



and broken plastic toys in pot B. Put the pots aside. Observe them after 3-4 weeks.

Do you find any difference in the contents of the two pots? If so, what is the difference? You will find that plant waste in pot A, has been decomposed. How could this happen? The plant waste has been converted into manure by the action of microbes. The nutrients

are again used by other plants and animals. Thus, microorganisms can be used to degrade the harmful and smelly substances and thereby clean up the environment.

2.4 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. Let us study more about their harmful activities.

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.

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.



Then how do you prevent the spread of communicable diseases?



We should keep a handkerchief on the nose and mouth while sneezing. It is better to keep a distance from infected persons.

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 (Fig. 2.8), which carries the parasite of malaria. Female *Aedes* mosquito acts as carrier of dengue virus. How can we control the spread of malaria or dengue?

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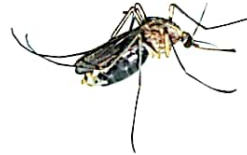


Fig. 2.8 : Female *Anopheles* mosquito



Why does the teacher keep telling us not to let water collect anywhere in the neighbourhood?

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.





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Table 2.1: 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.

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Some of the common diseases affecting humans, their mode of transmission and few general methods of prevention are given in Table 2.1.

Disease— causing Microorganisms in Animals

Several microorganisms not only cause diseases in humans and plants, but also



Robert Köch (1876) discovered the bacterium (*Bacillus anthracis*) which causes anthrax disease.

in other animals. For example, anthrax is a dangerous human and cattle disease caused by a bacterium. Foot and mouth disease of cattle is caused by a virus.

Disease— causing Microorganisms in Plants

Several microorganisms cause diseases in plants like wheat, rice, potato, sugarcane, orange, apple and others. The diseases reduce the yield of crops. See Table 2.2 for some such plant diseases. They can be controlled by the

Table 2.2: Some Common Plant Diseases caused by Microorganism

Plant Diseases	Micro-organism	Mode of Transmission	Figures
Citrus	Bacteria	Air	

