4 Science in Everyday Life

Learning Objectives

G50NL

After completing this lesson, students will be able to

- know about Scientists from Tamil Nadu.
- understand the reason for the blue appearance of the sky.
- differentiate reversible and irreversible processes in daily life.
- get awareness about waste materials generated in home and school environment.

Introduction

Science has helped us to find solution to many of our problems. It has shaped our daily life also. The world we are living in is not the same as before. It is changing everyday, infact every hour. We see lot of changes around us. Some of them are reversible and some of them are irreversible. Irreveresible changes like burning of wastes pollute our home and school environment. We need to know about waste management and proper disposable of wastes. Let us study about them in this lesson.

I. Scientists from Tamil Nadu

Tamil Nadu has a long history of science since ancient times. Scientific concepts can be seen in ancient Tamil literatures. Tamil Nadu has produced many scientists who have contributed to the world of science. The following table gives the names of some of the scientsts from Tamil Nadu and their contributions.

Name of the Scientists	Department	Contribution
Dr. M.S. Swaminathan	Genetics	Green Revolution
Srinivasa Ramanujam	Mathematics	Composite Numbers
Venkataraman Radhakrishnan	Biology	Structure of Ribosome
Dr. A.P.J. Abdul Kalam	Aeronautical Engineering	Missile development
Sir. C.V. Raman	Physics	Scattering of light

1 Sir. C.V. Raman (1888-1970)

Chandrasekhara Venkata Raman was born at Trichirapalli, Tamil Nadu on 7th November, 1888. In 1904, he completed his Bachelor of Arts (B.A) degree at Presidency College, Chennai. He stood first and won gold medal in Physics. In 1907, he got his Master of Science (M.Sc) degree from University of Madras.

Sir.C.V. Raman won the Nobel Prize in Physics in the year 1930 for his work in scattering of light. In 1954, he was awarded the Bharat Ratna.

Blue appearance of Sky

One day in the summer of 1921, Sir.C.V. Raman was on the deck of a ship sailing in the mediterranean sea. He was observing the blue colour of the sky and started reasoning it. He concluded that sunlight is scattered by the gases and particles present in the air. The white light we see is composed of different colours such as violet, indigo, blue, green, yellow, orange and red (VIBGYOR). Among these colours, blue is scattered more. Because of this reason, sky appears blue most of the time. During sunrise and sunset, rays have to travel long distance. As they travel, all other colours except red are scattered. So, sky appears red at sunrise and sunset.

Do you know?

National Science Day is celebrated on 28th of February in order to commemorate the invention of the Raman Effect by Sir. Chandrasekhara Venkata Raman on the same day in the year 1928.

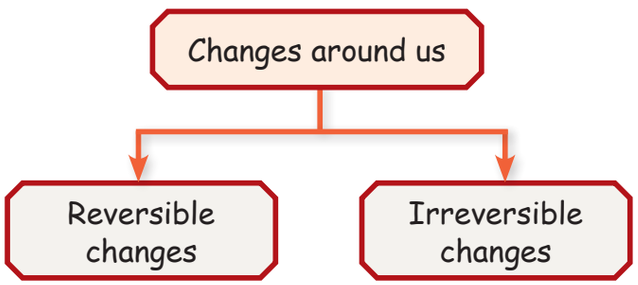
2 Dr. A.P.J. Abdul Kalam (1931-2015)

Avul Pakir Jainulabdeen Abdul Kalam was an Aeronautical Scientist. He was born on 15th October 1931 in Rameshwaram, Tamil Nadu. He got his Bachelor of Science (B.Sc) degree from St.Joseph's College, Trichirappalli in 1954. In 1960, he got his degree in Aeronautical Engineering from Madras Institute of Technology.

He was involved in India's missile development programme and thus came to be known as Missile Man of India. He also served as the President of India (2002-2007) and widely referred to as the People's President. He was awarded Padma Bhusan in 1981, Padma Vibhusan in 1990 and Bharat Ratna in 1997. He has written many books like Wings of Fire, India 2020 and Ignited minds.

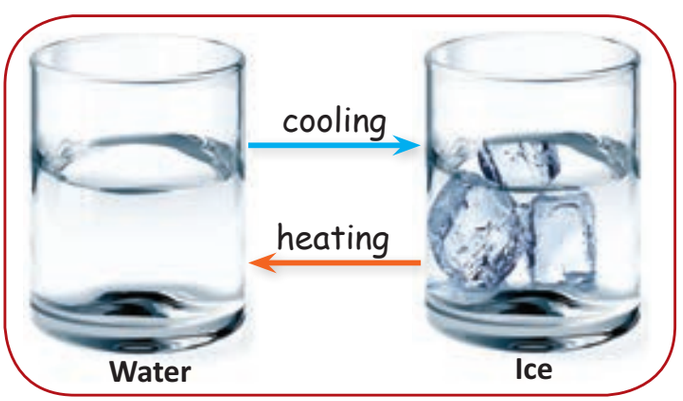
II. Changes Around Us

Change is the transition of a substance from one form to another. We see many changes around us. We see changes like day and night, summer and winter and so on. We also see changes in objects. Growth of a tree, ripening of fruits, falling of leaves are some of the changes taking place around us. You can observe changes in you also. Your height and weight increase, hair and nail grow and you have grown up as a whole compared to last year. These changes can be classified as reversible and irreversible changes.



1 Reversible Changes

Changes which can be reversed are called reversible changes. If you keep water in the freezer for some time, it is tranformed into ice. If it is taken out, it becomes water again. This is a reversible change.

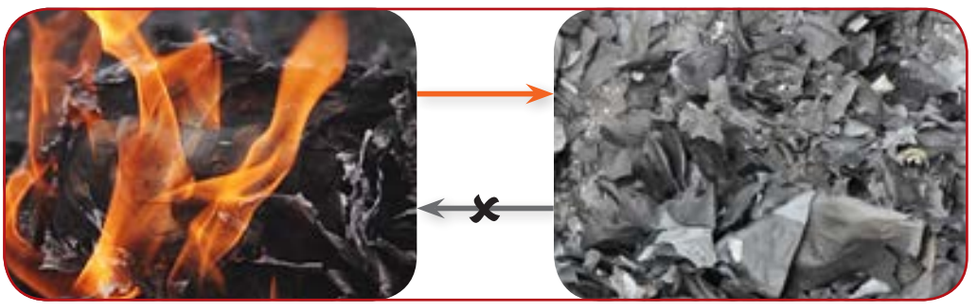


2 Irreversible Changes

Changes which cannot be reversed are called irreversible changes. If you burn a piece of paper it burns and turns into ash. It cannot become paper again. This is an irreversible change.

Do you know?

Irreversible changes are also known as permanent changes. Processes like burning, cooking, rusting of iron cause permanent changes.



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Activity 1

Take an elastic band and stretch it to the maximum. Now release it. What do you observe?

Cut it now into pieces. Can you get the band back again?

Activity 2

Take a balloon and blow air into it. You can see that the shape and size of the balloon is changed. Now let the air escape from the balloon. What do you observe now?

Now blow it to its full size and prick it with the tip of a pin. It is burst. Can you get the balloon back?

From these activities we can observe some differences between reversible and irreversible changes. Difference between reversible and irreversible changes are listed below.

Reversible Change	Irreversible Change
A substance can turn to its original state.	A substance cannot change to its original state.
The chemical properties of the substance do not change.	The chemical properties of the substance will change.
Most of the physical changes are reversible.	All chemical changes are irreversible.

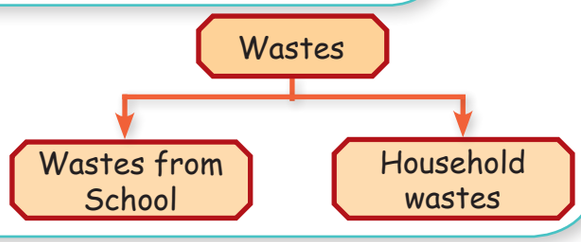
Activity 3

Which of these common changes, you think, can be reversed?

Change	Can it be reversed?
Raw egg to boiled egg	Yes / No
Ice cube to water	Yes / No
Batter to Idly	Yes / No
Milk to Curd	Yes / No
Grain to Flour	Yes / No
Bud to Flower	Yes / No
Cow dung to Biogas	Yes / No

III. Wastes Generated in our Environment

Waste is any substance which is discarded after primary use. It is worthless, defective and of no use. They are unwanted and undesirable materials.



1 Household Wastes

Wastes from home is known as household waste. Solid wastes disposed from home and apartments comprise of garbage and rubbish (bottles, cans, clothings, composts, disposable items, food packings, news papers, magazines and trimmings). We can classify the household wastes as below.

Organic wastes: Kitchen wastes, Vegetables, Flowers, Leaves, Fruits.

Toxic wastes: Old medicines, Paints, Chemicals, Bulbs, Spray cans, Fertilizers, Pesticide containers, Batteries, Shoe polish.

Recyclable wastes: Paper, Glass, Metals, Plastics.

Soiled wastes: Cloths soiled with blood and other body fluids.

e-wastes: Computer parts, Electronic materials, Cell phone parts, CFL bulbs.

Do you know?

- 40 million tons of electronic waste is generated every year worldwide.
- e-waste comprises 70% of our overall toxic waste.
- e-waste contains hundreds of substances, of which many are toxic.

Activity 4

Collect the wastes from your house before it is thrown into dustbin. Separate them into two groups.

Group 1: Garbage from the kitchen like fruit and vegetable peel, egg shells, waste food, tea leaves, news papers, dry leaves and paper bags.

Group 2: Pieces of cloth, polythene bags, broken glass, aluminum wrappers, nails, old shoes and broken toys.

Find out how you can dispose them properly.

2 Wastes from School

Do you know?

Each one in our state capital (Chennai) contributes 700 gram of waste everyday. It is the highest in our country.

You leave many waste materials inside your class rooms and throw away many things in the school campus. If they are not collected and disposed properly, your environment will be polluted. Papers, pen and its parts, blades, chocolate covers and plastic items are found in the school environment. The single most common material generated in schools is food waste. Food is not only wasted but it is also thrown away everywhere, making your surrounding unclean.

In a survey conducted, it is found that food waste accounts for 23.9% of the total wastes generated in the school and recyclable paper like card board, white paper and mixed papers accounted for 23.5% of the total waste. To keep our surrounding clean, we need to have a proper waste disposal system.



3 Need for Proper Disposal of Waste

With so much of wastes lying everywhere, what do you think that we should do? We urgently need a proper waste management system. Waste management is needed for the following reasons.

To control pollution

➔ Various pollutions like water pollution, air pollution and soil pollution can be avoided.

To conserve natural resources

➔ Waste disposal is important for the conservation of our environmental resources like forest, minerals and water.

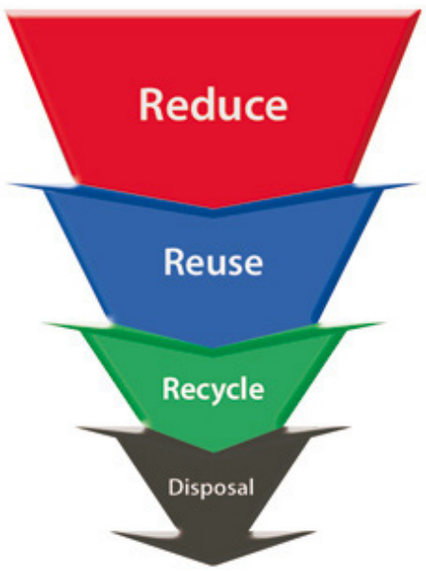
To control spread of diseases

➔ Spread of infectious diseases can be controlled.

Recycle for further use

➔ Wastes can be recycled to get products for further use.

4 Ways to Reduce Waste



The best place to start difference is our home. We need to learn how to reduce, reuse and recycle wastes. The following practices will be helpful to reduce wastes in our home and school environment.

➔ Use reusable and recyclable bags and containers.

➔ Avoid one time use items and use items which can be used permanently.

➔ Segregate wastes into bio-degradable and non-biodegradable items and hand over them to the municipal and corporation people who collect them.

➔ Do not throw away your wastes every where. Put them in dustbins and dispose them properly.

➔ Don't waste food. Waste food in schools can be collected and used to feed cattles.

➔ Organic wastes can be converted into manures.

Evaluation

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I. Choose the correct answer.

1. Blue appearance of the sky is due to_____ of light.
   a. reflection b. refraction c. interference d. scattering
2. Who is known as Missile Man of India?
   a. Sir. C.V.Raman b. Dr. A.P.J. Abdul Kalam
   c. Dr. M.S. Swaminathan d. Ramanujam
3. An example for reversible change is
   a. melting of ice b. burst of balloon
   c. burning paper d. change of milk into curd
4. Chemical reactions are example for
   a. reversible change b. irreversible change
   c. both of them d. none of them
5. Which of the following is not an organic waste?
   a. Flowers b. Vegetables
   c. Fruits d. Battery

II. Fill in the blanks.

1. The book 'Wings of fire' was written by _____
2. A stretched rubber band comes back to normal shape. It is an example for _____
3. Most of the physical changes are _____ changes.
4. News paper is a _____ waste.
5. Wastes from house and apartments are called _____ waste.

III. Match the following.

Bud to flower	-	Dr. A.P.J. Abdul Kalam
Reversible change	-	Recyclable waste
India 2020	-	Organic waste
Paper	-	Melting of ice
Vegetables	-	Irreversible change

IV. Circle the odd one.

1. a) Melting	b) Freezing	c) Boiling	d) Cooking
2. a) Boiling	b) Burning	c) Cooking	d) Rusting of iron
3. a) Vegetables	b) Flowers	c) Fruits	d) Chemicals
4. a) Paper	b) Glass	c) Metals	d) Paints

V. Answer briefly.

1. Sky appears blue in colour. Why?
2. What is reversible change?
3. Differentiate reversible and irreversible changes.
4. What are the different types of wastes?
5 Write a note on e-waste.
6 Name the scientists from Tamil Nadu?

VI. Answer in detail.

1. Write about different household wastes.
2. Explain the need for waste disposal.
3. How can you reduce waste in your school environment?