



FOREVER FOOD



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Have you ever wondered why there is such a wide variety of different storage options to preserve food? This diversity has been developed over time as a result of the study of food processing and preservation – part of food science. This study allows us to understand the different reactions which occur in food, such as the transformation of milk into cheese, or the fermentation of grapes to obtain wine and much more.

One of the branches of food science is called preservation. It determines the food items which need to be refrigerated (milk), frozen (cooked food) or left at room temperature (some fruits). It also helps to distinguish perishable food items with a longer shelf life from others that quickly spoil. It allows us to determine the best way to maintain the quality of food (flavour, colour, nutrients, consistency, and texture), extend its lifespan delay ageing and prevent the growth of microorganisms.

THINK:

What are some
ways in which food
can be preserved?
Can you find some
examples in your
refrigerator?



Let's take a look at some methods of preservation!

Drying

This method has been used to preserve food even before the era of refrigerators. It relies on the principle of reducing the quantity of water to prevent the growth of micro-organisms present in most types of meat and fruit. Drying is also used to preserve cereal grains, herbs and spices. Drying can be done by salt-curing the food, or by drying them in the sun and then sealing them in airtight containers to preserve their freshness.



Pasteurisation

Pasteurisation is the technique of heating food for a predetermined amount of time at a predetermined temperature, to reduce the quantity of micro-organisms which cause spoilage. This is commonly used for preserving milk, which is heated to 72°C for 15 seconds, or to 138°C for 2 seconds. The latter is the



most commonly used pasteurization method, called Ultra High Temperature (UHT), which may extend the lifespan of milk from a mere day to weeks.

Sugar-curing

This method is mainly used to preserve fruits, either in the form of syrup, as found in canned fruits, or in their crystallized form where the preserved food is sugar (producing jam) and then store in dry conditions.



The containers of jam are boiled to kill any remaining micro-organisms. Anti-bacterial agents can be added to jams to further prolong their lifespan. Once opened however, they are at risk of spoilage.

Freezing

Freezing at a temperature of -18°C is another frequently used technique, in grocery stores and in the home, for preserving a wide range of food. Freezing can extend the lifespan of food products from several weeks to several months, even up to a year. Most micro-



organisms cannot withstand such low temperatures, and the ageing process of food slows down tremendously.

Pickling

Pickling is used to preserve vegetables and fruits, which is first cooked or boiled in an anti-microbial liquid such as brine, vinegar or oil. The vegetable or fruit is then bottled in a liquid that is either naturally acidic or has acidic ingredients added to it, as this helps prevent the growth of micro-organisms.



In many countries, cold stores stock long-term storage of food stocks in case of national emergency. The cold storage device that is used most frequently in our daily lives is the refrigerator, which has a similar preservation method as the freezer, but stores food at around 4°C.

Activity: Jamming time!

CAUTION:

Adult supervision is required as boiling is involved.

What you'll need:

- 1 About 370g of strawberries
- 2 300g of white sugar
- 3 1 lemon
- 4 Orange squeezer
- 5 Saucepan
- 6 Stove
- 7 Spoon
- 8 Bowl
- 9 Clean jar / container
- 10 Blender (if available)

Steps:

- 1 Wash the strawberries and remove the sepals (leaf-like structures attached to the strawberry).
Cut the strawberries and use the back of a spoon to mash them in a bowl, until there are no big chunks remaining. If you have a blender, use it to blend the strawberries to speed things up (get an adult to help you)!
- 2 Pour all the mashed strawberries into a saucepan and add the juice of one lemon to it (remember to remove the seeds of the lemon). Add in the sugar and mix well.
- 3 Place the saucepan on the stove at low heat. Stir continuously to melt the sugar.
Increase the heat, stirring constantly until the mixture becomes thick. Be sure not to have the heat on too high, to prevent the bottom of your mixture from burning. After about 10 minutes, check for gelling*.
- 4 Let the jam cool down and transfer into a clean jar/container. Store this in the refrigerator. You can keep this for up to a month!

***To test for gelling**

- 1 Place a spoon in the freezer.
Put a bit of jam on the cold spoon, and place the spoon back in the freezer for 1 minute.
- 2 After 1 minute, try to draw a line through the jam on the spoon. If the jam stays separated, it is ready!



THINK:
Which method(s) of preservation are used in making jam?