines that kill or stop the growth of disease-causing microorganisms. Eg: Streptomycin, Tetracycline

## II. ASSERTION AND REASON

For questions number 10 to 12, two statements are given- one labelled Assertion (A) and the other labelled Reason (R).

Select the correct answer to these questions from the codes (i), (ii), (iii), and (iv) as given below

- i) Both A and R are true and R is the correct explanation of the assertion.
- ii) Both A and R are true but R is not the correct explanation of the assertion.
- iii) A is true but R is false.
- iv) A is false but R is true

**10.Assertion(A):**Cakes have a spongy texture.

**Reason(R):** While baking cakes, yeast reproduces rapidly and produces carbon dioxide gas which is responsible for this spongy texture.

**Ans: i) Both assertion and reason are true and the reason is the correct explanation of assertion.**

**11.Assertion(A):** Partial sterilisation of a product such as milk at a high temperature is known as pasteurisation.

**Reason(R):**It was discovered by Alexander Fleming in 1929.

**Ans: iii) A is true but R is false.**

**12.Assertion(A):** Bacteria and fungi are used to make medicines.

**Reason(R):** These medicines kill or stop the growth of disease-causing microorganisms.

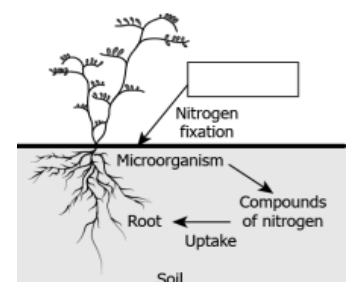
**Ans: i) Both A and R are true and R is the correct explanation of the assertion**

## III. PASSAGE BASED

Our atmosphere has 78% nitrogen gas. Nitrogen is one of the essential constituents of all living organisms as part of proteins, chlorophyll, nucleic acids, and vitamins. The atmospheric nitrogen cannot be taken directly by plants and animals. Certain bacteria and blue-green algae

present in the soil fix nitrogen from the atmosphere and convert it into compounds of nitrogen. Once nitrogen is converted into these usable compounds, it can be utilised by plants from the soil through their root system. Nitrogen is then used for the synthesis of plant proteins and other compounds. Animals feeding on plants get these proteins and other nitrogen compounds. When plants and animals die, bacteria and fungi present in the soil convert the nitrogenous wastes into nitrogenous compounds to be used by plants again. Certain other bacteria convert some part of them to nitrogen gas which goes back into the atmosphere. As a result, the percentage of nitrogen in the atmosphere remains more or less constant.

- i) Which of the following can fix atmospheric nitrogen in the soil?
  - a) **Rhizobium**
  - b) Bread mould
  - c) Polio virus
  - d) Penicillium
- ii) The process by which the amount of nitrogen remains the same in the atmosphere is known as
  - a) Fermentation
  - b) Carbon cycle
  - c) **Nitrogen cycle**
  - d) Photosynthesis
- iii) Some plants have nitrogen-fixing bacteria in their root nodules. What are these bacteria called?
  - a) Blue-green algae
  - b) Nitrosomonas
  - c) Azotobacter
  - d) **Rhizobium**
- iv) The two microorganisms which live in symbiotic association in lichens are
  - a) fungus and protozoa
  - b) alga and bacteria
  - c) bacteria and protozoa
  - d) **algae and fungus**
- v) A student is making an image to show the process of nitrogen fixation. What will be added to the empty box to complete the image?
  - a) Nitrogen molecules in the soil
  - b) Nitrogenous compounds
  - c) **Atmospheric nitrogen**
  - d) Nitrogen gas in the soil



#### IV. **CASE STUDY-BASED QUESTIONS**

1. Megha, a class VIII student was asked to submit a project report on mosquito-transmitted diseases. She visited a nearby hospital where her aunt was a nurse. Her aunt took her to a

patient suffering from malaria. Megha consulted with the doctor and got the information that a protozoan called Plasmodium is responsible for malaria. It lives in the liver and blood of the person who has been infected by this disease. A female Anopheles mosquito when sucks blood from the infected person, Plasmodium along with blood, is taken into its stomach.

i) The disease caused by protozoa is

- a) Tuberculosis
- b) Polio
- c) Typhoid
- d) Malaria

ii) What are pathogens? [Hint: Disease-causing microorganisms are known as pathogens. They are also called germs.]

iii) Name the groups in which microorganisms are broadly classified.

Hint: Microorganisms are broadly classified into four groups-bacteria, fungi, protozoa, and algae

iv) Explain how malaria is transmitted to humans.

Hint: A protozoan called Plasmodium is responsible for malaria. It lives in the liver and blood of the person who has been infected by this disease. A female Anopheles mosquito when sucks blood from the infected person, Plasmodium along with blood, is taken into its stomach. The Plasmodium, here, multiplies itself and reaches the salivary gland of the mosquito. Now, when this mosquito bites a healthy person, it injects Plasmodium along with saliva into him. The healthy person then gets an attack of malaria. In this way, malaria is transmitted to humans.

2. Kushal's family is happy as he became a proud father to a baby girl. Upon a routine visit to the hospital, the doctor advised him not to skip the vaccination schedule. The process of injecting a vaccine inside the body of a person in order to produce immunity against some disease is called vaccination. When a vaccine is injected into a healthy person, the person's body reacts by producing antibodies to attack the bacteria. The antibodies remain in the body and protect the body when the microbes enter again.

\_\_\_\_\_ is produced when vaccine is injected into the body of a person.

- a) Antigens
- b) Immune bodies
- c) Immune reactions
- d) Antibodies

iii) What is vaccination?

Hint: The process of administering a vaccine inside the body of a person in order to produce immunity against some disease is called vaccination.

iv) How does the vaccine work?

Hint: Weak or dead microbes are injected into the body for protection from diseases. When a vaccine is injected into a healthy person, the person's body reacts by producing antibodies to attack the bacteria. The antibodies remain in the body and protect the body when the microbes enter again.

iv) Explain why antibiotics do not work against flu or any infection caused by viruses.

Hint: Viruses cannot be killed by using antibiotics as their cell pathways are different from that of bacteria. It means taking antibiotics to get rid of flu or any other viral infection is useless, because it does not reduce the strength of the virus, nor does it reduce the duration of the infection. But, however, antibiotics will work if we get attacks of viral infection and bacterial disease at the same time. Even then, it will cure bacterial disease only but not a viral infection.

3. On Rahul's birthday, his mother prepared many dishes for him. After having their meal, they found that many food items were left over. Rahul's mother kept these leftovers in an air-tight container and refrigerated them.

(i) What is food preservation?

Hint: The method used for the prevention of spoiling food by the action of microbes is called food preservation.

(ii) What will happen to the food if it is not refrigerated? Hint: The food will get spoil and emit a bad smell with changed colour or taste.

(iii) What is the role of refrigeration in the food preservation method? Hint: Refrigeration retards or slows down the growth of microorganisms and enzyme activity in food. Thus, it prevents the spoilage of food.

#### V. SHORT ANSWER TYPE QUESTIONS (2 M):

1. What is the role of microorganisms in cleaning the environment and in sewage treatment?

(Hint: The **microorganisms** decompose dead organic wastes of plants and animals converting them into simple substances. These substances are again used by other plants and animals. Thus, **microorganisms** can be used to degrade harmful and smelly substances and thereby **cleans** up the **environment**)

2. What are microbes? Name the four major groups of microbes.

(Hint: Microorganisms or microbes are those organisms that cannot be seen with the naked eye, and can be viewed only under a microscope. Microorganisms are widespread in nature and are beneficial to life, but some can cause serious harm. They can be divided into four major types: bacteria, **fungi**, **protozoa**, and **algae**)

3. Describe how curd is made from milk. Name the bacterium which converts milk to curd.  
(Hint: When a small amount of pre-made curd is added to warm milk, then the lactobacillus bacterium present in curd multiplies in milk and converts it into curd. During this process, the lactobacillus bacterium acts on the lactose sugar present in milk and converts it into lactic acid. This lactic acid then converts milk into curd.)
4. What is a pathogen? How does it enter the body of living organisms?  
(Hint: Disease-causing **microorganisms** are called pathogens. another name for them is germs. they gain entry into the body of living organisms through the air, food, and water, direct contact with an infected person, through insects, and by cuts and wounds.)
5. Differentiate between viruses and other microorganisms.

Viruses	Other microbes
(i) They show the characteristics of living organisms or reproduce only by entering the host organisms.	(i) They do not need to enter any host organism to reproduce or show any characteristics of life.
(ii) They are non-cellular microbes.	(ii) They are cellular microbes.

**V. b) SHORT ANSWER TYPE QUESTIONS (3 M):**

1. Why does sugar solution with yeast powder become alcoholic in taste?  
(Hint: Sugar solution becomes alcoholic in taste because yeast synthesises an alcoholic compound from the sugar . This process is known as fermentation. It is used for making wine. The substance on which yeast is grown for wine production are grapes, grains of wheat, barley, etc.)
2. What is the role of yeast in the baking industry?  
(Hint: Baker's **yeast** is commonly used in **baking bread** and **bakery** products, serving as a leavening agent which causes the **bread** to rise (expand and become lighter and softer by converting the fermentable sugars present in the dough into carbon dioxide and ethanol.)
3. How are carriers harmful to us? Hint: Carriers take with them many harmful microorganisms or pathogens. They play a great role in transferring these pathogens to a healthy person, by sitting on the food items or directly transferring the pathogens inside the body of a person. Hence they are harmful to us.
4. Give reasons:
  - a) We should keep a handkerchief on the nose and mouth while sneezing.  
Hint: When a person suffering from common cold sneezes, the fine droplets of moisture containing thousands of viruses are spread in the air, these viruses may enter the body of

a healthy person while breathing, thus we should keep a handkerchief on the mouth, and nose so that viruses may not spread in the air and enter into healthy person's body to make him sick.

b) We should avoid consuming uncovered food items.

Hint: Houseflies sit on the garbage and animal excreta where pathogens stick to their bodies and these pathogens get transferred to uncovered food when these flies sit on uncovered food items and the person consuming these foods falls sick.

c) A mango gets spoilt or rotten after a few days but a mango pickle does not spoil for a long time.

Hint: Mango pickles contain salt which acts like a preservative. The oil prevents the entry of fungi and bacteria from attacking the pickle and spoiling it.

5. While returning from school, Boojho ate *chaat* from a street hawker. When he reached home, he felt ill and complained of stomach ache . What could be the reason?

Hint: The probable reason is that the *chaat* was contaminated by pathogenic microbes due to unhygienic conditions near the shop or the utensil used for serving could have been contaminated.

6. Describe the role of Rhizobium in maintaining soil fertility.

Hint: Rhizobium forms a symbiotic association with the roots of leguminous plants and fixes the elemental nitrogen into ammonia which **is** utilised by the host plant. The ammonia **is** also released from the root nodules of leguminous plants to the **soil** thus raising the **fertility** status of the **soil**

7. What is pasteurisation? How is it done?

Hint-pasteurization is the process in which microorganisms are destroyed by subjecting them first to high temperatures and sudden cooling. Milk is heated at 70°C temperature for about half a minute and suddenly cooled.

8. What precautions must be taken while taking antibiotics?

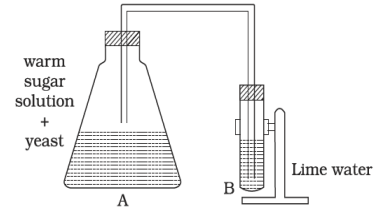
Hint: Antibiotics should be taken only on the advice of the doctor, and one must complete the course the doctor prescribes. Antibiotics taken in the wrong doses may make the organism resistant to the drug ,which may make the drug less effective against the organism in the future. Moreover, antibiotics may also kill the beneficial bacteria in the body.

9. Explain the different methods of preserving food items.

Hint: Among the oldest methods of preservation are **drying**, refrigeration, and **fermentation**. Modern methods include **canning**, **pasteurisation**, **freezing**, and the addition of chemicals. Advances in packaging materials have played an important role in modern food preservation.

10. Observe the setup given in the figure and answer the following questions.

- What happens to the sugar solution in A?
- Which gas is released in A?
- What changes will you observe in B when the released gas passes through it?



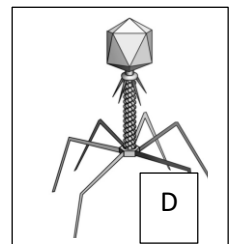
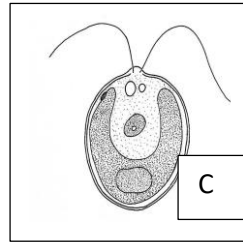
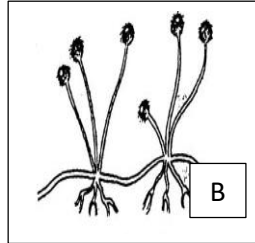
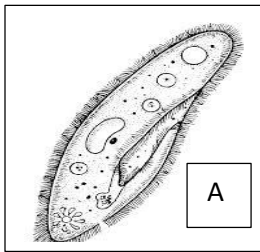
Hint: a)Yeast causes fermentation converting sugar into alcohol and carbon dioxide.  
 b)Carbon dioxide c)Lime water turns milky.

11. Where do microorganisms live?

Hint: They can survive in all types of environments, ranging from ice-cold climates to hot springs and deserts to marshy lands. They are also found inside the bodies of animals including humans. Some microorganisms grow on other organisms while others exist freely. Microorganisms like amoeba can live alone, while fungi and bacteria may live in colonies.

**VI. LONG ANSWER TYPE QUESTIONS (5 M):**

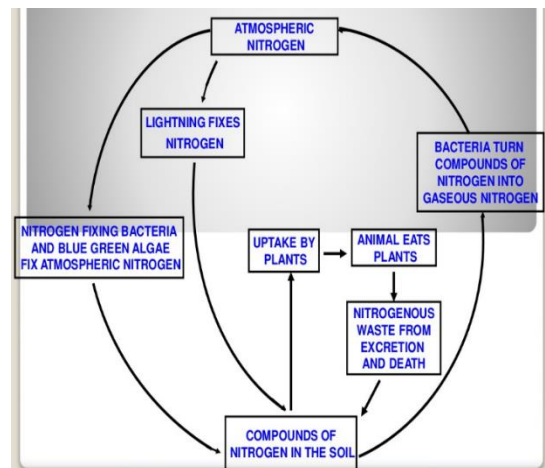
1. Identify the given organisms and mention their groups :



Hint: A- Paramecium, group- protozoa B- Rhizopus (bread mould), group- fungus C- Chlamydomonas, group- algae D- Bacteriophage, group – virus

2. What is nitrogen fixation? Draw a neat and labelled diagram of nitrogen cycle in nature.

Hint: Nitrogen fixation is the process by which atmospheric nitrogen is converted by either a natural or an industrial means to a form of nitrogen such as ammonia. In nature, most nitrogen is harvested from the atmosphere by microorganisms to form ammonia, nitrites, and nitrates that can be used by plants.





3. Complete the following table.

a)

Diseases	Causative organisms	Preventive measures
Tuberculosis	Bacteria	Keep the patient isolated
Cholera	Bacteria	Boiled water
Typhoid	Bacteria	Consume properly cooked food
Chicken pox	Virus	Keep the patient isolated

b)

Plant diseases	Causative organisms
Citrus canker	Bacteria
Rust of wheat	Fungi
Yellow vein mosaic of bhindi (okra)	Virus

#### Some Important Discoveries in Microbiology

Name of the Scientist	Year	Contribution
1. Robert Hooke	1665	Observed cork cells, bacteria and spermatozoa using his own crude microscope.
2. Anton van Leeuwenhoek	1676	First to describe and sketch microbes.
3. Louis Pasteur	1857-59	Discovered that fermentation is caused by yeast [fungi]; disproved the theory of spontaneous generation.
4. Robert Koch	1882	Gave the Germ theory of disease; tuberculosis is caused by <i>Mycobacterium tuberculosis</i> bacterium and anthrax by <i>Bacillus anthracis</i> (1875).
5. Alexander Fleming	1929	Developed antibiotic penicillin from <i>Penicillium notatum</i> [fungus].

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