CLASS VIII

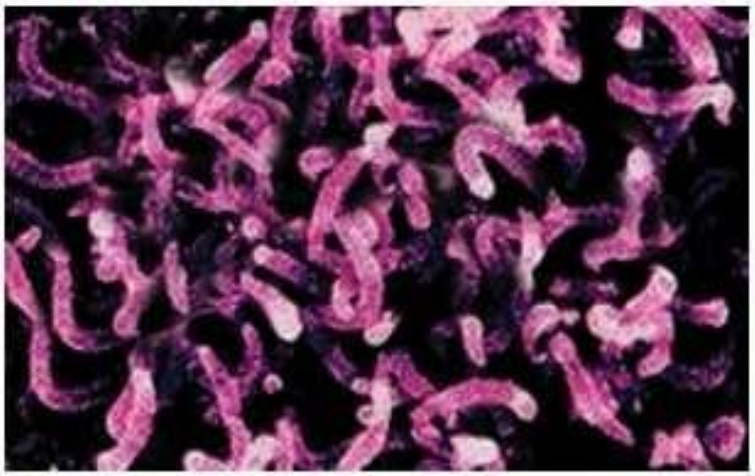
CHAPTER 02

MICROORGANISMS : FRIEND AND FOE

INTRODUCTION

The microorganisms or microbes are so small in size that they cannot be seen with the unaided eye. Some of these, such as the fungus that grows on bread, can be seen with a magnifying glass. Others cannot be seen without the help of a microscope. That is why these are called or microorganisms microbes. are Microorganisms classified into four major groups. These groups are bacteria, fungi, protozoa and some algae.

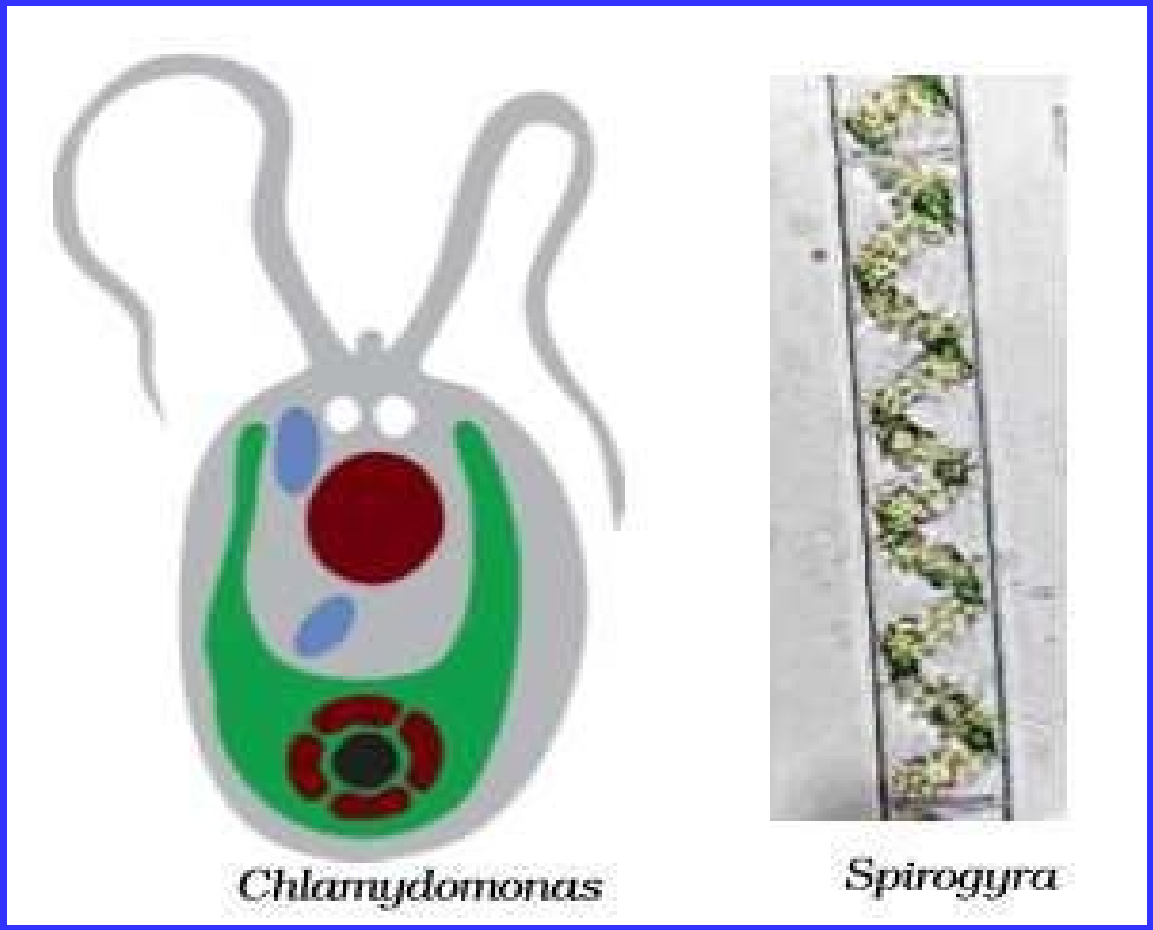
THESE ARE TYPES OF BACTERIA.



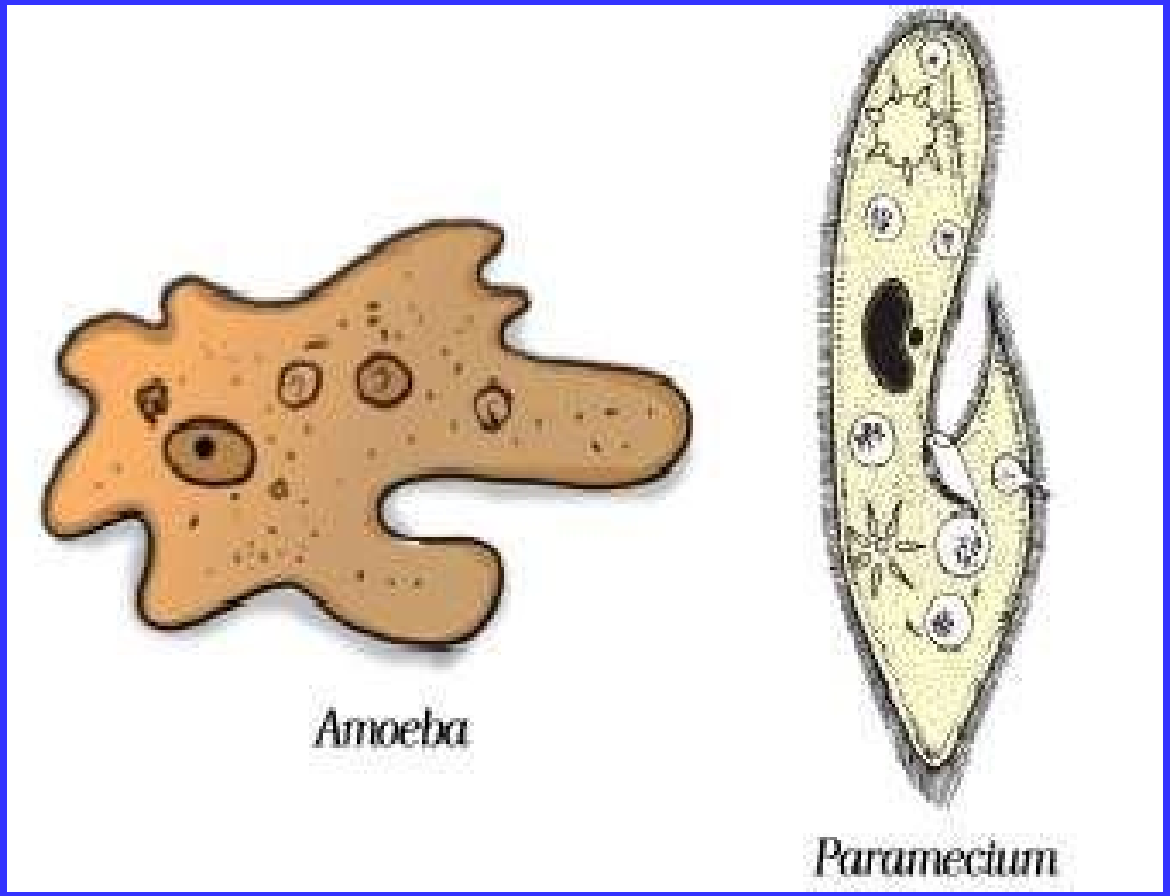
Spiral bacteria

Rod shaped bacteria

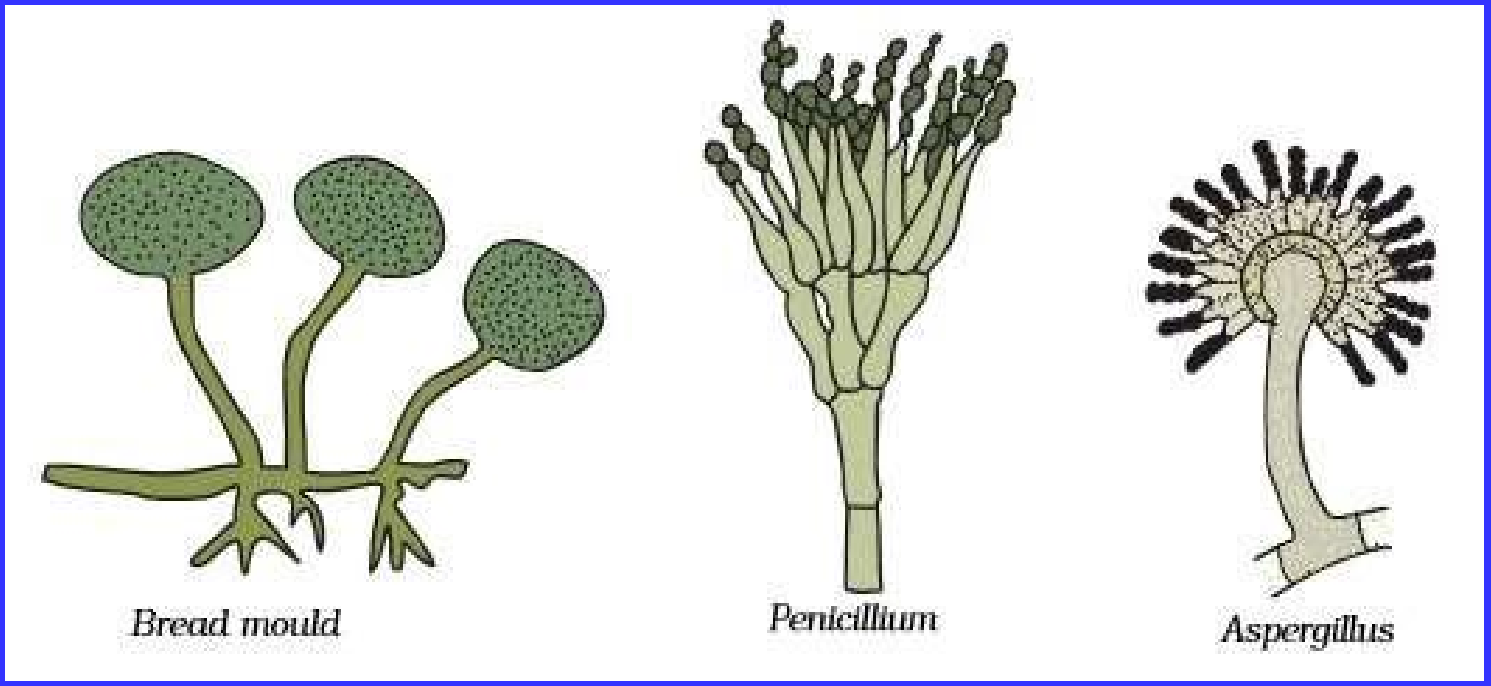
THESE ARE TYPES OF ALGAE.



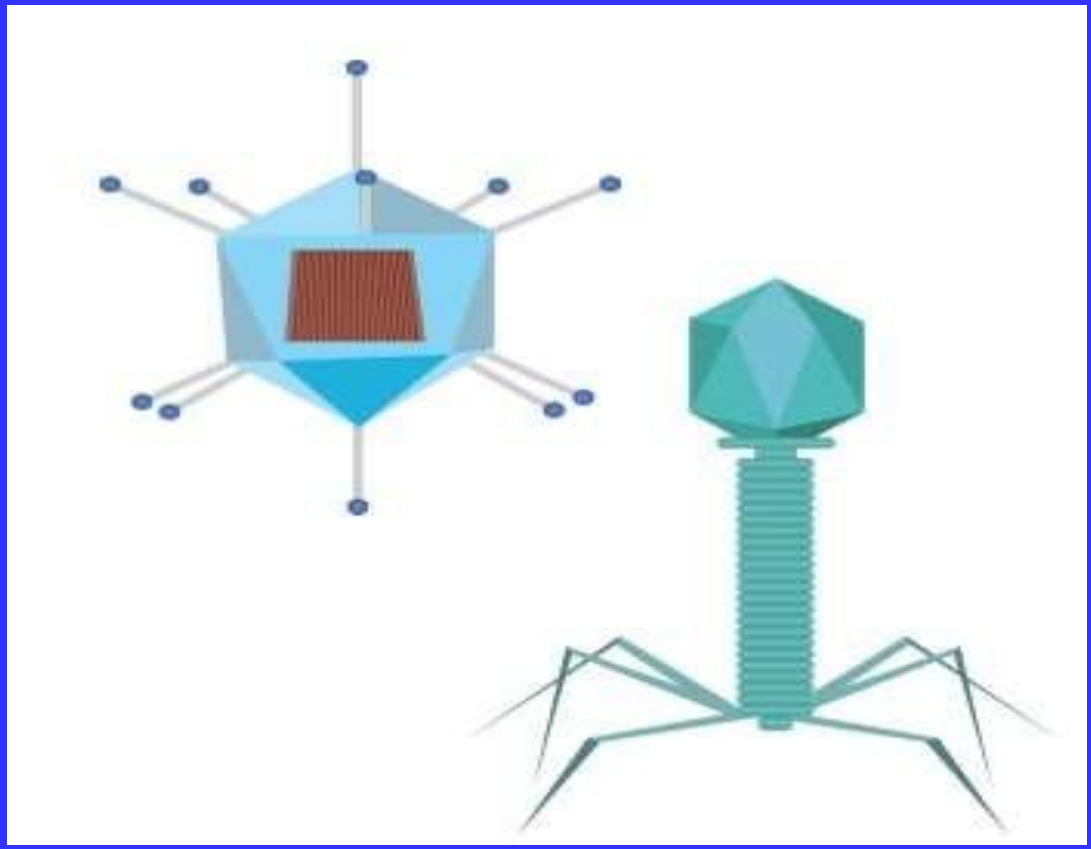
THESE ARE TYPES OF PARAMECIUM.



THESE ARE TYPES OF FUNGI.



THESE ARE TYPES OF VIRUS.



WHERE DO MICROORGANISMS LIVE?

Microorganisms may be single-celled like bacteria, some algae and protozoa, or multicellular, such as algae and fungi. They can survive under all types of environment, ranging from ice cold climate 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.

FRIENDLY MICROORGANISMS

Microorganisms are used for various purposes. They are used in the preparation of curd, bread and cake.

They are also used in cleaning up of the environment. For example, the organic wastes (vegetable peels, remains of animals, faeces, etc.) are broken down into harmless and usable substances by bacteria. Recall that bacteria are also used in the preparation of medicines. In agriculture they are used to increase soil fertility by fixing nitrogen.

MAKING OF CURD

Curd contains several microorganisms. Of these, the bacterium Lactobacillus promotes the formation of curd. It multiplies in milk and converts it into curd. Bacteria are also involved in the making of cheese, pickles and many other food items. An important ingredient of rava (sooji), idlis and bhaturas is curd.

MAKING OF BREAD

Yeast reproduces rapidly and produces carbon dioxide during respiration. Bubbles of the gas fill the dough and increase its volume. This is the basis of the use of yeast in the baking industry for making breads, pastries and cakes.

COMMERCIAL USE OF MICROORGANISMS

Microorganisms are used for the large scale production of alcohol, wine and acetic acid (vinegar). Yeast is used for commercial production of alcohol and wine. For this purpose yeast is grown on natural sugars present in grains like barley, wheat, rice and crushed fruit juices, etc. The process of conversion of sugar into alcohol is known as fermentation.

ACTIVITY

Take a 500 ml beaker filled up to ¾ with water. Dissolve 2-3 teaspoons of sugar in it. Add half a spoon of yeast powder to the sugar solution. Keep it covered in a warm place for 4-5 hours. Now smell the solution. Could you get a smell ?

OBSERVATION

This is the smell of alcohol as sugar has been converted into alcohol by yeast. This process of conversion of sugar into alcohol is known as **FERMENTATION**.

MEDICINAL USE OF MICROORGANISMS

Whenever you fall ill the doctor may give you some antibiotic tablets, capsules or injections such as of penicillin. The source of these medicines is microorganisms. These medicines kill or stop the growth of the disease-causing microorganisms. Such medicines are called antibiotics. These days a number of antibiotics are being produced from bacteria and fungi. Streptomycin, tetracycline and erythromycin are some of the commonly known antibiotics which are made from fungi and bacteria.

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MEDICINAL USE OF MICROORGANISMS

The antibiotics are manufactured by growing specific microorganisms and are used to cure a variety of diseases. Antibiotics are even mixed with the feed of livestock and poultry to check microbial infection in animals. They are also used to control many plant diseases.

ALEXANDER FLEMING AND PENICILLIN.

In 1929, Alexander Fleming was working on a culture of disease-causing bacteria. Suddenly he found the spores of a little green mould in one of his culture plates. He observed that the presence of mould prevented the growth of bacteria. In fact, it also killed many of these bacteria. From this the mould penicillin was prepared.

EDWARD JENNER AND SMALL-POX VACCINE

Edward Jenner discovered the vaccine for small-pox in 1798.

It is important to remember that antibiotics should be taken only on the advice of a qualified doctor. Also you must finish the course prescribed by the doctor. If you take antibiotics when not needed or in wrong doses, it may make the drug less effective when you might need it in future. Also antibiotics taken unnecessarily may kill the beneficial bacteria in the body. Antibiotics, however, are not effective against cold and flu as these are caused by viruses.

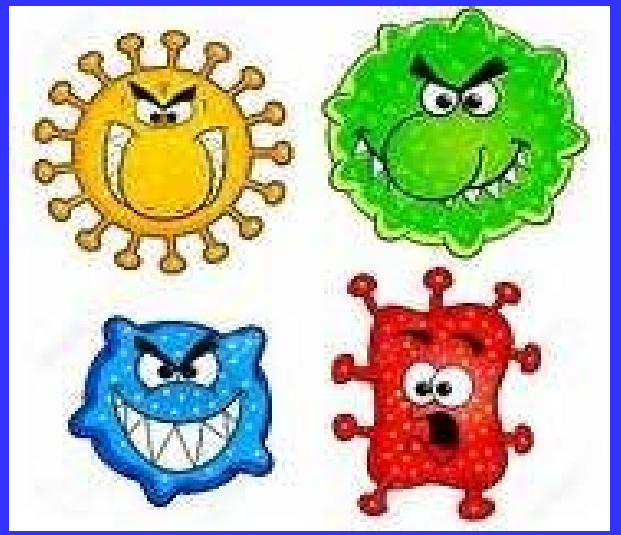
INCREASING SOIL FERTILITY

Some bacteria and blue green algae are able to fix nitrogen from the atmosphere to enrich soil with nitrogen and increase its fertility. These microbes are commonly called biological nitrogen fixers.

THESE ARE THE NITROGEN FIXING BLUE GREEN ALGAE.

HARMFUL MICROORGANISMS

Microorganisms are harmful in many ways. Some of the microorganisms cause diseases in human beings, plants and animals. Such disease-causing microorganisms are called pathogens. Some microorganisms spoil food, clothing and leather.



DISEASE- CAUSING MICROORGANISMS IN HUMANS

Pathogens enter our body through the air we breathe, the water we drink or the food we eat. They can also get transmitted by direct contact with an infected person or carried through an animal. Microbial diseases that can spread from an infected person to a healthy person through air, water, food or physical contact are called communicable diseases. Examples of such diseases include cholera, common cold, chicken pox and tuberculosis.

DISEASE- CAUSING MICROORGANISMS IN HUMANS

When a person suffering from common cold sneezes, fine droplets of moisture carrying thousands of viruses are spread in the air. The virus may enter the body of a healthy person while breathing.

SMALL INSECTS OF DISEASE

There are some insects and animals which act as carriers of disease-causing microbes. Housefly is one such carrier. The flies sit on the garbage and animal excreta. Pathogens stick to their bodies. When these flies sit on uncovered food they may transfer the pathogens. Whoever eats the contaminated food is likely to get sick. So, it is advisable to always keep food covered. Avoid consuming uncovered items of food. Another example of a carrier is the female Anopheles mosquito, which carries the parasite of malaria. Female Aedes mosquito acts as carrier of dengue virus.

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SMALL INSECTS OF DISEASE

All mosquitoes breed in water. Hence, one should not let water collect anywhere, in coolers, tyres, flower pot etc. By keeping the surroundings clean and dry we can prevent mosquitoes from breeding. Try to make a list of measures which help to avoid the spread of malaria.

FEMALE ANOPHELES MOSQUITO

SOME COMMON HUMAN DISEASES CAUSED BY MICROORGANISMS

Human Disease	Causative Microorganism	Mode of Transmission	Preventive measures (General)
Tuberculosis	Bacteria	Air	Keep the patient in complete isolation. Keep the personal belongings of the patient away from those of the others. Vaccination to be given at suitable age.
Measles	Virus	Air	
Chicken Pox	Virus	Air/Contact	
Polio	Virus	Air/Water	
Cholera	Bacteria	Water/Food	Maintain personal hygiene and good sanitary habits. Consume properly cooked food and boiled drinking water. Vaccination.
Typhoid	Bacteria	Water	
Hepatitis B	Virus	Water	Drink boiled drinking water. Vaccination.
Malaria	Protozoa	Mosquito	Use mosquito net and repellents. Spray insecticides and control breeding of mosquitoes by not allowing water to collect in the surroundings.

SOME COMMON PLANT DISEASES CAUSED BY MICROORGANISMS

Plant Diseases	Micro-organism	Mode of Transmission	Figures
Citrus canker	Bacteria	Air	
Rust of wheat	Fungi	Air, seeds	
Yellow vein mosaic of *bhindi* (Okra)	Virus	Insect	

LOUIS PASTEUR AND PASTEURIZATION

bacterial contamination, a process now called pasteurization. He is regarded as one of the three main founders of bacteriology, together with Ferdinand Cohn and Robert Koch, and is popularly known as the

"**FATHER OF MICROBIOLOGY**".

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LOUIS PASTEUR AND PASTEURIZATION

Pasteurized milk can be consumed without boiling as it is free from harmful microbes. The milk is heated to about 700 C for 15 to 30 seconds and then suddenly chilled and stored. By doing so, it prevents the growth of microbes. This process was also discovered by Louis Pasteur. It is called pasteurization.

STORAGE AND PACKING

These days dry fruits and even vegetables are sold in sealed air tight packets to prevent the attack of microbes.

NITROGEN CYCLE