5. Food Safety

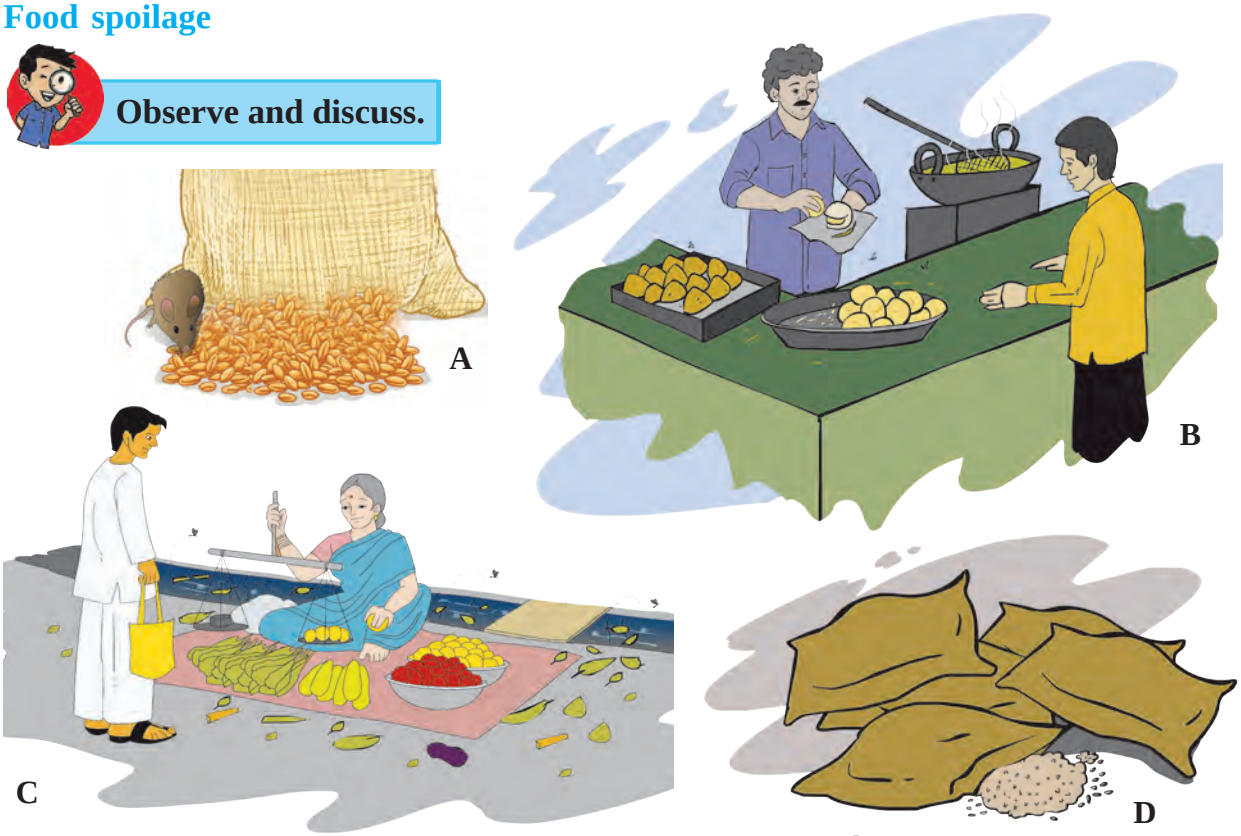
Let's recall. Complete the following chart with the correct information.

Sr. No.	Food / Source	Nutrients obtained	Function in body
1.	Jowar, wheat, millet (bajra), rice		
2.	Beans and pulses		
3.	Oil, ghee, etc.		
4.	Fruits and vegetables		

All constituents of food-carbohydrates, fats, proteins, vitamins, minerals, fibre and water are necessary for the proper growth of the body. We get these nutrients from food materials like wheat, jowar, pulses, rice, vegetables, fruits, etc. However, what will happen if these food materials are infested by insects or spoiled in any way?

Food spoilage

Observe and discuss.



5.1 Events in our surroundings

Factors responsible for food spoilage

Sometimes, fruits or their skins turn black. Some foodstuffs give out a foul or bad odour. Such foodstuffs are not suitable for us to eat. Sometimes, naturally available food materials are spoiled by wrong handling as when they are over-cooked, or improperly stored, say in a damp place. In such cases, the quality of the food materials deteriorates. They may also be spoiled during transportation. Can you give more such examples of food spoilage?

The foodstuffs we consume, whether of animal or plant source, must be of the best quality. Otherwise, we may fall prey to disease or illness. Food is said to be spoiled if there is a change in its colour, odour, texture, quality, taste and there is a loss of its nutrient content.

Observe and discuss.

5.3 Our favourites

On a day out with our friends or family we enjoy mouth-watering dishes like *pani-puri*, *shev-puri*, *pav-bhaji*, *vada-pav*, pizzas, burgers. But, have you ever given a thought to how or where they were made? Were they displayed and served hygienically? What was the source of the water used for preparing them? Discuss all these matters with your science teacher.

Observe.

Which fruits in the picture appear to be good to eat? Why?

5.3 Fruits

Various kinds of changes occur in food materials. For example, fruits turn black or change taste, meat becomes sour or peanuts become rancid. All these changes occur due to factors within the food materials.

Often, food grains, etc. produced in farms are damaged due to various reasons like improper handling, improper storage, improper transportation, etc. Some foodstuffs like meat and milk are either acidic or alkaline. They may get spoiled due to chemical reactions on contact with metals. Sometimes, foodstuffs may be spoiled due to contamination by micro-organisms or insects from the surrounding air, water or soil.

Can you give some other examples of factors that cause spoilage of food?

Food wastage

Can you tell ?

How and where is food wasted?

With the help of science and technology, India has shown great progress in the production of various foodstuffs like cereals, fruits, vegetables, fish as well as milk and milk-products. Even so, many people in our country and all over the world face the problem of hunger. Many do not get even one meal a day. Hence, it is our duty to prevent wastage of food wherever it takes place.

Quantitative wastage of food : Wrong methods of farming like hand sowing of seeds, inadequate threshing, improper storage and wrong methods of distribution are some reasons for quantitative wastage of food. Besides, much food is wasted as a result of the custom of offering and serving too much food to guests at traditional feasts or banquets. Had it not been wasted, all this food could have met the need of many others.

Qualitative wastage of food : Using wrong methods of protecting food, excessive use of food preservatives, over-cooking, washing the vegetables after cutting them, mis-handling of fruits like grapes and mangoes, mis-calculation of the time required to transport food from producers to consumers, are some of the causes of qualitative wastage of food.

What can you do to prevent food wastage and spoilage?

1. Serve yourself only as much as you can eat.
2. Avoid over-cooking food.
3. Avoid throwing away left-over food. Re-use it in a proper way.
4. Buy only as much grain, vegetables, fruits, milk, etc. as you need. Avoid the temptation to make excessive purchases.
5. Store grains and other perishable foodstuffs like vegetables, fruits, milk, etc. using proper methods.
6. Check the expiry date of bottled, canned, packed food and use within that time.
7. Eat all the food that you have served yourself.

Observe and discuss.

What can we do to avoid use of rice grains as '*akshata*' and to prevent wastage of food during wedding feasts?

16th OCTOBER
WORLD FOOD DAY
To work towards food security and avoid food wastage.

Food storage and preservation

We have learnt about various methods of safe storage of food like freezing, drying, boiling, air-tight packing, etc. These different methods prevent the growth of micro-organisms in food and thereby save the food from spoiling.

Food protection and food preservation

Food protection : Prevention of food spoilage by microbial growth and infestation by pests is called food protection.

Food preservation : Use of various preservatives to prevent, for a long period of time, food spoilage due to internal factors is called food preservation.

National Institutions

Food and Drug Administration

This is a government organization that controls production and distribution of food and drugs by their standardization. Food Safety and Standardization Authority of India (FSSAI) has been established as per the Food Safety and Standardization Act-2006.

Web addresses : www.fssai.gov.in
www.fda.maharashtra.gov.in

Methods of Food Protection

Freezing

Biological and chemical reactions in food materials are slowed down at low temperature. As a result, food remains in good condition for a longer duration. That is why, refrigerators are used in the kitchen.

Smoking

Food is preserved with the help of smoke. Aluminium phosphide is used in this method.

Use of insecticides

Melathion is sprayed on the gunny bags containing foodgrains.

Irradiation

In this method, food is exposed to ionizing radiations such as high energy electrons emitted by accelerators, X-rays, gamma-rays emitted by radioactive isotopes, etc. This process destroys the microbes, insects, etc. Shelf-life of fruits increases due to increase in ripening period. The shelf-life of potatoes and onions increases due to slowed-down sprouting.

Use of insert gas

Nitrogen gas is filled in air-tight packets of potato wafers and other food products thus preventing the growth of fungus and insects in them.

Use of preservatives

Natural preservatives

Some naturally available materials like salt, sugar, oil are used as preservatives in pickles, jams, *murabba*, *petha*, etc.

Chemical preservatives

Acetic acid (vinegar), citric acid, sodium benzoate and some nitrate and nitrite salts are some examples of chemical preservatives. They are used in sauces, jellies, jams, and in packaged ready-to-cook vegetables and ready-to-eat foods, etc. These preservatives keep the food safe for a very long duration.

Pasteurisation

This method involves heating the milk or other similar foodstuffs up to a certain temperature, e.g., milk at 80° C for 15 minutes and cooling it quickly. This destroys the microbes present in the milk and it keeps for a longer duration.

Do you know?

In Maharashtra, irradiation plants have been installed at Lasalgaon for onions and potatoes and at Navi Mumbai for spices and condiments.

Great Scientists

The microbiologist, Louis Pasteur developed the technique of preserving the quality of food by raising its temperature to prevent microbial growth in the food.

Let's recall. What is meant by adulteration of food?

Complete the following table.

Sr. No.	Foodstuff	Adulterant
1.	Milk	----------
2.	Red chilly powder	----------
3.	----------	Seeds of papaya
4.	Ice cream	

The health of all people, young and old, poor or rich, is endangered by food adulteration. Different types of adulterants affect our health in different ways. Some adulterants cause abdominal discomfort or poisoning, while some may affect the functioning of some organs if consumed over a long period of time, or even cause cancer.

Food is adulterated in this way too!

1. Removal of some important components of food; e.g., removal of fat content of milk, essence of cloves, cardamoms, etc.
2. Mixing of a low quality inedible or cheaper material or a harmful colour with food.
3. Mixing of some harmful materials like small stones, fine sand, iron filings, urea, dung of horse, sawdust, etc.

Think a little!

Each one of us should think about what we eat every day and about the nutritive value and quality of the food we eat.

How will you find out if food has been adulterated?

Food material	Adulterant	Test	Conclusion
Milk	Water	Put a drop of milk on a glass slide and slightly incline it to spread the drop.	If the spread-mark of milk does not appear milky white, water must have been added to it.
Red chilly powder	Brick dust	Take a spoonful of chilly powder in a beaker, add water up to half of the beaker, stir it and leave it undisturbed for a few minutes.	If a red layer is seen settled at the bottom of the beaker, it must have been adulterated with brick dust.
Turmeric powder	Metanyl yellow	Take a pinch of turmeric powder in a test tube, add a small quantity of water to it, shake the mixture and add a few drops of conc. HCl.	The mixture becomes red on addition of conc. HCl and the red colour does not disappear if metanyl yellow is present.
Rava	Fine iron filings	Pass a magnet through the *rava*.	Iron filings adhere to the magnet.

My friend, the internet!

Watch the video-clips about food adulteration on www.youtube.com and make an identification kit for detecting food adulteration.

Books, my friends!

Collect books which give more information about food adulteration. Read and try to identify food adulteration.

Do you know?

In 1954, Parliament passed the Prevention of Food Adulteration Act. It has been amended from time to time and the amendment of 1976, provides for 'life imprisonment' for the person involved in adulterating food with a harmful substance. There are clear directions that food should be properly stored, packing material should not endanger the food or medicines and there should clear and legible information on it about the manufacturing date, expiry date, and instructions for storage.

Always remember –

1. Some chemicals are injected into fruits to make them more attractive and tasty.
2. Milk vendors add urea to the milk so that it appears to have higher fat content.
3. Shopkeepers change the 'Expiry date' of the food packets and air tight containers to avoid a financial loss.
4. Calcium carbide and some other chemicals are used to make fruits look more attractive, e.g., bright yellow bananas.
5. Frequently, harmful chemicals like carbonated soda, phosphoric acid, etc. are mixed with cold drinks.

1. Complete the following statements by using the correct option from those given below.

(Irradiation, dehydration, pasteurization, natural, chemical)

(a) Drying the food grains from farms under the hot sun is called ..... .

(b) Materials like milk are instantly cooled after heating up to a certain high temperature. This method of food preservation is called ..... .

(c) Salt is a ..... type of food preservative.

(d) Vinegar is a ..... type of food preservative.

2. Answer the following questions in your own words.

(a) How is milk pasteurized?

(b) Why should we not consume adulterated food materials?

(c) What precautions do your parents take to keep foodstuffs safe?

(d) How does food spoilage occur? Which are the various factors spoiling the food?

(e) Which methods of food preservation would you use?

3. What shall we do?

(a) There are vendors selling uncovered sweetmeats in open places in the market.

(b) A '*pani-puriwalla*' is serving the *pani puri* with dirty hands.

(c) We have purchased a large quantity of fruits and vegetables.

(d) We need to protect foodstuffs from pests like rats, cockroaches, wall--lizards, etc.

4. Find the odd-man-out.

(a) salt, vinegar, citric acid, sodium benzoate

(b) *lakhi* dal, brick dust, metanyl yellow, turmeric powder

(c) banana, apple, guava, almond

(d) storing, freezing, settling, drying

5. Complete the chart below.

S.No.	Foodstuff	Adulterant
1.	-----	Metanyl yellow
2.	Black pepper	-----
3.	-----	Iron filings
4.	Honey	-----

6. Explain why this happens and suggest possible remedies.

(a) Qualitative wastage of food.

(b) The cooked rice is underdone.

(c) The wheat that was bought is a bit moist.

(d) The taste of yoghurt is too sour/slightly bitter.

(e) Cut fruits have turned black.

7. Give reasons.

1. Food remains safe at 5° Celsius.
2. Nowadays, food is served buffet style during large gatherings.

Project :

1. Go to your kitchen and take notes about the food safety measures and the food wastage you see there.
2. In a science exhibition demonstrate the various methods of detecting food adulteration.

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