Azadi Ka Amrit Mahotsav

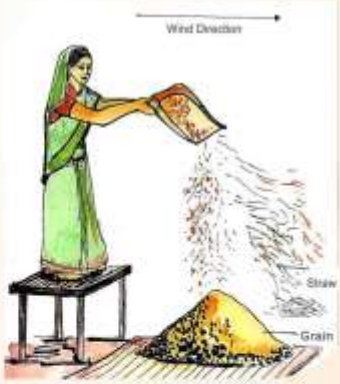
# SCIENCE TEXTBOOK

## Veda Bhushan I Year / Prathama - I Year / Class VI

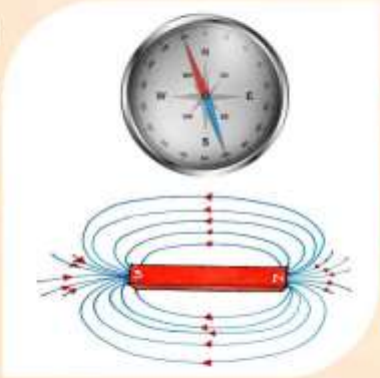
**MAHARSHI SANDIPANI RASHTRIYA VEDA SANSKRIT SHIKSHA BOARD**

(Established and Recognized by the Ministry of Education, Government of India)

पञ्चमहाभूतमयस्तारा-गण-पञ्जरे महीगोलाः।
खेऽयस्कान्तान्तः स्थो रोह इवावस्थितो वृतः॥
वनस्पतिभ्यः मूलेभ्यः शाखाभ्यः पुष्पेभ्यः फलेभ्यः।
अद्भिरन्नादिभिरन्नमत्ति य एवं वेद।
स इत् तन्तुं न वि जानाम्योतुम् ।
अस्थि स्नाव मांसं मज्जानमाभरत्।
घृतं पीत्वा मधु चारु गव्यम्।
वेद नावः समुद्रियः।
यदश्नामि बलं कुर्वे।







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Text book developed by :

Cover and decoration :

Drawing :

Technical Support :

Composed by :

Reviewers :

 ISBN :
Price :

Edition : 1st Edition.

Published Copies :

Paper usage : Printed on 80 GSM paper with RSTB Watermark

Publisher : Maharshi Sandipani Rashtriya Vedavidya Pratishthan (Under the Ministry of Education, Govt. of India) Vedavidya Marg, Chintaman Ganesh, Post Jawasiya, Ujjain (M.P.) 456006
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# PREFACE

## (In the light of NEP 2020)

The Ministry of Education (Department of Higher Education), Government of India established Rashtriya Veda Vidya Pratishthan in Delhi under the Chairmanship of Hon'ble Education Minister ( then Minister of Human Resource Development) under the Societies Registration Act, 1860 (XXI of 1860) on 20th January, 1987. The Government of India notified the resolution in the Gazette of India vide no 6-3/85- SKT-IV dated 30-3-1987 for establishment of the Pratishthan for preservation, conservation, propagation and development of oral tradition of Vedic studies (Veda Samhita, Padapatha to Ghanapatha,Vedanga, Veda Bhashya etc), recitation and intonation of Vedas etc and interpretation of Vedas in scientific lines. In the year 1993 the name of the organization was changed to Maharshi Sandipani Rashtriya Veda Vidya Pratishthan (MSRVVP) and it was shifted to Ujjain, Madhya Pradesh.

The National Education Policy of 1986 and Revised Policy Formulations of 1992 and also Programme of Action (PoA) 1992 have mandated Rashtriya Veda Vidya Pratishthan for promoting Vedic education throughout the country. The importance of India's ancient fund of knowledge, oral tradition and employing traditional Guru's for oral education was also emphasized in the PoA.

In accordance with the aspirations of the nation, national consensus and policy in favour of establishing a Board for Veda and Sanskrit Education at national level, the General Body and the Governing Council of MSRVVP under the Chairmanship of Hon'ble Education Minister, Government of India, have set up "Maharshi Sandipani Rashtriya Veda Sanskrit Shiksha Board" (MSRVSSB) in tune with the mandate of the Pratishthan and its implementation strategies. The Board is necessary for the fulfillment of the objectives of MSRVVP as envisioned in the MoA and Rules. The Board has been approved by the Ministry of Education, Government of India and recognized by the Association of Indian

Universities, New Delhi. The bye-laws of the Board have been vetted by Central Board of Secondary Education and curriculum structure have been concurred by the National Council of Educational Research and Training, New Delhi.

It may also be mentioned here that the committee "Vision and Roadmap for the Development of Sanskrit - Ten year perspective Plan", under the Chairmanship of Shri N. Gopalaswamy, former CEC, constituted by the Ministry of Education Govt. of India in 2015 recommended for establishment of a Board of Examination for standardization, affiliation, examination, recognition, authentication of Veda Sanskrit education up to the secondary school level. The committee was of the opinion that the primary level of Vedic and Sanskrit studies should be inspiring, motivating and joyful. It is also desirable to include subjects of modern education into Vedic and Sanskrit Pathashalas in a balanced manner. The course content of these Pathashalas should be designed to suit to the needs of the contemporary society and also for finding solutions to modern problems by reinventing ancient knowledge.

With regard to Veda Pathashala-s it is felt that they need further standardization of recitation skills along with introduction of graded materials of Sanskrit and modern subjects so that the students can ultimately acquire the capabilities of studying Veda bhashya-s and mainstreaming of students is achieved for their further studies. Due emphasis may also be given for the study of Vikriti Patha of Vedas at an appropriate level. The members of the committee have also expressed their concern that the Vedic recitation studies are not uniformly spread all over India; therefore, due steps may be taken to improve the situation without in anyway interfering with regional variations of recitation styles and teaching method of Vedic recitation.

It was also felt that since Veda and Sanskrit are inseparable and complementary to each other and since the recognition and affiliation problems are same for all the Veda Pathashalas and Sanskrit Pathashalas throughout the country, a Board may be constituted for both together. The committee observed that the examinations conducted by the Board

should have legally valid recognition enjoying parity with modern Board system of education. The committee observed that the Maharshi Sandipani Rashtriya Veda Vidya Pratishthan, Ujjain may be given the status of Board of Examinations with the name "Maharshi Sandipani Rashtriya Veda Sanskrita Vidya Parishat with headquarters in Ujjain which will continue all programs and activities which were being conducted hitherto in addition to being a Board of Examinations.

The promotion of Vedic education is for a comprehensive study of India's glorious knowledge tradition and encompasses multi-layered oral tradition of Vedic Studies (Veda Samhita, Padapatha to Ghanapatha,Vedanga, Veda Bhashy aetc), recitation and intonation, and Sanskrit knowledge system content. In view of the policy of mainstreaming of traditional students and on the basis of national consensus among the policy making bodies focusing on Vedic education, the scheme of study of Veda stretching up to seven years in Pratishthan also entails study of various other modern subjects such as Sanskrit, English, Mathematics, Social Science, Science, Computer Science, Philosophy, Yoga, Vedic Agriculture, etc. as per the syllabus and availability of time. In view of NEP 2020, this scheme of study is with appropriate inputs of Vedic knowledge and drawing the parallels of modern knowledge in curriculum content focusing on Indian Knowledge System.

In Veda Pathashala-s, GSP Units and Gurukula-s of MSRVVP, affiliated to the Board transact the curriculum primarily based on oral tradition of a particular complete Veda Shakha with perfect intonation and memorization, with additional subsidiary modern subjects such as English, Sanskrit, Mathematics, Science, Social Science and SUPW. Gradually, the Veda Pathashala-s will also introduce other skill and vocational subjects as per their resources.

It is a well-known fact that there were 1131 shakha-s or recensions of Vedas; namely 21 in Rigveda, 101in Yajurveda, 1000 in Samaveda and 9 in Atharva Veda. In course of time, a large number of these shakhas became extinct and presently only 10 Shakhas, namely, one in Rigveda, 4

in Yajurveda, 3 in Samaveda and 2 in Atharvaveda are existing in recitation form on which Indian Knowledge System is founded now. Even in regard to these 10 Shakhas, there are very few representative Vedapathis who are continuing the oral Vedic tradition/ Veda recitation/Veda knowledge tradition in its pristine and complete form. Unless there is a full focus for Vedic learning as per oral tradition, the system will vanish in near future. These aspects of Oral Vedic studies are neither taught nor included in the syllabus of any modern system of school education, nor do the schools/Boards have the systemic expertise to incorporate and conduct them in the conventional modern schools.

The Vedic students who learn oral tradition/ recitation of Veda are there in their homes in remote villages, in serene and idyllic locations, in Veda Gurukulas, (GSP Units), in Veda Pathashala-s, in Vedic Ashrams etc. and their effort for Veda study stretches to around 1900 – 2100 hours per year; which is double the time of other conventional school Board's learning system. Vedic students have to have complete Veda by-heart and recite verbatim with intonation *(udatta, anudatta, swaritaetc),*on the strength of memory and guru parampara, without looking at any book/pothi. Because of unique ways of chanting the Veda mantras, unbroken oral transmission of Vedas and its practices, this has received the recognition in the UNESCO-World Oral Heritage in the list of Intangible Cultural Heritage of Humanity. Therefore, due emphasis is required to be given to maintain the pristine and complete integrity of the centuries old Vedic Education (oral tradition/ recitation/ Veda knowledge Tradition). Keeping this aspect in view the MSRVVP and the Board have adopted unique type of Veda curriculum with modern subjects like Sanskrit, English, Vernacular language, Mathematics, Social Science, Science, Computer Science, Philosophy, Yoga, Vedic Agriculture etc. as well as skill and vocational subjects as prescribed by NEP 2020.

As per Vedic philosophy, any person can become happy if he or she learns both *Para-Vidya and Apara-Vidya.* The materialistic knowledge from the Vedas, their auxiliary branches and subjects of material interest were called *Apara-Vidya*. The knowledge of supreme reality, the ultimate quest from Vedas, Upanishads is called *Para-Vidya.* In all the total

number of subjects to be studied as part of Veda and its auxiliaries are fourteen. There are fourteen branches of learning or *Vidyas* - four Vedas, Six Vedangas, Mimamsa (Purva Mimamsa and Uttara Mimamsa), Nyaya, Puranas and Dharma shastra. These fourteen along with Ayurveda, Dhanurveda, Gandharvaveda and Arthashastra become eighteen subjects for learning. All curriculum transaction was in Sanskrit language, as Sanskrit was the spoken language for a long time in this sub-continent.

Eighteen Shilpa-s or industrial and technical arts and crafts were mentioned with regard to the Shala at Takshashila. The following 18 skills/Vocational subjects are reported to be subjects of the study– (1) Vocal music (2) Instrumental music (3) Dancing (4) Painting (5) Mathematics (6) Accountancy (7) Engineering (8) Sculpture (9) Cattle breeding (10) Commerce (11) Medicine (12) Agriculture (13) Conveyancing and law (14) Administrative training (15) Archery and Military art (16) Magic (17) Snake charming (18) Art of finding hidden treasures.

For technical education in the above mentioned arts and crafts an apprenticeship system was developed in ancient India. As per the Upanishadic vision, the vidya and avidya make a person perfect to lead contented life here and liberation here-after.

Indian civilization has a strong tradition of learning of shastra-s, science and technology. Ancient India was a land of sages and seers as well as of scholars and scientists. Research has shown that India had been a Vishwa Guru, contributing to the field of learning (vidya-spiritual knowledge and avidya- materialistic knowledge) and learning centers like modern universities were set up. Many science and technology based advancements of that time, learning methodologies, theories and techniques discovered by the ancient sages have created and strengthened the fundamentals of our knowledge on many aspects, may it be on astronomy, physics, chemistry, mathematics, medicine, technology, phonetics, grammar etc. This needs to be essentially understood by every Indian to be proud citizen of this great country!

The idea of India like “Vasudhaiva Kutumbakam” quoted at the

entrance of the Parliament of India and many Veda Mantra-s quoted by constitutional authorities on various occasions are understood only on study of the Vedas and true inspiration can be drawn only by pondering over them. The inherent equality of all beings as embodiment of "sat, chit, ananda" has been emphasized in the Vedas and throughout the Vedic literature.

Many scholars have emphasized that Veda-s are also a source of scientific knowledge and we have to look into Vedas and other scriptural sources of India for the solution of modern problems, which the whole world is facing now. Unless students are taught the recitation of Vedas, knowledge content of Vedas and Vedic philosophy as an embodiment of spiritual and scientific knowledge, it is not possible to spread the message of Vedas to fulfill the aspiration of modern India.

The teaching of Veda (Vedic oral tradition/ Veda recitation/ Veda knowledge Tradition) is neither only religious education nor only religious instruction. It will be unreasonable to say that Vedic study is only a religious instruction. Veda-s are not religious texts only and they do not contain only religious tenets; they are the corpus of pure knowledge which are most useful to humanity as whole. Hence, instruction or education in Veda-s cannot be construed as only "religious education/religious instruction."

Terming "teaching of Veda as a religious education" is not in consonance with the judgment of the Hon'ble Supreme Court (AIR 2013: 15 SCC 677), in Civil Appeal no. 6736 of 2004 (Date of judgment-3rd July 2013). The Vedas are not only religious texts, but they also contain the knowledge in the disciplines of mathematics, astronomy, meteorology, chemistry, hydraulics, physics, science and technology, agriculture, philosophy, yoga, education, poetics, grammar, linguistics etc. which has been brought out in the judgment by the Hon'ble Supreme Court of India.

## Vedic education through establishment of Board in compliance with NEP-2020

The National Education Policy-2020 firmly recognizes the Indian Knowledge Systems (also known as 'Sanskrit Knowledge Systems'), their

importance and their inclusion in the curriculum, and the flexible approach in combining various subjects. Arts' and Humanities' students will also learn science; try to acquire vocational subjects and soft skills. India's special heritage in the arts, sciences and other fields will be helpful in moving towards multi-disciplinary education. The policy has been formulated to combine and draw inspiration from India's rich, ancient and modern culture and knowledge systems and traditions. The importance, relevance and beauty of India's classical languages and literature is also very important for a meaningful understanding the national aspiration. Sanskrit, being an important modern language mentioned in the Eighth Schedule of Indian Constitution, its classical literature that is greater in volume than that of Latin and Greek put together, contains vast treasures of mathematics, philosophy, grammar, music, politics, medicine, architecture, metallurgy, drama, poetry, storytelling, and more (known as 'Sanskrit Knowledge Systems').These rich Sanskrit Knowledge System legacies for world heritage should not only be nurtured and preserved for posterity but also enhanced through research and put in to use in our education system, curriculum and put to new uses. All of these literatures have been composed over thousands of years by people from all walks of life, with a wide range of socio-economic background and vibrant philosophy. Sanskrit will be taught in engaging and experiential as well as contemporary relevant methods. The use of Sanskrit knowledge system is exclusively through listening to sound and pronunciation. Sanskrit textbooks at the Foundation and Middle School level will be available in Simple Standard Sanskrit (SSS) to teach Sanskrit through Sanskrit (STS) and make its study enjoyable. Phonetics and pronunciation prescriptions in NEP 2020 apply to the Vedas, the oral tradition of the Vedas and Vedic education, as they are founded upon phonetics and pronunciation.

There is no clear distinction made between arts and science, between curricular and extra-curricular activities, between vocational and academic streams, etc. The emphasis in NEP 2020 is on the development of a multi-disciplinary and holistic education among the sciences, social sciences, arts, humanities and sports for a multi-disciplinary world to

ensure the unity and integrity of all knowledge. Moral, human and constitutional values like empathy, respect for others, cleanliness, courtesy, democratic spirit, spirit of service, respect for public property, scientific temper, freedom, responsibility, pluralism, equality and justice are emphasized.

The NEP-2020 at point no. 4.23 contains instructions on the pedagogic integration of essential subjects, skills and abilities. Students will be given a large amount of flexible options in choosing their individual curriculum; but in today's fast-changing world, all students must learn certain fundamental core subjects, skills and abilities to be a well-grounded, successful, innovative, adaptable and productive individual in modern society. Students must develop scientific temper and evidence based thinking, creativity and innovation, aesthetics and sense of art, oral and written expression and communication, health and nutrition, physical education, fitness, health and sport, collaboration and teamwork, problem solving and logical thinking, vocational exposure and skills, digital literacy, coding and computational thinking, ethics and moral reasoning, knowledge and practice of human and constitutional values, gender sensitivity, fundamental duties, citizenship skills and values, knowledge of India, environmental awareness etc. Knowledge of these skills include conservation, sanitation and hygiene, current affairs and important issues facing local communities, the states, the country and the world, as well as proficiency in multiple languages. In order to enhance the linguistic skills of children and to preserve these rich languages and their artistic treasures, all students in all schools, public or private, shall have the option of learning at least two years in one classical language of India and its related literature.

The NEP-2020 at point no. 4.27 states that -"Knowledge of India" includes knowledge from ancient India and its contributions to modern India and its successes and challenges, and a clear sense of India's future aspirations with regard to education, health, environment, etc. These elements will be incorporated in an accurate and scientific manner throughout the school curriculum wherever relevant; in particular, Indian Knowledge Systems, including tribal knowledge and indigenous and

traditional ways of learning, will be covered and included in mathematics, astronomy, philosophy, yoga, architecture, medicine, agriculture, engineering, linguistics, literature, sports, games, as well as in governance, polity, conservation. It will have informative topics on inspirational personalities of ancient and modern India in the fields of medicinal practices, forest management, traditional (organic) crop cultivation, natural farming, indigenous sports, science and other fields.

The NEP-2020 at point no. 11.1 gives directions to move towards holistic and multidisciplinary education. India emphasizes an ancient tradition of learning in a holistic and multidisciplinary manner, including the knowledge of 64 arts such as singing and painting, scientific fields such as chemistry and mathematics, vocational fields such as carpentry, tailoring; professional work such as medicine and engineering, as well as the soft skills of communication, discussion and negotiation etc. which were also taught at ancient universities such as Takshashila and Nalanda. The idea that all branches of creative human endeavour, including mathematics, science, vocational subjects and soft skills, should be considered 'arts', has a predominantly Indian origin. This concept of 'knowledge of the many arts' or what is often called 'liberal arts' in modern times (i.e., a liberal conception of the arts) will be our part of education system.

At point No. 11.3 the NEP-2020 further reiterates that such an education system "would aim to develop all capacities of human beings - intellectual, aesthetic, social, physical, emotional, and moral in an integrated manner. Such an education will help develop well-rounded individuals that possess critical 21st century capacities in fields across the arts, humanities, languages, sciences, social sciences, and professional, technical, and vocational fields; an ethic of social engagement; soft skills, such as communication, discussion and debate; and rigorous specialization in a chosen field or fields. Such a holistic education shall be, in the long term, the approach of all undergraduate programmes, including those in professional, technical, and vocational disciplines."

The NEP-2020 at point no. 22.1 contains instructions for the promotion of Indian languages, art and culture. India is a rich storehouse of culture – which has evolved over thousands of years, and is reflected in its art, literary works, customs, traditions, linguistic expressions, artifacts, historical and cultural heritage sites, etc. Traveling in India, experiencing Indian hospitality, buying beautiful handicrafts and handmade clothes of India, reading ancient literature of India, practicing yoga and meditation, getting inspired by Indian philosophy, participating in festivals, appreciating India's diverse music and art and watching Indian films are some of the ways through which millions of people around the world participate in, enjoy and benefit from this cultural heritage of India every day.

In NEP-2020 at point no. 22.2 there are instructions about Indian arts. Promotion of Indian art and culture is important for India and to all of us. To inculcate in children a sense of our own identity, belonging and an appreciation of other culture and identity, it is necessary to develop in children key abilities such as cultural awareness and expression. unity, positive cultural identity and self-esteem can be built in children only by developing a sense and knowledge of their cultural history, art, language and tradition. Therefore, the contribution of cultural awareness and expression is important for personal and social well-being.

The core Vedic Education (Vedic Oral Tradition / Veda Path / Veda Knowledge Tradition) of Pratishthan along with other essential modern subjects- Sanskrit, English, Mother tongue, Mathematics, Social Science, Science, Computer Science, Philosophy, Yoga, Vedic Agriculture, Indian Art, Socially useful productive work etc., based on the IKS inputs are the foundations/sources of texts books of Pratishthan and Maharshi Sandipani Rashtriya Veda Sanskrit Shiksha Board. These inputs are in tune with the NEP 2020. The draft books are made available in pdf form keeping in view the NEP 2020 stipulations, requirements of MSRVVP students and the advice of educational thinkers, authorities and policy of Maharshi Sandipani Rashtriya Veda Vidya Pratishthan, Ujjain. These books will be updated in line with NCFSE in future and finally will be made available in print form.

The Teachers of Veda, Sanskrit and Modern subjects in Rashtriya Adarsh Veda Vidyalaya, Ujjain and many teachers of Sanskrit and modern subjects in aided Veda Pathshalas of Pratishthan have worked for last two years tirelessly to prepare and present Sanskrit and modern subject text books in this form. I thank all of them from the bottom of my heart. Many eminent experts of the national level Institutes have helped in bringing quality in the textbooks by going through the texts from time to time. I thank all those experts and teachers of the schools. I extend my heartfelt gratitude to all my co-workers who have worked for DTP, drawing the sketches, art work and page setting.

All suggestions including constructive criticism are welcome for the improvement of the quality of the text books.

**आपरितोषाद् विदुषां न साधु मन्ये प्रयोगविज्ञानम्।**
**बलवदपि शिक्षितानाम् आत्मन्यप्रत्ययं चेतः॥**

(Abhijnanashakuntalam 1.02)

*Until the scholars are fully satisfied about the content, presentation, attainment of objective, I do not consider this effort to be successful, because even the scholars are not fully confident in the presentation without feedback from the stakeholders.*

**Prof. ViroopakshaV Jaddipal**
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Maharshi Sandipani Rashtriya Veda Sanskrit Shiksha Board, Ujjain

# FOREWORD

The presented textbook of Science for Class 6th in Class Vedbhushan I/Prathama-I/School Education has been published in compliance with the guidelines of the National Education Policy 2020. This course includes knowledge of Vedic Vangmay and ancient India and its contribution towards modern India and its successes and challenges and a clear sense of India's future aspirations in relation to education, health, environment etc. In particular, indigenous methods of learning based on Indian knowledge system and specific curriculum on forest management, traditional (organic) crop cultivation, natural farming etc. have been included. While developing the curriculum, care has been taken to ensure that various points and subjects can be easily understood through games. Video documentaries on inspirational personalities of ancient and modern India in science and other fields will be shown throughout the school curriculum. Students will be encouraged to visit different states as participants in cultural exchange programs.

To check the students' understanding of the subject, practice questions have been included at the end of each lesson, which include multiple choice questions and descriptive questions. Model question papers have been included at the end of the book so that students can self-evaluate themselves.

# CONTENTS

# Chapter - 1

# Food and Components of Food

1.1 What do the different nutrients do for our body?

1.2 Balanced Diet

1.3 Classification of animals on the basis of food intake

Our body needs energy for doing a work, we get this energy from food. We know that every dish is made of one or more types of raw materials, which we get from plants or animals. What are the constituents of this raw material? This raw material contains some essential components which are useful for our body. These components which are useful are called nutrients. The major nutrients in our food are named carbohydrates, proteins, fats, vitamins and minerals. Apart from this, our food also contains dietary fibers and water which are needed by our body. The dietary fibers in our diet is mainly supplied by the products which are obtained from plants. The major sources of dietary fibers are coarse grains, fruits, vegetables, pulses, potatoes etc.

## 1.1 What do various nutrients do for our body?

### 1. Carbohydrates:-

Carbohydrates provides energy to our body. It forms the exoskeleton of animals. Major sources of carbo-hydrates:- Wheat, rice, maize, millet, potato, sweet potato, turnip, sugarcane etc.


**व्रीहमत्तं यवमत्तमथो माषमथो तिलम्।**

(अथर्ववेद - 6.140.2)

We should take rice, barley, black gram and sesame in food.

**यदश्नामि बलं कुर्व इत्थं वज्रमा ददे ।**

(अथर्ववेद - 6.135.1)

Which food I eat, is powerful. That is, energy is obtained from food.

**अन्नाद्येन यशसा तेजसा ब्राह्मणवर्चसेन ।**

(अथर्ववेद - 13.4(5).49)

We get fame and energy (brightness) from food.

2. **Proteins:-** Proteins are needed for the growth of the body and to stay healthy. Protein-rich food is often called bodybuilding food.

**Major sources of proteins:-** Soybeans, beans, tuar dal, moong, gram, milk, cheese, eggs, meat, fish etc.

Fig 1.1 - Milk | Fig 1.1 – Soybean | Fig 1.1 - Pulses

Figure 1.1 - Major sources of proteins

3. **Vitamins:-** Vitamins protect our body from diseases. Vitamins also help in keeping our eyes, bones, teeth and gums healthy.

Figure 1.2 – Major sources of vitamins

Types of vitamins -

1. **Vitamin A:-** Keeps our skin and eyes healthy.

   **Source:-** Mango, Papaya, Carrot, Green Vegetables

   **Symptoms:-** Blindness, blurred vision

   **Disease:-** Night blindness

2. **Vitamin B1: -** Helps in building of muscles of the body.

   **Sources:-** Wheat, Rice, Liver

   **Symptoms:-** Muscle weakness

   **Disease:-** Beri-Beri

3. **Vitamin C :-** Protects our body from diseases.

   **Sources:-** Amla, Orange, Tomato, Guava, Lemon, Chili, Sour food

   **Symptoms:-** Bad smell from the mouth, Bleeding from the gums

   **Disease:-** Scurvy

4. **Vitamin D:-** Protects our bones and teeth, makes them strong. Also it protects from skin diseases.

   **Sources:-** Milk, sunlight, eggs, fish etc.

   **Symptoms:-** Weakness of bones

   **Disease:-** Rickets

5. **Vitamin E:-** Strengthens Hair.

   **Sources:-** Leafy vegetables, milk, butter, vegetable oil, sprouted wheat

   **Symptoms:-** Weakness of hair

   **Disease:-** Hair loss.

6. **Vitamin K:-** It is helpful in making blood cloting in case of injury.

**Source:-** Tomatoes, green vegetables and also produced automatically in the intestines.

**Disease:-** Non-clotting of blood.

4. **Fat:-** It provides quick energy to the body.

Figure 1.3 Major sources of fat

**Sources:-** Butter, Oil, Ghee (Butter), Groundnut, Sesame, Meat, Fish, Eggs, Milk etc.

**घृतं पीत्वा मधु चारु गव्यं पितेव पुत्रानभि रक्षतादिमम् ।**

(अथर्ववेद - 2.13.1)

Energy is gained by drinking Ghee and Milk.

5. **Minerals:-** It is helpful in digesting food. Helps in passing out of undigested food from the body.

**Sources:-** Whole grains, pulses, potatoes, fresh fruits, leafy vegetables, pure water.

**Diseases:-**

(i) Bones become weak and tooth decay due to lack of calcium.

(ii) Deficiency of iodine causes goiter.

(iii) Iron deficiency causes anemia or weakness in the body.

**अद्भिरन्नादिभिरन्नमत्ति य एवं वेद ।**

(अथर्ववेद - 15.14.6)

I eat food with the water that digests the food. Mineral are helpful in digesting food.

| No. | Name of the student | Food item | Food item |
|---|---|---|---|
| 1 | Diwakar | Moong Dal | Raw pulses, Water, Salt, Oil, Spices |
| 2 | Bhanubhakt | Idli | Rice, Urad dal, Salt, Water |
| 3 | Saket | Maize Bread | Maize flour, Water, Salt, Ghee |
| 4 | Kirti | | |
| 5 | Krashika | | |

## 1.2 Balanced Diet: -

For grow the and maintain of good health, our diet should contain all the nutrients that our body needs in, right quantities. This type of diet is called a balanced diet.

**Table 1.2 -** For boys and girls of 10-18 years for one day balanced diet chart

| S.No. | Food Items | Boys | Girls |
|---|---|---|---|
| 1 | Gram (wheat, rice) | 420 gm | 380 gm |
| 2 | Pulses | 45 gm | 45 gm |
| 3 | Leafy vegetables | 50 gm | 50 gm |
| 4 | Vegetables (other) | 50 gm | 50 gm |
| 5 | Milk | 250 ml | 250 ml |
| 6 | Tuber | 30 gm | 30 gm |
| 7 | Jaggery or Sugar | 45 gm | 45 gm |
| 8 | Fats and oils | 40 ml | 35 ml |

**यदन्नमद्भि बहुधा विरूपं हिरण्यमश्वमुत गामजामविम् ।**

**(अथर्ववेद - 6.71.1)**

I eat different types of food properly that is, I take all the nutrients in proper quantity in the diet.

**वैवस्वते राजनि तज्जुहोम्यथ यज्ञियं मधुमदस्तु नोऽन्नम् ।**

**(अथर्ववेद - 6.116.1)**

The food we eating should be sweet and healthy.

**शिवौ ते स्तां व्रीहियवावबलासावदोमधौ।**

**(अथर्ववेद - 8.2.18)**

There is mention of taking barley and rice as food.

## 1.3 Classification of animals on the basis of food :-

On the basis of taking foods, animals are divided into 3 parts.

1. Herbivores animals: - Such animals which take food items obtained from trees and plants as food are called herbivores animals. For example– cow, sheep, goat, camel, deer etc.

Cow

Sheep

Camel

Fig . 1.4 - Herbivores

2. **Carnivores animals: -** Such animals which take food items obtained from animals like meat, fish, eggs etc. as food. For example – Lion, Cheetah, Wolf, Crocodile, Snake etc.

Lion

Crocodile

Wolf

Figure 1.5 - Carnivores

3. **Omnivorous animals: -** Such animals which take the food materials obtained from both animals and trees and plants in the form of food. For example – crow, dog, cat, man.

Crow

Dog

Cat

Fig . 1.6 - Omnivores

**Activity 2 –** Classify the animals on the basis of the food they eat and the food they eat by writing the names of different animals.

**Table 1.3**

| No. | Name of animal | Food Classification | Based on food |
|---|---|---|---|
| 1. | Cow | Grass | Herbivores |
| 2. | Lion | Meat | Carnivores |
| 3. | Dog | Roti (cereal), Meat | Omnivores |
| 4. | | | |
| 5. | | | |
| 6. | | | |

## Practice Questions -

Q.1. Select the correct option –

1) Which of the following is the major source of protein?

(A) Rice (B) Soybeans

(C) Tomato (D) Wheat

2) Which of the following is a herbivores animal -

(A) Cheetah (B) Deer

(C) Lion (D) Dog

3) The disease caused by deficiency of Vitamin A is –

(A) Non-clotting of blood (B) Rickets

(C) Scurvy (D) Night blindness

Q.2. Fill in the blanks -

1) Deficiency of …… causes a disease called beri-beri.

2) Lack of Vitamin C causes …… disease.

3) Deer is a …… because it eats only grass.

Q.3. Mark True (✓) or False (✗) against the following statements.

1) By eating bread alone, we can meet the nutritional requirements of our body.

2) Carbohydrates help in the growth of the body.

3) Cheetah is a herbivores animal.

Q. 4. Match the correct pair -

| | Column 'A' | Column 'B' |
|---|---|---|
| 1) | Carbohydrates | - Protecting the body from diseases |
| 2) | Protein | - To give instant energy to the body |
| 3) | Vitamins | - Help in digestion of food |

4) Minerals - Providing energy to the body

5) Fat - Helpful in body growth

Q.5 Very short answer type questions –

1) Write the name of the vitamin which provides protection to the bones and teeth of the body.

Q.6 Short Answer Type Questions -

1) Write the names of the major nutrients of our food ?

2) Name two food items in which carbohydrate nutrients are available in abundance.

Q.7 Long Answer Type Questions

1) Explain the classification of animals on the basis of food?

2) How many types of vitamins are there? explain.

3) What is a balanced diet? Make a balanced diet table for boys and girls of 10-18 years.

Functional work

1. Complete the table of midday meal given in the school -

| S.No. | Weak | Meal Served |
|---|---|---|
| 1 | Monday | |
| 2 | Tuesday | |
| 3 | Wednesday | |
| 4 | Thursday | |
| 5 | Friday | |
| 6 | Saturday | |
| 7 | Sunday | |

2. Sprouting moong/gram/pea/wheat in your school.

3. Make charts of different food items.

# Chapter – 2

# Synthetic fibers and Plastics

2.1 Classification of Fibers

2.2 Types of synthetic fibers

2.3 Properties of Synthetic Fibers

2.4 Plastics

2.5 Plastics and the Environment

Look carefully at the clothes used in our homes like blankets, sheets, curtains etc. You will see that all of them are made of different types of clothes. Clothes are made up of fibers (threads), where do these fibers come from?

**वृक्षे वृक्षे नियता मीमयद्गौस्ततौ वयः प्र पतान् पूरुषादः।**

*(ऋग्वेद - 10.27.22)*

It is mentioned in Rigveda threads to provide strength to the wood of the bow and string of the bow.

**स इत् तन्तुं न वि जानात्योतुं स वक्त्वान्यृतुथा वदाति ।**

*(ऋग्वेद - 6.9.3)*

He knows how to weave yarn. The weaving of clothes is mentioned in the Rigveda.

## 2.1 Classification of Fibers

**1. Natural fibers:-** Fibers which are obtained from both plants and animals are called natural fibers. These are of two types -

**(a) Plant Fibers :** Such fibers which we get from plants are called plant fibers. For example – Cotton, Jute, Moonj are examples of fibers obtained from plants.

**(b) Animal fibers** - Such fibers which we get from animals are called animal fibers. For example:- wool, silk are obtained from animals. Wool is obtained from the sheared wool of sheep or goat. It is also obtained from the hair of rabbits, yaks and camels. Silk fiber is obtained from the silk-worm.

Figure 2.1: Natural fiber (cotton)

Figure 2.2: Animal fiber (wool)

**2. Synthetic Fibers** - Such chemical substances whose source is not plants and animals are called synthetic fibers. These are man-made fibers. A synthetic fiber is made of small units of fiber which linked together. Each tiny unit is actually a chemical substance. Many such units together form a larger single unit called a polymer.

## 2.2 Types of synthetic fibers

**1. Rayon** - Paper pulp or wood pulp is used to make rayon. It is called artificial silk, it can be dye in many varieties. Rayon is mixed with cotton to make bedsheets or mixed with wool to make carpets or rugs.

Figure 2.3: Rayon

**आशसनं विशसनमथो अधिविकर्तनम्।** (ऋग्वेद - 10.85.35)

Sun is wearing Shirobhushan, Jhalar and three colored clothes. That is, it indicates towards the synthetic fiber like rayon three colours, clothes.

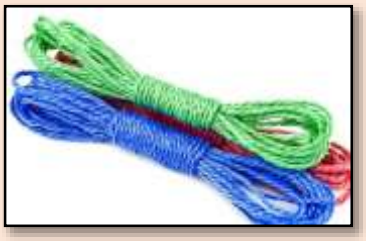


Figure 2.4: Nylon

**2. Nylon** :- Nylon is another man-made fiber. It is made from coal, water and

air. It is strong, elastic, shiny, easy to wash, lightly. It is also used in the manufacture of tents, toothbrushes, parachutes and ropes for climbing rocks.

**भद्रान् कृण्वन्निन्द्रहवान् त्सरिखिभ्य आ सोमो वस्त्रा रभसानि दत्ते।**

*(ऋग्वेद - 9.96.1)*

Soma gives shining clothes. There is indicate towards the shining cloth, like nylon.

3. **Polyester:-** It is used in making textile material. It is also used in making bottles, utensils, sweaters, shawls etc.

**Activity 1 -** With the help of your teacher try to classify the clothes worn by the students like Dhoti, Uttari, Shawl, Kurta, Moja, Sweater etc. as cotton, silk, woolen, synthetic fibers.

**Activity 2 -** Draw in your notebook the pictures of animals whose hair is used as wool.

## 2.3 Properties of synthetic fibers :-

They are dry quickly, they are more flexible, less expensive, easily available and convenient to maintain.

## 2.4 Plastics:-

Like synthetic fibers, plastics is also a polymer. It is of two types -

1. **Thermoplastic:-** Plastic which bends easily on heating is called thermoplastic. For example - Polythene, PVC. They are used for making toys, combs and utensils.

2. **Thermosetting Plastic:-** Plastic, which becomes soft when firstly heated and is molded into desired shape. It cannot be softened by reheating. For example - Melamine, Bakelite.

(A) Bakelite is a poor conductor of heat and electricity. It is useful in making electric switches, handles of various utensils.

(B) Melamine is used for making fire resistant cloth.

## 2.5 Plastics and the Environment: -

Plastics does not decompose by natural process so it causes environmental pollution. When the synthesized material is burnt, it takes a long time to burn completely. In this process, it pollutes the environment by emitting a large amount of toxic gases.

Figure 2.6:- Environmental pollution

## Practice Questions

Q.1 Multiple Choice Questions

1. From which of the following wool is not obtained?

   (a) Yak (b) Camel

   (c) Goat (d) Dog

2. Which of the following is a synthetic fiber -

   (a) Jute (b) Wool

   (c) Nylon (d) Cotton

3. Which of the following is a source of rayon -

   (a) Silk (b) Wood pulp

   (c) Wool (d) Jute

Q.2. Fill in the blanks.

1) Synthetic fibers are also called …… or …… fibers.

2) Like synthetic fiber, plastic is also a …… fiber.

3) Melamine is a …… plastic.

Q.3. Mark True (✓) or False (✗) against the following statements.

1) Cotton is an example of animal derived fiber.

2) Nylon is a synthetic fiber.

3) Cloth is made of by weaving threads.

Q.4 Match the correct pair –

| | Column 'A' | Column 'B' |
|---|---|---|
| 1. | Silk fiber | a) Polyethene |
| 2. | Thermoplastic | b) Bakelite |
| 3. | Thermosetting plastic | c) Silkworm |

Q. 5 Very short answer type questions

1. Which fiber is obtained from wood pulp?

Q.6 Short Answer Type Questions

1. Classify the following fibers as natural or synthetic.

   Nylon, Wool, Cotton, Silk, Polyester, Jute

2. Write the names of two articles which are made from cotton fiber.
3. Write the names of two articles which are made from coconut fiber.
4. Write the names of some natural fibers.

Q.7 Long Answer Type Questions

1. Make a list of clothes which are useful in daily life and from which fibers these clothes are made? Write the name
2. Differentiate between thermoplastic and thermosetting.
3. How does plastics affect the environment? explain.
4. What is synthetic fiber? Write the types of synthetic fibers.

Project work -

1. Visit a handloom or power loom unit (textile mill) near your school and find out the methods by which clothes are made.
2. Aware peoples by using chart in your neighborhood they not to use plastic.

# Chapter – 3

# Separation of Substances

3.1 Methods of Separation of Substances

3.2 Major Methods of Separation of Mixtures

One or more types of harmful and useless ingredients are mixed in a mixture which are harmful to our health. Hence there is a need to separate the various components from a mixture.

In our daily life, we see many examples in which we separate substances from a mixture of substances. While making tea, the tea leaves are separated from the liquid by a tea strainer. After harvesting the grain is separated from the straws.

## 3.1 Methods of separation of substances:-

### 1. Handpicking:-

This method is used to separate some soil particles, stones and straw from wheat, rice, pulses. The quantity of such impurities is usually not much in crops.

Figure-3.1 Hand selection

**2. Threshing:-** The process of separating grains from the stalks of dry plants is called threshing. In this process, the grains are separated by beating the stalks, sometimes threshing is done with the help of oxen. Threshing is used to separate the excessive grain particles from the stalks.

Figure 3.2 – Threshing

**3. Winnowing:-** Filtering is used to separate heavy and light components from the mixture by winds or gusts of air. Farmers use this method to separate the lighter straw from the heavier grains. The

lighter particles of straw are carried away by the wind and collected away from the grains, while the heavier particles of grains separated and form a heap.

Figure 3.3 – Winnowing

4. **Sieving:-** This method is used to remove large impurities from grains. Usually, before grinding wheat in a flour mill, impurities like stones and straw are removed. Usually the sack of wheat is put on an oblique sieve. The stones, stalks and straw which remain in the wheat after purifying and threshing are removed by sieving. This method is also used to separate pebbles and stones from sand at construction sites. Pebbles and stones are separated from sand by sieve.


Figure 3.4 – Sieving

**सक्तुमिव तितउना पुनन्तो यत्र धीरा मनसा वाचमक्रत।**

*(ऋग्वेद - 10.71.2)*

Just as sattu (flour) is used after completing the filtering method, in the same way using voice (speech) Lakshmi resides in the tongue by using speech. In Vedic mantras, the use of filtration method has been imagined. Here there is a reference to the filtration method of material separation.

**Activity 1 –** In your pathshala, try to separate the impurities from the flour by a sieve. Can we separate impurities from flour by sieving method?

### 3.2 Some important methods of separation of mixtures are: -

1. **Sedimentation:-** In this process of heavier components settles on the bottom when water is added to the mixture is called sedimentation. Often, by putting rice or pulses in a vessel of water before cooking, the impurities start floating in the water.

2. **Decantation:-** The process of overturning the water along with the soil without stirring the sediment mixture is called decantation.

3. **Filtration:-** When insoluble solid impurities are present in a liquid, the process of separating them with the help of filter paper is called filtration. Before drinking the juices of fruits and vegetables, seeds and solid particles are separated from them by this method.

4. **Evaporation:-** The process of converting water into its vapor is called evaporation. Salt is obtained from sea water by this method. When sea water is left in large shallow pits, the water gets heated by the sunlight and gradually turns into vapor by evaporation. After some time all the water evaporates and the solid salts are left at the bottom. After that, the mixture of these salts is purified and common salt is obtained.

Fig. 3.5 - Extraction of salt from sea water

5. **Condensation:-** The process of converting water vapor into its liquid state is called condensation.

**Activity 2 –** Take a metal plate in your school on which some ice is kept. Put the plate just above the spout of the kettle. Let the water in the kettle turn into steam. When the steam comes in contact with the plate cooled with ice, it condenses to become water.

## Practice Questions

Q.1 Multiple Choice Questions

1. Which of the following is the method of separating soil particles from grain winnowing –

   a) Threshing b) Winnowing

   c) Handpicking d) Evaporation

2. Which of the following is the process of converting water into vapor?

   a) Condensation b) Evaporation

   c) Decantation d) Filtration

3. By which method the juice of the fruit is separated from its seeds and solid particles?

   a) Sedimentation b) Filtration

   c) Decantation d) Evaporation

Q.2. Fill in the blanks.

1. The method of separating grains from straws is called ……...
2. If milk is poured on a cloth, the cream remains on it. This process of separation is called……
3. Salt is obtained from sea water by…….. process.
4. When muddy water is kept in a bucket overnight, the impurities settled at the bottom. After this the clean water is separated from above. The process of separation used in this process is called …….

Q.3. True or False -

1. A mixture of milk and water can be separated by filtration.
2. A mixture of salt and sugar can be separated by filtering.
3. Separation of tea leaves from tea can be done by filtration.

4. The separation of grain and straw can be done by decantation process.

Q.4 Match the correct pair –

| | Column 'A' | Column 'B' |
|---|---|---|
| 1. | Condensation | a) From sea water to salt water |
| 2. | Decantation | b) Sedimentation of heavy components. |
| 3. | Sedimentation | c) Change of water vapor to liquid state |
| 4. | Evaporation | d) The process of inverting impure water with soil |

Q.5 Very short answer type questions

1. By which method the impurities present in rice are separated before cooking.

Q.6 Short Answer Type Questions

1. How will you separate sand and water from a mixture of sand and water?
2. What is meant by sieving, where is it used?
3. Is it possible to separate sugar from a mixture of flour and sugar? If yes how would you do it?

Q.7 Long Answer Type Questions

1. Explain the method of hand picking, threshing, winnowing for the separation of materials.
2. Explain the method of sedimentation, decantation, filtration to separate the mixture.

**Project work -**

1. Separate the particles of soil, particles of stone from grains (wheat, rice, pulses) in the presence of the warden / teacher in your school.

# Chapter – 4

# Changes around us

4.1 Various changes

4.2 Miscellaneous Changes in the Surroundings

4.3 Physical and Chemical Changes in daily events

In this chapter, we will study about the various changes taking place around us. For example – transform into making of water ice, rusting of iron, curd formation from milk, growth of plants, melting of ice, growth of our hair, transformation of unripe fruits into ripe fruits etc. Changes always occur in color, shape, state, internal structure and condition, examples of changes occurring on this basis are as follows –

4.1 Various changes –

| | |
|---|---|
| Change in colour | Raw mangoes are green in color which turn yellow when ripe. They become colourful. |
| Change in shape | Change in the shape of the moon. |
| Change in structure | Growing children |
| Change of state | Melting of ice cream |
| Change in internal structure | Formation of curd from milk |
| Change of position | Migration of bees from one flower to another |
| Change in temperature | Rise in temperature when it becomes hot. |

**नवो नवो भवति जायमानोऽह्नां केतुरुषसामेत्यग्रम् ।**
**भागं देवेभ्यो विद्या व्यायन् प्र चन्द्रमास्तिरते दीर्घमायुः ॥**

(अथर्व. पैप्पलाद 18.3.3)

In this mantra of Atharvveda, it has been mention that the moon becomes new by increasing each phase in the sukla paksha, that is, it increases in size, it has been pointed out towards the change in the shape.

## 4.2 Various changes in the surrounding –


Fig – 4.1 Various changes in the surroundings

There are many types of changes around us like -

1) **Slow Changes -** Such changes take place very slowly, they take hours, days and nights, months or years to complete, they are called slow changes. As

- Rusting of iron.
- Child becoming an adult.
- Making curd from milk.
- Ripening of fruits.

2) **Rapid changes –** Such changes happen at a very fast. They take a few moments, seconds or minutes to complete, they are called rapid changes. As -

- Burning of paper.
- Burnt out bulb.

3) **Reversible change** - You must have seen that when a spring is stretched, it gets stretched and when released, it regains its original state. You have seen that as soon as the cause that is causing the change is removed, the object returns to its original state.

When a change can be reversed in the opposite direction, it is called a reversible change. As -

- Ice melts on heating and turns into solid ice on cooling.
- Electric fan starts at the push of a button and returns to its previous state when turned off.

4) **Irreversible change** – On burning wood it turns into smoke and ash from which we cannot recover wood, similarly milk cannot be recovered when curd is made from milk.

When a change cannot be reversed in the opposite direction are called irreversible changes. As -

- Rusting of iron.
- On grinding wheat, its transformation into flour.
- Ripening of fruits.
- Burning of paper.

**Activity 1 -** Take some ice cubes, keep them in the sun light for some time. What is the change in the shape of ice after some time? We see that the shape of ice has changed, ice has melted to form water, can we convert water into ice again? We can convert water into ice by cooling it in a refrigerator. Tell me what kind of change will this be?

Figure 4.2 – Ice

**Activity 2 –** Take four incense sticks of a certain length. Kept them at a suitable place and let them burn for some time, then extinguish it and measure the length of the incense stick.

Fig. 4.3 – Incense stick

5) **Recurring Changes –** The changes which are repeated after fixed time intervals are called recurring changes .

Ex. – change of weather, change of season, Motion of pendulum of clock, sunrise-sunset.

6) **Non-recurring changes –** The changes which do not recur after fixed time intervals are called non-recurring changes.

Example – Earthquake, accident etc.

7) **Physical Changes –** It is a temporary changes in which the shape, size and physical state of matter changes and after the change no new substance is formed, it is called physical change. As -

- Melting of ice
- Freezing of Ghee
- Magnet becomes iron
- Sugar soluble in water

8) **Chemical Changes –** This is a permanent change in which a new substance is formed and the properties of the new substance are different from the original substance, it is called a chemical changes.

- Digestion of food
- Ripening of fruits
- Rusting of iron
- Making Curd from milk
- Paper burning of paper

## 4.3 Physical and chemical changes in daily events –

**Evaporation –** The change of liquid into vapor is called evaporation.

warm

liquid ⟶ Vapor

evaporation

The water of the wet clothes evaporates, due to evaporation and the wet clothes become dry.

**Condensation -** The process of changing a vapor or a gas into a liquid state after cooling is called condensation.

Cold

Steam ⟶ Liquid

Condensation

Drops of water are visible on the lower surface of the plate when the plate is covered over the water heating vessel, such drops can be obtained by heating the liquid and cooling it, which is called condensed liquid and this action is called condensation.

**Freezing -** The cooling of a liquid into ice is called freezing.

Extreme cold

Liquid ⟶ Ice

Ice cream is made by this process.

**Melting –** The process of melting a solid substance into water is called melting. The temperature at which a solid substance starts melts it is called its melting point.

**Sublimation -** Such a process in which a solid substance directly changes into vapor state without changing into liquid state is called sublimation. For example, on heating camphor, it directly converts into vapor.

## Practice Questions

Q.1. Select the correct option –

1) The change of milk into curd is –

a) Physical change b) Chemical change

c) Rapid change d) None of these

2) Chemical change is -

a) Permanent b) Temporary

c) Permanent and reversible d) None of these

3) Melting of ice is a change in -

a) Physical change b) Chemical change

c) Rapid change d) None of these

Q.2. Fill in the blanks –

1) Change of seasons is …… change.

2) Burning of paper is a …… change.

3) Freezing of ice is a …… change.

4) Folding a paper is a ……change.

Q.3. Mark True (✓) or False (×) against the following statements.

1) The cooling of a liquid into ice is called freezing.

2) The cooling of vapor into liquid state is called evaporation.

3) The melting of a solid substance into water is called melting.

Q.4. Find the right match.

| | Column 'A' | Column 'B' |
|---|---|---|
| 1) | Solidification of ghee | a. Chemical change |
| 2) | Ripening of fruits | b. Physical changes |

3) Growth of children — c. Change in temperature

4) Change in temperature — d. Changes in shape.

When warm

Q.5. Very short answer type questions

Classify the following into slow and rapid changes –

1) Ripening of fruits

2) Baby becoming adult

3) Making curd from milk

4) Burning of paper

5) Rusting of iron

6) Melting of ice

Q.6. Short Answer Type Questions

1) What is evaporation?

2) What is freezing?

3) What kind of change is the conversion of grains into flour grinding?

4) What kind of change is the falling of the fruit from the tree to the ground?

Q.7. Long answer type questions –

1) Explain the difference between physical and chemical change by giving examples.

**Project work -**

To make a list of physical and chemical changes occurring in daily life by experiment and observation.

# Chapter – 5

# Getting to know plants

5.1 Classification on the basis of size

5.2 Classification on the Basis of climbing

5.3 Classification by age

5.4 Functions of different parts of plants

When we observe the plants around us, we see that some plants are small and some are huge. The flowers of some plants are red, green and blue and some plants do not have flowers at all. You must have seen many green plants around your house and in the pathsala premises.

## 5.1 On the basis of size

On the basis of size it is divided into 3 parts –

1. Herbs:- Plants with green and soft stems are called herbs, they are generally small and often do not have many branches.

Figure 5.1 – Herbs

2. Shrubs:- In some plants, the branches emerge near the base of the stem. The stem is hard but does not become too thick, it is called a shrubs.

Figure 5.2 – Bush

3. Trees:- Some plants are very tall and their stems are strong and deep. In these, the branches emerge from the upper part of the stem at a higher height from the ground. These are called trees.

Figure – 5.3 Tree

Activity 1 - Can we reverse the change in the length of the incense stick? Tell me what kind of change is this?

| S.No. | Plant name | Herb / Bush / Tree |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |

## 5.2 Types of plants on the basis of climbing –

**Branches:-** Branches are of 2 types.

(1) **Creepers: -** Plants with weak stems cannot stand straight and they spread on the ground, they are called creepers.

Figure 5.4 – Vines

(2) **Climbers:-** Such vines which climb up with the help of another plant are called climbers.

## 5.3 Classification of Plants

We Can classify plants (1) on the basis of age (2) on the basis of habitat as follows -

(1) **On the basis of age -**

Plants are of two types on the basis of age, the details of which are as follows -

1. **Annual plants:-** Such plants whose life period is of one year or one season are called annual plants. For example - maize, sorghum, millet, mustard etc.

2. **Perennial plants:-** Those plants which life period of more than two years, these plants generally flowering in summer and spring. Perennial plants are generally large and shady trees. For example – Neem, Pine, Banyan etc.

(2) **On the basis of habitat**

There are 2 types of plants on the basis of their habitats, the details of which are as follows -

1. **Aquatic Plants:-** Such plants which are found in aquatic habitat like – River, Pond, Lake, Sea are called aquatic plants. For example – lotus, water chestnut, water hyacinth etc. These plants are also called hydrophyte plants, roots are less developed in aquatic plants.

**अवकोल्बा उदकात्मान ओषधयः।**

*(अथर्ववेद - 8.7.9)*

Some medicines (plants) are produced in rivers, ponds etc.

2. **Terrestrial Plants:-** The plants found on land are called terrestrial plants.

**या रोहन्त्याङ्गिरसीः पर्वतेषु समेषु च।**

*(अथर्ववेद - 8.7.17)*

Many medicines (plants) are produced on flat land.

**Flowering plants:-** Such trees and plants in which have flowers are called flowering plants. Like - Rose, Hibiscus, Gulmohar, etc.

**पुष्पवतीः प्रसूमतीः फलिनीरफला उत।**

*(अथर्ववेद - 8.7.27)*

In the Atharvaveda, Pushpavati (with flowers), Prasumati (with buds or sprouts), Falini (with fruits), Afala (without flowers) has been mentioned about plants.

**याः फलिनीर्या अफला अपुष्पा याश्च पुष्पिणीः ।**

*(ऋग्वेद - 10.97.15) (यजुर्वेद - 12.89)*

Falini (fruit bearing), Afla (without fruit) plants are mentioned in rigveda does not have.

**Non-flowering plants :-** Plants in which does not have flowers are called non-flowering plants. For example – fern, bamboo etc.

**Activity 2 -** Take two wide small containers. Keep soaked cotton in these vessels. Keep 5-6 seeds of moong in one vessel and 5-6 seeds of soyabean in another vessel. Always keep the cotton moist by pouring water till the seeds germinate and become seedlings. After a week they start coming out of the cotton.

## 5.4 Functions of Different Parts of Plants :-

### 1. Root :-

Plants absorb water and minerals from the soil through their roots. These roots absorb the water located between the soil particles and carry it to the stem, branches and leaves, the roots provide stability to the plants. The roots work to hold the soil particles together, due to which they play an important role in preventing soil erosion. There are mainly two types of roots found in plants.

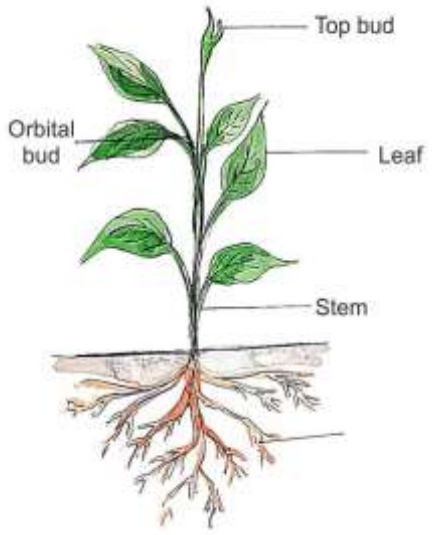



Fig. – 5.5 Different parts of plants

**Taproot :-** Those are the roots in which there is a major root and other roots emerge from it in the side, these are called taproot (root). For example - Mango, Neem etc.

**Fibrous Roots :-** There is no one main root in these, all the roots look similar and are in the form of a bunch, these are called fibrous roots. For example - maize, wheat, onion, sugarcane etc.

**2. Stem :-**

Like the roots, the stem also conducts water and food. Potato, ginger, turmeric etc. are the modifiers of underground stem which work for food storage, as well as turmeric and ginger are used in making different types of medicines.

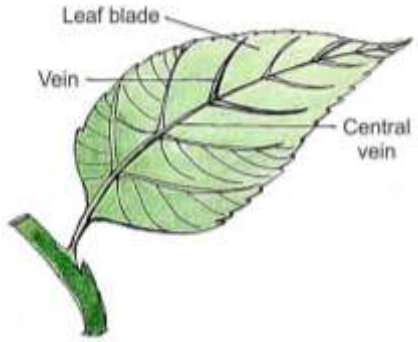


Fig. 5.6 – Cross section of a leaf

**3. Leaf :-**

The part of the leaf by which it is attached to the stem is called petiole. The flat part of the leaf is called the leaf blade. The raised line in the middle of the leaf blade is the central vein and many subveins emerge from it.

**मधुमन्मूलं मधुमदग्रमासां मधुमन्मध्यं वीरुधां बभूव।**

*(अथर्ववेद - 8.7.12)*

Front part, middle part, leaf, flower of fruits and plants are mentioned.Tree parts are mentioned in atharveda For example roots, front part.

**मूलेभ्यः स्वाहाशाखाभ्यः स्वाहाव्वनस्प्पतिभ्यः स्वाहापुष्प्पेभ्यः-**
**स्वाहाफलेभ्यः स्वाहौषधीभ्यः स्वाहा ।** *(यजुर्वेद - 22.28)*

Roots, Branch, flower and fruit of trees are mentioned.

**Function of Leaf -** The process of making food by green plants in the presence of carbon dioxide, water, light and chlorophyll is called photosynthesis.

The process of photosynthesis can be represented by the following equation –

$$6CO_2 + 6H_2O \xrightarrow{\text{chlorophyll, sunlight}} C_6H_{12}O_6 + 6O_2$$

$$\text{Carbon dioxide + water} \xrightarrow{\text{chlorophyll sunlight}} \text{carbohydrate + oxygen}$$

Plants store food in the form of starch. This starch is stored in leaves, fruits and stems. Leaves manufacture glucose in the presence of light and chlorophyll. Water and carbon dioxide are used in this process. In this process, oxygen gas and water is formed as a by-product. The food assimilated by the leaves is finally stored in the form of starch in various parts of the plants.

Many stomata are found on the surface of the leaves, the leaves do respiration through these stomata. The exchange of gases depends on the opening and closing of stomata.

**अधुक्षत् पिप्युषीमिषमूर्जं सप्तपदीमरिः। सूर्यस्य सप्त रश्मिभिः॥**

*(ऋग्वेद - 8.72.16)*

**तमू अकृण्वन् त्रेधा भुवे कं स ओषधीः पचति विश्वरूपाः।**

*(ऋग्वेद - 10.88.10)*

**अग्रेणीरसि स्वावेश ऽ उन्नेतृणामेतस्य वित्तादधि त्वा स्थास्यति देवस्त्वा सविता मध्वानक्तु सुपिप्पलाभ्यस्त्वौषधीभ्यः।**

(यजुर्वेद - 6.2)

The rays of the sun indicate the process of photosynthesis. Trees receive powerful energy from the rays of the seven colors of the sun.

**सहस्वमेऽअरातीः सहस्वपृतनायतः ।**

**सहस्वसर्व्वंपाप्मानꣳसहमानास्योषधे ॥**

*(यजुर्वेद - 12.99)*

**अश्श्वातीꣳसोमवतीमूर्ज्जयन्तीमुदोजसम् ।**

**आविꣳसिसर्व्वाऽओषधीरस्माऽअरिष्टतातये ॥**

*(यजुर्वेद - 12.81)*

The medicine has been described as the one that cures diseases and gives strength to the body.

**इष्कृतिर्न्नाम वोमाताथोयूयꣳस्थनिष्कृतीꣳ ।**

**सीराः पतत्रिणीस्स्थनषदामयतिनिष्कृथ ॥**

(यजुर्वेद - 12.83)

Medicine has been compared to dormant rivers. Medicines to the removal of diseases from the body of a sick person.

**अति विश्श्वा÷ परिष्ठा स्तेनऽ इव व्व्रजमक्रमुः ।**

**औषधीः प्राचुच्यवुर्युत्किञ्च तन्वोरप÷ ॥**

*(यजुर्वेद - 12.84)*

**यस्यौषधीꣳ प्प्रसर्पथाङ्गमङ्गं परुष्परुꣳ ।**

**ततो यक्ष्मं व्वि बाधध्व ऽ उग्रो मध्यमशीरिव ॥**

*(यजुर्वेद - 12.86)*

Medicines destroy the diseases of the body.

**अश्श्वत्थे वो निषदनं पर्णे वो व्वसतिष्कृता ।**

**गोभाज ऽ इत्किलासथ यत्सनवथ पूरुषम् ॥**

*(यजुर्वेद - 12.79)*

Ashvatya (ficus tree) Palash (sacred tree) mention as a medicine.

**अन्न्या वो ऽ अन्न्यामवत्वन्यान्न्यस्या उपावत ।**

**ताः सर्व्वा÷ संविदाना ऽ इदं मे प्रावता वच÷ ॥**

*(यजुर्वेद - 12.88)*

A new medicine made from a combination of medicines has been mentioned in yajurveda

**त्वां गन्धर्व्वा ऽ अखनँस्त्वामिन्द्रस्त्वां बृहस्पति÷ ।**

**त्वामोषधे सोमो राजा व्विद्वान् यक्ष्मादमुच्यत ॥**

*(यजुर्वेद - 12.98)*

Medicine is mentioned for the treatment of Tuberculosis (TB) in yajurveda.

**दीग्घायुस्त ऽ ओषधे खनिता यस्मै च त्वां खनाम्यहम् ।**

**अथो त्वं दीर्घायुर्भूत्वा शतवल्शा व्विरोहितात् ॥**

*(यजुर्वेद - 12.100)*

Underground medicineis mentioned in yajurveda.

**शीतहदा हि नो भुवोऽग्निष्कृणोतु भेषजम् ।**

*(अथर्ववेद - 6.106.3)*

**अग्निर्हिमस्य भेषजं भूमिरावपनं महत् ।**

*(यजुर्वेद - 23.10)*

Bheshaj (medicine) element in Agni is mentioned in yajurveda.

**नक्तंजातास्योषधे रामे कृष्णे असिक्नि च।**

**इदं रजनि रजय किलासं पलितं च यत्॥**

(अथर्ववेद - 1.23.1)

In this mantra of Atharvaveda, treatment of leprosy is mentioned by turmeric, bhringraj, neel medicine.

## Practice Questions

Q.1. Choose the correct option –

1. One of the following is an annual plant -

   (a) Maize (b) Banyan

   (c) Neem (d) Mango

2. How many types of plants are there on the basis of size -

   (a) Three (b) Four

   (c) Two (d) Six

3. Which of the following is an aquatic plant -

   (a) Khejdi (b) Water Hyacinth

   (c) Berrry (d) Neem

Q.2. Fill in the blanks

1. Leaves respire by …….
2. Roots are of two types (a) …….. (b) ……..
3. Green plants prepare their food by the process of …….

Q.3. Mark True (✓) or False (✗) against the following statements.

1. Maize is an example of an annual plant.
2. Water chestnut is a terrestrial plant.
3. Plants with green and soft stems are called herbs.

Q.4. Match the right pair –

| | Column 'A' | Column 'B' |
|---|---|---|
| 1. | Perennial plant | a. Sorghum |
| 2. | One year old plant | b. Neem |
| 3. | Non-flowering plant | c. Rose |

4. Flowering plant d. Fern

Q.5. Very short answer type questions

1. Such Branches which climb up with the help of another plant, what are they called?

Q.6. Short Answer Type Questions

1. What is photosynthesis?
2. On the basis of age the plant can be divided into how many parts? Write their name
3. What is the function of stem in plants?
4. Which of the following plants have flowers?

Grass, Maize, Wheat, Chili, Tomato, Basil, Ficus tree, Rosewood, Banyan, Mango, Jamun, Guava, Pomegranate, Banana, Papaya, Lemon, Sugarcane, Potato, Groundnut

Q.7. Long Answer Type Questions

1. Explain the functions of different parts of a plant.
2. Into how many parts can plants be divided on the basis of climbing?

Project work -

Plant different types of plants in your pathshala garden and take care of them.

# Chapter – 6

# Body Movements

6.1 Different joints of the body

6.2 Human Skeleton

6.3 Movement of animals

When we sit with concentration, we feel that many movements are happening continuously in our body automatically. Like blinking of eyes, breathing etc.

**Human body and its movements:-**

While doing a physical exercises in pathsala, our hands and feet are moving. When we move the shoulder in a circular motion, then our shoulder also moves. We can freely rotate some parts of our body in any direction while some parts can be rotated in only one direction but we are unable to rotate some parts of our body.

Have you noticed that we can bend or rotate different parts of the body from the same place where the two parts are connected to each other – for example elbow, shoulder and neck. These places are called joints, if there was no joint in our body then it would not be possible for our body to do any kind of movement. Press your head, face, neck, nose, ears, behind the shoulders, hands, feet, fingers and toes with your finger. Have you ever felt that your finger is pressing something hard? These hard structures are bones. How do we bend our elbows when the bones cannot be bent? There are many types of joints in our body for different activities and different types of movements.

**निर्दुरमण्य ऊर्जा मधुमती वाक्।**

*(अथर्ववेद 16.2.1)*

In this mantra of Atharvaveda, it is mentioned to protect the body from skin diseases.

**सुश्रुतौ कर्णौ भद्रश्रुतौ कर्णौ भद्रं श्लोकं श्रूयासम्।** *(अथर्ववेद 16.2.4)*

It is told in this mantra of Atharvaveda that our ears should never stop listening well and closely and our eyes should be full of the power to see like Garuda (hawk).

## 6.1 Different joints of the body

### Ball and Sacket joints:-

This can be understood through activity. Fold a strip of paper in the form of a cylinder. Make a hole in an old rubber or plastic ball and insert the folded paper cylinder into it. You can also stick the paper cylinder on the ball. Try placing the ball in a small bowl and rolling it around, does the ball move freely in the bowl.

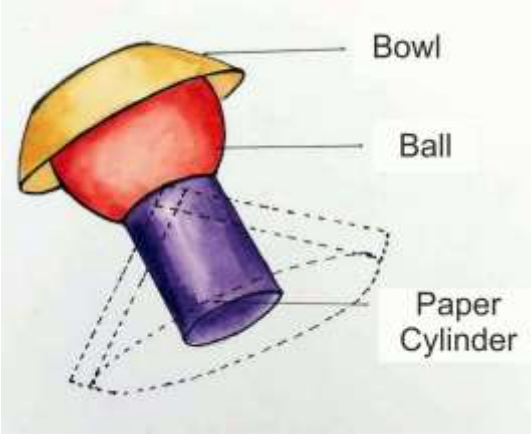


Fig. 6.1 – Ball and Socket joints

Now imagine that the cylinder of paper is your hand and the ball is one end of it. The bowl is like the part of the shoulder that your arm attaches to. A bone is buried in a bowl-like cavity. This type of alliance provides speed in all directions.


Fig. 6.2 – Ball and Socket joints

**Pivotal joint:-** The joint connecting the neck and the head is the pivotal joint. Through this, the head can be rotated forward and backward or right and left.

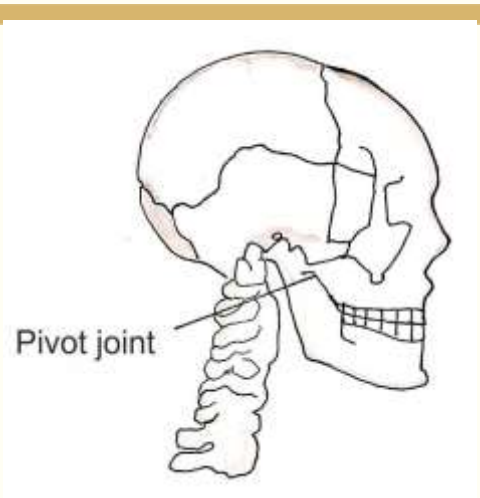



Fig. 6.3 - Pivot joint

**Hinge joints:-** To understand the hinge joint, open and close any door of the house repeatedly. Watch its constipation carefully. This allows the door to open forward and backward. The elbow has a hinge joint, which allows movement in only one direction, forward and backward.

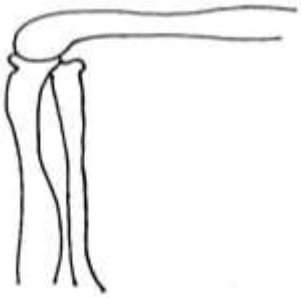


Fig. 6.4– Hinge joint

**Fixed Joints:-** Some of the joints between the bones of our head are different from the ones we have discussed so far. These bones cannot move on these joints, such joints are called immovable joints. When you open your mouth, you move your lower jaw away from the head. Now try moving your upper jaw, can you move it? There is a fixed joint between the upper jaw and the skull.

## 6.2 Human Skeleton:-

All the bones of our body form a framework to give a beautiful shape to the body. This structure is called skeleton. From the X-ray picture, we get to know the shape of all the hard bones of the body.

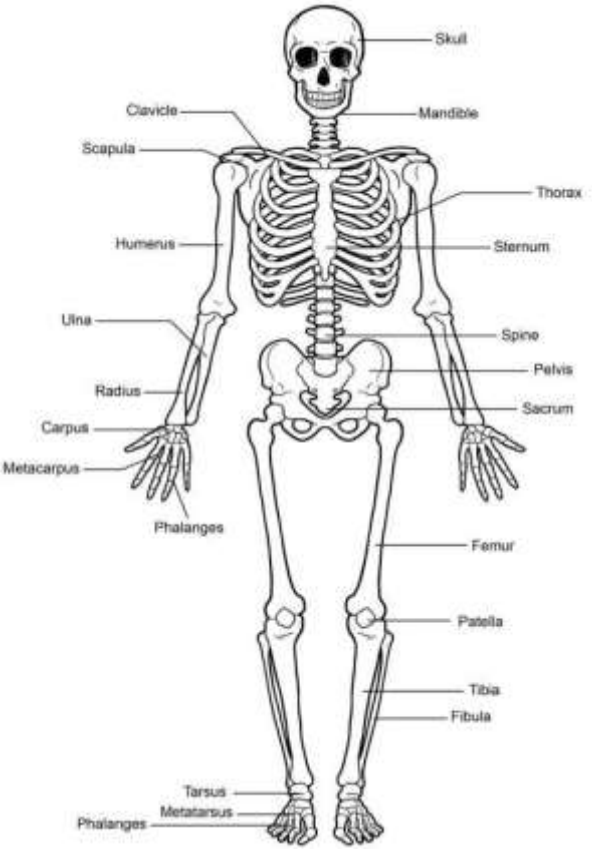
**यदा केशानस्थि स्नाव मांसं मज्जानमाभरत्।**

**(अथर्ववेद - 11.8.11)**

The creator has filled the body with bones, nerves, flesh and marrow. That is, the body is made of bone, oasis, marrow.

**Bones of the hand:-** Bend your fingers Can you bend them at each joint ? How many bones are there in your middle finger? Feel the back of your palm to feel whether there are many bones in it. It is made up of several bones called carpels.

**Rib cage :-** In this the ribs are bent. It forms a box by joining the bone of the chest and the spinal cord. This conical box is called rib-cage. There are 12 ribs on both sides of the chest . Some important parts of our body remain safe in it.



Human Skeleton

**पृष्टीर्बर्जह्ये पार्श्वे कस्तत् समदधादृषिः।**

*(अथर्ववेद - 11.8.14)*

The back, clavicle, ribs are joined by whom. Here ribs are mentioned.

**Spine:-** Ask some of your friends to touch your toes by bending down without bending their knees. Is it smooth, flat or stable ? Starting at your friend's neck, slide your fingers down his back. The structure you experience is the spine. It is made up of many small bones, which are called vertebrae. The spinal cord is made up of 33 vertebrae.

**ग्रीवभ्यास्त उष्णिहाभ्यः कीकसाभ्यो अनुक्यात्।**

(अथर्ववेद - 2.33.2)

Removed diseases from neck, back of head, spine and joints. Here the spinal cord is mentioned.

**Bones of the shoulder :-** When we do Surya Namaskar, then in the third to tenth position of Surya Namaskar, in the asanas we do with emphasis on our hands, you can see the protruding bones near the shoulders. These are called shoulder bones.

**Pelvic bones :-** These form a box-like structure that protects the various organs found at the bottom of your stomach. This is the part of the hip on which you sit.

**Human Skull :-** Your skull is made up of many bones joining each other. It protects the most important part of our body by enclosing the brain.

**Cartilage :-** It is not as hard as bones and can be bent called cartilage. The ear can be easily folded by touching it, cartilage is found in it.

**Muscle :-** Make a fist of your one hand. Try to touch the shoulder of the same arm with the thumb of the fist. Then you will feel some change in your upper arm, you will see the bulging part it is called muscle. Due to contraction (reduction in length), the muscles emerge. While walking or running, the muscles of the legs become short, hard and thick. It pulls on the bone. Two muscles work together to move the bone. To provide movement to a bone, two muscles have to work jointly. When one of the two muscles contracts, the bone is pulled in that direction. The second muscle of the pair becomes relaxed (increases in length and becomes thinner). To move the bone in the opposite direction, the now relaxed muscle contracts and pulls the bone to its former position while the first muscle now relaxes. A muscle can only pull, it cannot push, so to move a bone, two muscles have to work jointly.

**सप्तास्यासन् परिधयस्त्रिः सप्त समिधः कृताः ।**

**देवा यद्यज्ञं तन्वाना ऽ अबध्नन्पुरुषं पशुम् ॥**

(यजुर्वेद - 31.15)

The composition of the human body is similar to the composition of the universe. There are 3-3 types of 7-7 Samidhas of Srishti Yagya in the 7 periphery of the universe, that is, the work of creation is being conducted with 21 elements. Similarly, the body is also functioning through 3 types of 7 Samidhas, in total there are 21 Samidhas. Seven circles mean seven skins, within which seven metals and seven arts are located.

**केन पार्ष्णी आभृते पुरुषस्य केन मांसं सम्भृतं केन गुल्फौ ।**
**केनाङ्गुलीः पेशनीः केन खानि केनोच्छ्लङ्खौ मध्यतः कः प्रतिष्ठाम् ॥**

*(अथर्ववेद - 10.2.1)*

The base of the body is located at the heel, from our heel a muscle goes to the upper leg bone. It binds with the upper bone and the weight of the upper bone falls on it. Some muscles are such that they have gone to the bones of the leg. In this way, the muscles are holding the ankles and ankles from their fixed position. Along with holding the ankles by the muscles related to the (heel), it is also firmly attached to the muscles of the toes. The muscles are located in the wrist (ankle).

**कस्मान्नु गुल्फावधरावकृण्वन्नष्ठीवन्तावुत्तरौ पुरुषस्य ।**
**जङ्घे निर्ऋत्य न्यदधुः क्वस्विज्जानुनोः संधी क उ तच्चिकेत ॥**

*(अथर्ववेद - 10.2.2)*

The thighbones are 2 and the gulfs from the position of the lower parts of both are located on the sides . Therefore, the 2 bones from the lower part of which the position of the ankle is formed, those bones called thigh bone are located in the vertical form, they keep them raised above the heel.

**अष्टाचक्रा नवद्वारा देवानां पूरयोध्या**
**तस्यां हिरण्ययः कोशः स्वर्गो ज्योतिषावृतः ॥**

*(अथर्ववेद - 10.2.31)*

8 chakras and 9 gates in the body .

**अयं जनो नाम चलन् पृथिव्यां यः पार्थिवः कस्य हेतोः ॥**
**तस्यापि चाङ्घ्र्योरधि गुल्फजङ्घा जानूरुमध्योरशिरोधरांसाः ॥**

*(श्रीमद्भागवत पंचम स्कन्ध अय द्वादशोध्याय 5.12.5)*

In this verse of Shrimad Bhagwat, various parts of the body like ankle, calf, knee, thigh, waist, chest, neck and shoulder etc. are mentioned.

parts of the human body are mentioned in the Arthavaveda.

**अक्षीभ्यां ते नासिकाभ्यां कर्णाभ्यां छुबकादधि ।**
**यक्ष्मं शीर्षण्यं मस्तिष्काज्जिह्वाया वि वृहामि ते ॥**
**ग्रीवाभ्यस्त उष्णिहाभ्यः कीकसाभ्यो अनूक्यात् ।**
**यक्ष्मं दोषण्य १ मंसाभ्यां बाहुभ्यां वि वृहामि ते ॥**
**हृदयात ते परि क्लोम्नो हलीक्ष्णात् पार्श्वाभ्याम् ।**
**यक्ष्मं मतस्नाभ्यां प्लीह्नो यक्नस्ते वि वृहामसि ॥**
**आन्त्रेभ्यस्ते गुदाभ्यो वनिष्ठोरुदरादधि ।**
**यक्ष्मं कुक्षिभ्यां प्लाशेर्नाभ्या वि वृहामि ते ॥**
**ऊरुभ्यां ते अष्ठीवद्भ्यां पार्ष्णिभ्यां प्रपदाभ्याम् ।**
**यक्ष्मं भसद्यं २ श्रोणिभ्यां भासदं भंससो वि वृहामि ते ॥**
**अस्थिभ्यस्ते मज्जभ्यः स्नावभ्यो धमनिभ्यः ।**
**यक्ष्मं पाणिभ्यामङ्गुलिभ्यो नखेभ्यो वि वृहामि ते ॥**
**अङ्गे अङ्गे लोम्निलोम्नि यस्ते पर्वणिपर्वणि ।**
**यक्ष्मं त्वचस्यं ते वयं कश्यपस्य वीबर्हेण विष्वञ्चं वि वृहामसि ॥**

*(अथर्ववेद 2.33)*

In this mantra of Atharvaveda, different parts of the body like eye, nose, ear, chibuk (chin), head, brain, tongue, neck, usniha, keksa, anukya ( arm), dosha (hand), ansa, heart, chloma, haliksna. Shroni (joint), bhasad, bhasas, bone, marrow, ligament, artery, pani (hand), finger, nail, organ, lom, parvshana, tvak, mehanam, basti, basti - bil are enumerated as organs.

## 6.3 Movement of animals

1. **Earthworm :-** The body of earthworm appears to be made up of many rings kept adjacent to one end of the other. Earthworm does not have bones in its body but it has muscles which help in its contraction and growth. While walking, the earthworm extends the posterior part of its body. After that it grasps the ground with the anterior part and frees the posterior part, after that it contracts the body and pulls the dorsal part forward. In this he moves forward for some distance. The earthworm moves forward on the soil repeating this process again and again. Its body has smooth substances which help it to walk.

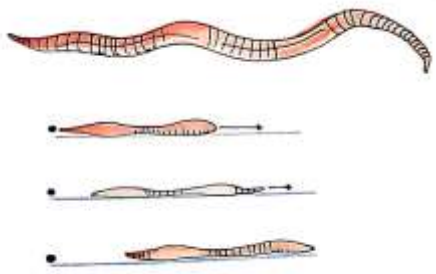


Figure 6.6 – Movement of earthworm

2. **Snail :-** There is a round structure on the back of the snail, it is called shell and it is the exoskeleton of snails. But it is not made of bones. This shell is single and it does not help the snail to move, it gets pulled along with the snail. When the hole in the shell opens, a thick muscular structure and head comes out of it. Thick structure is its leg which is made of hard muscles.

3. **Birds :-** Birds can fly because their body is adapted to fly. There are air cells in their bones due to which their bones are light but strong, the bones of the legs are favorable for walking and sitting. The bones of the forelimbs are modified to form the wings of a bird. The shoulder bones are specially adapted to hold the flight muscles and help in raising and lowering the wings.

Fig. 6.8- Movement of bird

**उदस्य श्यावौ विथुरौ गृध्रौ द्यामिव पेततुः ।**

(अथर्ववेद - 7.95.1)

From this it is clear that gridho (birds) fly in the sky.

**यां द्विपादः पक्षिणः संपतन्ति हंसाः सुपर्णाः शकुना वयांसि।**

*(अथर्ववेद - 12.1.51)*

Two-legged swans, eagles etc. birds fly in the sky.

4. **Fish** :- The head and tail of a fish is thinner and sharper than its middle part, such a shape of the body is called stream line.

Due to its special shape, water flows here and there and fish can easily swim in the water. The skeleton of the fish is covered with rigid muscles and bends and the tail moves in the opposite direction. When the fish rapidly turns its body, its tail turns in the other direction. Due to this, a jerk is felt and the fish moves forward. There are fins on the body of the fish, which help in maintaining balance and direction in the water while swimming.

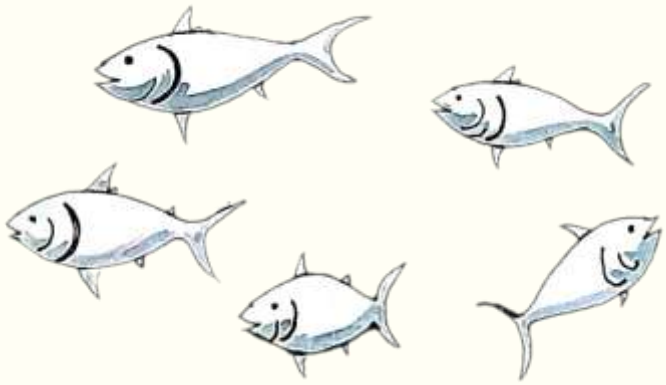


Figure 6.9 – Movement of fish

5. **Snake :-** The body of snake is folded in many rings. Similarly, each ring of the snake pushes it forward, due to which the snake moves forward at a very high speed but does not move in a straight line. The movement of snake is circular.

## Practice Questions

Q.1 Multiple Choice Questions

1. Self-continously motion in the body is –

   a) Walking b) Running

   c) Blinking of eyelids d) Looking back

2. The name of the organ made of cartilage is -

   a) Eye b) Ear c) Nose d) Lips

3. Among the following, the name of the animal which moves in circular motion is -

   a) Lizard b) Snake c) Frog d) Fish

Q.2 Fill in the blanks:

1. The bones of the elbow are joined by the _____.
2. Joints of bones help the body in _____.
3. The movement of all animals is _____.

Q.3 Indicate true (✓) and false (✗) against the following statements.

1. The speed and movements of all animals are exactly the same.
2. Cartilage is harder than bone.
3. There is no joint in the bones of the fingers.

Q.4 Match the correct pair -

| | Column 'A' | Column 'B' |
|---|---|---|
| 1. | Upper jaw | a. There are feathers on the body. |
| 2. | Fish | b. have exoskeleton. |
| 3. | Ribs | c. is a fixed joint. |
| 4. | Snail | d. protects the heart. |

Q.5 Very short answer type questions

1. What type of movement is the movement of the fish?
2. What is the human skeleton made up of?

Q.6 Short Answer Type Questions

1. What is pivot joint?
2. Why can't our elbows turn ball and sockets joint backwards?
3. What is the Kanduk-Khallika treaty?

Q.7 Long Answer Type Questions

1. Explain the motion of a bird with a diagram.
2. Explain Kanduk-Khallika treaty with a diagram.

Project work -

1. Make a chart of the human skeletal system.

# Chapter – 7

# Science in Daily Life

Due to supernatural progress in science, we have started using many scientific equipment's in our daily life like – gas stove, fan, motor cycle, refrigerator, washing machine, electric press etc.

**Use of science in daily life -**

Science is the greatest power of man. This is the basic fundamental of the operation of the world. Scientific inventions have established their dominance in every sphere of life.

1. In the field of communication: -

(a) Telephone (b) Fax (c) Satellite launch

Twentieth century has seen the transformation of traditional media into modern media. Public media print and writing a few steps ahead Radio, television, telephone, telegraph, fax, videoconferencing, tablet, iPad, mobile phone's 3G 3G), 4G ( 4G), 5G ( 5G ) services, weather Related warnings, artificial satellite based telecommunication brought a revolution in this field. The modern technology of sending messages through the Internet is called e-mail.

**अश्वस्तूपरो गोमृगस्ते प्राजापत्याꣳ कृष्णग्रीव ऽ आग्नेयो ररा्टे पुरस्तात्सारस्वती मेष्यधस्ताद्बन्वोराश्विनावधोरामौ बाह्वौꣳ सौमपौष्णꣳ श्यामो नाभ्या ँ सौर्ययामौ श्वेतश्च कृष्णश्च पार्श्वयोस्त्वाष्ट्रौ लोमशासक्थौ सक्थ्योर्व्वायव्व्यः श्वेतꣳ पुच्छ ऽ इन्द्राय स्वपस्याय व्वेहद्वैष्णवो व्वामनꣳ ।**

यजुर्वेद - 24.1

Horse (horse), ram and nilgai have the qualities of a breeder, it is mentioned to use them for ride, vehicle, communication system.

**व्वसन्ताय कपिञ्जलानालभते ग्रीष्माय कलविङ्कान्वर्षाभ्यस्तित्तिरीञ्छरदे व्वर्तिका हेमन्ताय ककराञ्छि शिराय व्विककरान् ॥**

*(यजुर्वेद - 24.20)*

Kapinjal bird for spring, sparrow bird for summer, pheasant for rain, quail for autumn, kakar for winter and vikkar bird for winter can provide knowledge of seasons. When the black pheasant makes a special type of sound. Then there is mention of getting the knowledge of the arrival of rain.

**व्विभूरसि प्रवाहणो व्वह्निरसि हव्व्यवाहनः ।**

*(यजुर्वेद - 5.31)*

There is mention of fire having communicative qualities.

2. In the field of traffic :-

Cycle, scooter, truck, rail, aeroplane, rocket, spaceship etc. are giving evidence of human progress in the universe. Regular visits to the celestial bodies are being made by scientists by the establishment of Chandra Vijay Mangalyaan and space station. Superfast trains have reduced long distances. The use of computer has played an important role in the field of transport. As -

- Making reservation for bus, train and aeroplane for traveling.
- Controlling the flight of an airplane from Air Traffic Control (ATC).
- Operation and controlling of metro train.
- Operation and controlling of watercraft.

**ये ते पन्थानो बहवो जनायना रथस्य वर्त्मानसश्च यातवे ।**

(अथर्ववेद - 12.47)

The paths of human beings and chariots have been mentioned.

**तमूहथुर्नौभिरात्मन्वतीभिरन्तरिक्षप्रुद्भिरपोदकाभिः ।**

*(ऋग्वेद - 1.116.3)*

The word Apodakabhi means celestial boat. Water does not affect on it.

**वेद नावः समुद्रियः ।** *(ऋग्वेद - 1.25.7)*

King Varuna knew the boats or ships that float in the sea.

**यास्ते पूषन्नावो अन्तः समुद्रे हिरण्ययीरन्तरिक्षे चरन्ति।**

(ऋग्वेद - 6.58.3)

The boat that runs under the sea is described in this mantra. Pusha Dev's golden boats used to move inside the sea and also in space.

**समुद्रं गच्छ स्वाहान्तरिक्षं गच्छ स्वाहा देव ँ सवितारं गच्छ स्वाहा मित्रावरुणौ गच्छ स्वाहाहोरात्रे गच्छ स्वाहा च्छन्दा ꣳसि गच्छ स्वाहा द्यावापृथिवी गच्छ स्वाहा यज्ञं गच्छ स्वाहा सोमं गच्छ स्वाहा दिव्यं नभो गच्छ स्वाहाग्निं वैश्वानरं गच्छ स्वाहा मनो मे हार्दि यच्छ दिवं ते धूमो गच्छतु स्वर्ज्योति÷ पृथिवीं भस्मनापृण स्वाहा ।**

(यजुर्वेद - 6.21)

Transportation of sea, space, earth, sky are mentioned in this mantra.

**धेनुर्व्वोढाऽनड्वानशु३ सप्ति÷ ।**

(यजुर्वेद - 22.22)

The means of transportation on earth are mentioned in this mantra.

**अनश्वो जातो अनभीशुरुक्थ्यो३ रथस्त्रिचक्रः परि वर्तते रजः ।**

(ऋग्वेद - 4.36.1)

Chariot with three wheels is mentioned in this mantra.

**सुनावमा रुहेयमस्रवन्तीमनागसमम् ।**
**शतारित्रा ꣳ स्वस्तये ॥**

*(यजुर्वेद - 21.7)*

Boat is mentioned in this mantra.

**सुत्रामाणं पृथिवीं द्यामनेहस ँ सुशर्माणमदिति ँ सुप्रणीतिम् ।**
**दैवीं नाव ँ स्वरित्रामनागसमस्रवन्तीमारुहेमा स्वस्तये ॥**

*(यजुर्वेद - 21.6)*

A boat have light mentioned in this mantra.

### 3. In the field of medicine : -

Identification, diagnosis and surgery of various types of diseases like cancer, TB, heart disease, smallpox etc. and equipment used in medicine like X-ray, C.T. Scan, ECG Computer is used in the operation and control of etc. By telemedicine method by computer, patient sitting far away is treated and operations are also done by laser method.

X-Ray

C.T. Scan

E.C.G.

Figure 7.1 – Medical equipment

### 4. In the field of education :-

Science has played an important role in the field of education. Such as – smart classes, classroom study through Eduset, writing books through e-mail and internet, studying, sending letters, solving mathematical problems, getting education from home under distance education system.

### 5. In the field of agriculture :-

tractors for sowing, various machines for harvesting crops and threshers for extracting grains, use of pesticides on crops, artificial means

for irrigation and use of scientific methods like drip irrigation, sprinkler irrigation etc. are also possible due to science.

6. In the entertainment sector :-

Cinema Television, Radio, Tape recorder, C.D. DVD ৎNew CD through Layer and Computer Preparation, listening to music, film production, serial production, watching films, making cartoon films, playing computer games etc. all became possible only because of scientific inventions.

7. In the field of industrial :-

Science has been used the most in the industrial sector because all the machines used in industries were made due to scientific inventions and their operation is also possible in the present era only through computers. The use of such huge machines on a large scale is not possible without computers. For example, from making thread in fabric preparation to dyeing, weaving and folding the cloth by passing through various activities, all the work is done by machine. Refrigerators are used to cool substances.

8. In the field of defense and nuclear power :-

Agni Baan, Varsha Baan, Shakti Baan have been mentioned in the Ramayana and Mahabharata texts. Based on our ancient texts and other research texts, the scientists of the world did various experiments and researches. Whether it is the matter of generating electricity from the nuclear power plant of Rawat Bhata in Rajasthan or the nuclear tests of Pokhran, which made India's name included in the powerful nations of the world, all are the gift of science. Indian scientist Dr. Homi Jahangir Bhabha laid the foundation of nuclear research in India and did many researches. He is called the father of Indian nuclear science.

**शतकर्दम.. प्रवातानुवाते प्रणीतो यावच्चरति तावन्मारयति।**

*(कोटिल्य.अर्थ.पृष्ट. 905)*

A asparagus, kardan, crab, kaner and fish mixed with castor and blown in the direction of the wind will people wherever the smoke goes.

**9. In the field of building construction and architecture :-**

Different methods of design and construction of ancient fort temples and modern multi-storeyed buildings have been possible only because of scientific inventions. Cement concrete Road .The construction of roofs, multi-storey buildings and other huge buildings on the basis of Vastu art is the gift of science.

**पुरः कृणुध्वमायसीरधृष्टा मा वः सुस्रोच्चमसो दृंहता तम् ।**

*(अथर्ववेद - 19.58.4)*

The city fort which are made of iron is mentioned in this mantra.

**10. In the area of the banking :-**

Due to small savings in Indian families, India's economic condition does not get affected when there is a recession in the world market. But in the present era, due to science, there is an ATM for money whenever you want. Transfer of money from one account to another, credit card, transfer of money from one account to another, e-commerce, etc. are the gifts of science.

## Practice Questions

Q.1 Choose the correct option.

1. Due to which scientific instrument revolution in the field of education took place.

   (a) Television (b) Radio

   (c) Computer (d) Tape recorder

2. What is the contribution of science in the field of communication?

   (a) Fax (b) Television

   (c) Telephone (d) All of the above

3. Which of the following is not a means of entertainment?

   (a) Video game (b) Fax

   (c) Computer (d) T.V.

Q.2 Fill in the blanks

1. The modern technique of sending messages through the Internet is called……...
2. Due to the progress of science, today electricity generation in many countries is done by……power.
3. ……device is used to cool substances.

Q.3 Mark True (✓) or False (✗) against the following statements.

1. X-rays are used in the field of medicine.
2. Air traffic control can control the flight of an aeroplane.
3. Crops can be irrigated by drip irrigation method.

Q.4 Match the correct pair

| | Column 'A' | Column 'B' |
|---|---|---|
| 1. | Telephone | a. Electric field |
| 2. | Thresher | b. Medical field |

| | | |
|---|---|---|
| 3. | Nuclear Power Station | c. Education Sector |
| 4. | Eduset | d. Communication Sector |
| 5. | X-Ray | e. agricultural sector |

Q.5 Very short answer type questions

1. In which state Rawatbhata Atomic Research Center is located?

Q.6 Short Answer Type Questions

1. Write the names of electrical appliances used in daily life.
2. Write the names of the instruments used in the field of medicine.
3. write the name equipment's used in the field of entertainment.

Q.7 Long Answer Type Questions

1. How can science be useful in the development of villages? Explain in detail.

Project work -

1. Make a chart of scientific instruments.
2. Make a chart of the various equipment used in the hospital of your school and put it on the notice board.

# Chapter – 8

## Motion and Measurement of Distance

8.1 Definition of Motion

8.2 Different Types of Motions

8.3 Basic units and derived units

8.4 Units of Length

We see different types of movements in our daily life. As soon as the morning comes, we see the movement of birds in the sky. To do exercise, we bring our hands and feet into a state of motion. In this way we are associated with different types of movements in our daily life. We use measurement in one way or the other as soon as we wake up in the morning. We look at the clock as soon as we wake up in the morning. We all want to control our weight with the help of Yogasan-Pranayama and exercise. The pachak (cook) weighs the food items in the Bhojanshala (kitchen). Thus we use units of measurement regularly in our daily life.

In Atharvaveda, the mention of motion is found in the following form –

Motion of a Bird

Motion of a Body

Clock

Weight Machine

Figure 8.1 – Different Motion

**सं सं स्रवंतु सिंधवः संवाताः संपत्रिनः।**

(अथर्ववेद 1.15.1)

Motion of rivers, wind (air) and birds is mentioned in this mantra.

## 8.1 Definition of Motion

The change in the position of objects is called motion.

By looking at objects, you can find out whether they are in motion or at rest. You see that in flying bird, crawling ant, moving bus, running children, in all situations the position of objects is changing with time.

The change in position of an object with time is called motion.

## 8.2 Different Types of Motions

You must have also enjoyed sliding on the slider, swinging. Do they all have some kind of motion ? There are many types of motion. There are different types of motion like straight line motion, circular motion, periodic motion, rotational motion, vibrational motion etc.

**(a) Straight Line Motion :-** The motion which takes place in a straight line is called a straight line motion. Motion of a vehicle on a straight road, motion of a child sliding on a slider, motion of a train on a straight track are examples of straight line motion.

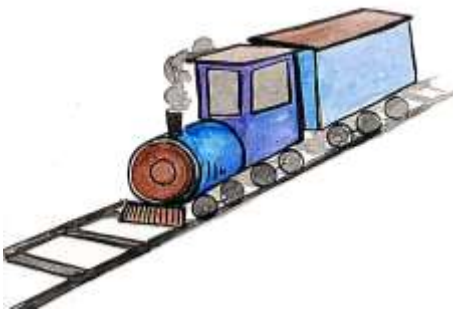


Fig. 8.2 – Rectilinear motion

**(b) Circular Motion :-** When an object moves on a fixed circular path, then this motion is called circular motion. Tie a stone to one end of the string. Holding the other end of the string tightly, rotate it rapidly. We observe that the stone moves in a circular path.

Figure 8.3 – Circular motion

(c) **Periodic motion :-** Such motion which is repeated after a fixed time is called periodic motion. You must have seen the pendulum of the clock swinging and the children swinging. In these, the pendulum and swing of the clock repeat their path after a certain time while moving. This type of motion is called harmonic motion.

Fig. 8.4 – Harmonic motion

**गतमूर्ध्वं गमनमागतमधोगमनं यत्र । पक्षिगतिविशेष:। (जटाधर)**

Oscillation motion of a body is up and down in the vertical direction.

(d) **Vibrational Motion:-** The motion in which the object vibrates is called vibrational motion . Take a long thread and hold one end of it tightly. Ask your friend to hold the other end of the thread tightly. Keep the thread taut, hold it from the middle and pull it downwards and release it. Watch the movement of the thread carefully, the thread vibrates.

(e) **Rotational Motion:-** The motion that occurs around a fixed axis is called rotational motion.

The motion of a spinning top and a potter's wheel are examples of rotational motion.

## 8.2 Origin of physical units –

Various methods of measurement are being used since ancient times.

1. **1 cubit –** The distance between the elbow and the tip of the middle finger is called 1 cubit.
2. **1 Balisht –** The distance between the tip of the thumb and the little finger is called 1 Balisht.
3. **1 foot or foot –** The length of the foot was called 1 foot.
4. **1 Unica or Inch –** The twelfth part of 1 foot was called Unica or Inch.

## 8.3 Basic units and derived units –

Length, mass, time in MKS system are meter, kg second respectively and in CGS system the units of length, mass, time are cm., gram second. These units are called basic units. The units of area, density, volume etc. are known with the help of basic units. Such units are called derived units.

Different instruments of measurement –

- Ruler (scale)
- Measuring tape
- Vernier caliper
- Weight scale
- Watch
- Microscopes

**Ruler (Scale) –** To measure straight lines and curved lines.

**Measuring Tape –** For measuring long lengths.

**Vernier caliper –** for measuring very small lengths or diameters of fine wire.

**Weight Scale –** To measure the weight (mass) of an object.

**Clock –** To measure time.

**Microscope –** to magnify the size of micro-organisms.

**Units of length :-** All the countries of the world use a unit system which is called the International System of Units ( SI) . The international unit of length is the meter. Its 1000th part is called centimeter. One- tenth of a centimeter is called a millimeter.

| | | |
|---|---|---|
| 1 meter | = | 100 cm |
| 1 centimeter | = | 10 millimeters |
| 1 meter | = | 1000 millimeters |
| 1 kilometer | = | 1000 meters |

## Practice Questions

Q.1 Choose the correct option.

1. Example of circular motion is –

   (a) Motion of train (b) Motion of crusher bull

   (c) Motion of a sitar string (d) Motion of a butterfly

2. Which of the following motion is not repeated after a fixed interval of time ?

   (a) Fruit plucking from the tree

   (b) Heart beat

   (c) Rotation of the earth on its axis

   (d) Motion of the pendulum of a clock

3. Is the unit of distance in SI system ?

   (a) Kilogram (b) Meter

   (c) Second (d) Gram

4. Example of vibrational motion is –

   (a) Speed of swing (b) Speed of wheel

   (c) Speed of bus (d) Speed of string of guitar

Q.2 Fill in the blanks

1. The motion of the pendulum of a clock is ----------.
2. The motion of the wheel of vehicles is _____.
3. The motion of a vehicle moving on a straight road is ----------

Q.3 Mark true or false against the following statements.

1. The motion of a train is an example of straight line motion.
2. The motion of the top is an example of rotational motion.
3. The motion of a swing is an example of rectilinear motion.

Q.4 Match the correctly –

| | Column 'A' | Column 'B' |
|---|---|---|
| 1. | Rotating motion | The potter's wheel |
| 2. | Circular motion | Motion of the strings of the sitar |
| 3. | Rectilinear | Motion of a swing |
| 4. | Vibrational motion | Falling from above |

Q.5 Very short answer type questions

1. When the train moves in a straight line, what kind of motion does the train have?
2. What kind of motion does the swing make when you swing it?

Q.6 Short Answer Type Questions

1. Write two examples of periodic motion ?
2. Write two examples each of the means of transport used on air, water and land.

Q.7 Long Answer Type Questions

1. Write the similarities and differences between the motion of a moving bicycle wheel and a moving ceiling fan ?
2. The height of a person is 1.65 meters. Express it in centimeters and millimeters?

Project work -

1. Measure the length of your room.

# Chapter – 9

## Light Shadows and Reflection

9.1 Sources of Light

9.2 Light brightness or luminous intensity

9.3 How shadow is formed

9.4 Reflection of Light

9.5 Image from a plane mirror

9.6 Multiple Images

9.7 Reflection by Spherical Mirrors

During the day we can see all the things around us very clearly, but during the night when there is complete darkness, then we cannot see the things clearly. Then we need light producing source like torch, lamp, lantern, electric bulb etc. to see the objects. There is a lack of light in the dark, without light we cannot see things, that is, light helps us to see things.

When light hits the objects and reaches our eyes, then the objects are visible to us. Light is a type of energy due to which we can see objects.

**ज्योतिष्मतीं त्वा सादयामि ज्योतिष्कृतं त्वा सादयामि ज्योतिर्विदं त्वा सादयामि भास्वतीं त्वा सादयामि ज्वलन्तीं त्वा सादयामि मल्मलाभवन्तीं त्वा सादयामि दीप्यमानां त्वा सादयामि रोचमानां त्वा सादयामि अजस्त्रां त्वा सादयामि बृहज्ज्योतिषं त्वा सादयामि बोधयन्तीं त्वा सादयामि जाग्रतीं त्वा सादयामि॥**

तैत्तिरीय संहिता 1.4.34

I keep you in that which is light. I give you the place that illuminates. I keep the light I find in you. I give you that bright spot. I keep you most inflammable. I give you that bright spot. I ignite you that art. I keep you in that flammable place. I keep you that art immortal. I keep you, who has great light. i wake you up I awaken you to that art.

## 9.1 Sources of Light

Sun is the biggest source of light, but sunlight is received only during the day. We use lamps, lanterns, electric bulbs, tube lights etc. to generate light at night. The objects which themselves emit light like the sun are called luminous objects. Often we also get the light of the moon during the night. This light of the moon is actually the light of the sun. When the light of the Sun reaches the Earth after colliding with the Moon, its light is received on the Earth during the night. Since the moon does not shine with its own light, such objects which do not shine with their own light are called non-luminous objects.

**On the basis of light passing through objects, objects can be divided into three parts –**

1. **Transparent objects :-** Such objects through which light can pass well and on the other side of which we can clearly see the objects are called transparent. For example - glass, air, clean water, some plastic etc.

2. **Opaque objects :-** Such objects through which light cannot pass and on the other side of which we cannot see the object at all, are called opaque. For example, metals, wood, cardboard, stone, etc. are opaque objects.

3. **Translucent objects :-** Such objects which allow light to pass through them only partially and the objects on the other side of which we do not see clearly are called translucent. Like – ground glass, oiled paper, butter paper.

**Activity 1 -**

**Materials required -** A small pipe, Candle, Table, Matches, Stick

Put a lit candle on a table in the presence of your Guruji, now try to see the candle through the pipe. Do you see the candle? Now bend the pipe in the middle and again try to see the candle through the pipe. What is the conclusion you get in both these cases?

In the first position the candle is visible and in the second position the candle is not visible. Why does this happen? This happens because light travels in a straight line.

## 9.2 Light brightness or intensity of illumination –

**Heating up of electric bulb -** Inside the electric bulb there is a thin wire which is called filament. When the switch is pressed, the filament heats up to a high temperature and electric current flows through it. As a result, that filament starts glowing, in other words the light from that electric bulb is due to the heating of that filament.

**The fluorescent bulb remains cool –** The light bulb uses an inert gas, which glows as soon as an electric current is passed through it. Hence it is cool to the touch.

**Measurement of luminous intensity of a light source -** The luminous intensity of a light source is measured by comparing it with the brightness of a candle. The unit of this luminous intensity is called candle power. If you have 100 candle-power in your room, then the brightness of that bulb will be equal to 100 candles. What will be the candle-power of the sun at noon? Can you guess it?

The light of the Sun at noon is more than 1,000,000 candle-power.

**Lumen –**

Lumen is a unit used to measure the luminous intensity of a light source. 1 candle power = 12.56 lumen

**Brightness of the source of light -**

Burn a match stick and hold it very close to your eye. Look at its flame for a minute. You will find the room dark. The brightness or luminosity of the Sun is 1,00,000 candelas or 12,560,000 lumens. But when you hold a lit matchstick near your eyes, it appears bright. As the distance increases, the luminous intensity of the source decreases or becomes dimmer.

### Speed of light rays -

~150,000,000 km from Earth is far. The rays of light from the Sun reach the Earth in 8 minutes 30 seconds and the rays of light from the Moon reach the Earth in 1 minute 30 seconds, so the speed of light is 2,29,792 km. per second or $3 \times 10^8$ meters per second.

## 9.3 How shadow is formed : -

When light falls on an opaque object, the image formed on the wall or screen behind the object is called shadow. The shadow is formed on the opposite side of the light source. To understand this, light a dark room by lighting a candle. Draw the shadow of your hand on the wall. Now remove the hand and extinguish the candle by placing your hand on the transparent glass plate in front of the candle. You will not see the shadow of your hand. It is clear that in order to see the shadow, it is necessary to have some light source and some opaque object should be kept in the path of light.

## 9.4 Reflection of Light :-

Light travels in a straight line. If an opaque barrier is placed in the path of light, it cannot pass through it, but what will happen when a bright object like a plane mirror is placed?

To understand this, stand in the open in front of a building during day time with a plane mirror in hand and let the sunlight fall on this mirror. Now rotate the mirror in such a way that a spot of light falls on the wall of the building where sunlight is not coming. A spot of light starts forming on the wall of the building. When light coming from the sun falls on a plane mirror, the mirror changes the direction of the light falling on it.

The phenomenon of light rays colliding with a mirror or any other shiny surface and returning back to the same medium is called reflection of light.

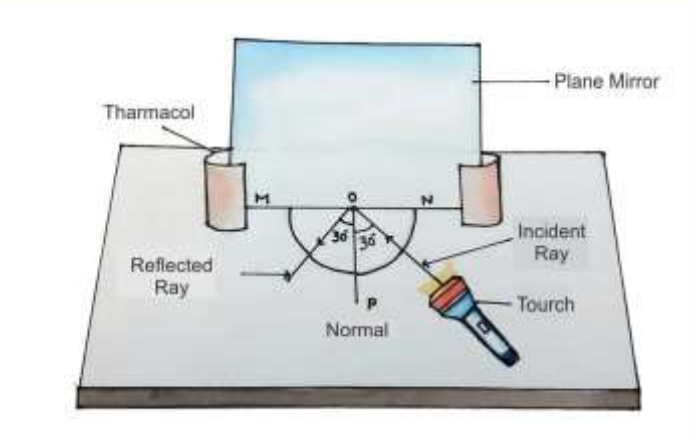



Figure 9.2 – Reflection of light

**Reflection of light -** The two laws of reflection of light are as follows: -

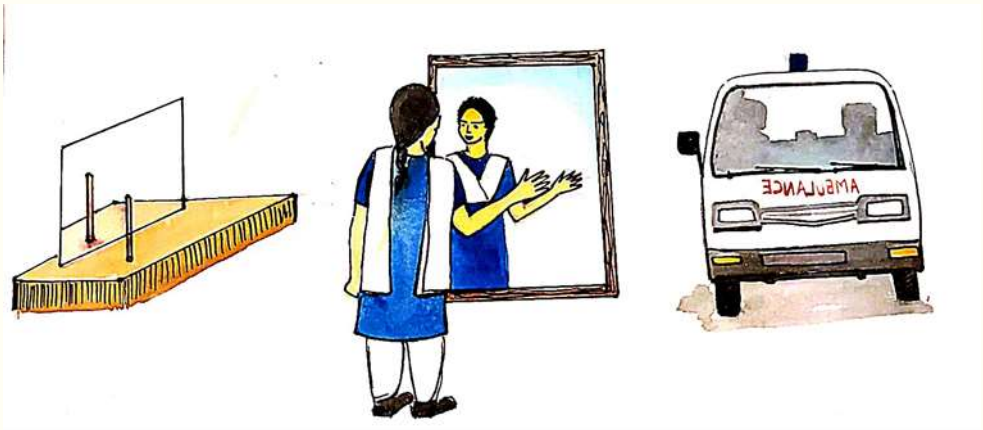
1. The incident ray, the point of incidence, the normal and the reflected ray should lie in the same plane.
2. The angle of incidence should be equal to the angle of reflection.

- The ray of light falling on the mirror is called the incident ray.
- The light ray coming back after reflection from the mirror is called reflected ray.
- At the point where the incident ray strikes the mirror, draw a line making an angle of 900 with the mirror. This line is called normal to the reflecting surface at that point.
- The angle between the incident ray and the normal is called the angle of incidence.
- The angle between the reflected ray and the normal is called the angle of reflection.

## 9.5 Image from a plane mirror :-

In a plane mirror, the image is straight and equal in size to the object, the image is formed at the same distance behind the mirror as the distance of the object from the mirror, this image is inverted. Lateral Variation- Standing in front of a plane mirror, extend your right hand and look at

your image. You will find that your left hand is outstretched in your image.




Because of the change of side, special letters are written in front of the Ambulance, so that its reflection in the side glass (mirror) near the driver of the vehicle moving ahead becomes correct and it is seen written Ambulance. So that he can give side to the ambulance coming from behind.

**बुद्धिर्यस्य बलं तस्य ।** ***(पञ्चतन्त्र)***

When the rabbit takes the lion to the well, the lion sees his reflection in the water.

**We can see objects only because of reflection -**

When the objects collide with different points and come to our eyes after being reflected, then the image of all the points of those objects is formed in our eyes, due to which we see those objects.

## 9.6 Multiple Images :-

You must have gone to a shop to get your hair cut. There you are made to sit in front of a mirror and there is also a mirror behind you. These two mirrors are parallel to each other. Because of the rear mirror, you see multiple images of yourself.

Figure 9.4 – Multiple images

## 9.7 Reflection by Spherical Mirrors -

**Your reflection in the spoon –** There are two types of surfaces of the spoon. The inner part or the front part of the spoon is raised or sunken inwards and the outer or back part of the spoon is raised outwards. Hence, the inner part of the spoon acts as a concave mirror and the outer part of the spoon acts as a convex mirror. When you hold the inside of the spoon closer to you, you see it bigger (magnified) and inverted. When you move the spoon away from you, the image changes. Depending on the distance of the spoon from you, sometimes your image appears inverted and enlarged (magnified), sometimes inverted but the same size, and sometimes inverted and smaller (reduced). Is . When you see yourself in the outer surface of the spoon, your image is the same – tall and short.

Fig. 9.5 – Image from a spoon

**Use of spherical mirrors in daily life –**

1. **Use of Concave Mirror –** Concave mirror is used by otolaryngologist and dentist for medical treatment and it is used in beauty parlor (shringar griha), as shaving (shave) mirror, as headlights of motor vehicle.

Figure 9.6 – Use of concave mirror

2. **Use of Convex Mirror –**

Convex mirrors are used as side mirrors of vehicles.

Fig. 9.7 – Use of convex mirror

## Practice Questions

Q.1. Select the correct option

1. Which of the following is opaque ?

   (a) Glass (b) Water (c) Kerosene (d) Wood

2. The artificial source of light is -

   (a) Sun (b) Moon (c) Candles (d) Stars

3. It is necessary for shadow formation –

   (a) Light source (b) Opaque object

   (c) Curtain (d) All of the above

4. The angle of incidence is equal to the angle of reflection -

   (a) Always (b) Sometimes

   (c) In special cases (d) Never

5. The image of an object placed in front of a plane mirror is formed by –

   (a) The object and the mirror at equal distance

   (b) At twice the distance at equal distance.

   (c) At half the distance

   (d) At four times the distance

Q.2. Fill in the blanks

1. Light travels in…… line.
2. Lantern is a……source of light.
3. Such objects on the other side of which we can see the objects are called……
4. To see our image we use ……mirror.

Q.3. Mark True (✓) or False (✗) against the following statements.

1. We can see objects due to the phenomenon of reflection of light.
2. Wood is a transparent material.

3. Oiled paper is a translucent material.

Q.4 Match the correct pair.

| | Column 'A' | Column 'B' |
|---|---|---|
| 1. | Transparent Objects | - Metals |
| 2. | Opaque object | - Air |
| 3. | Illuminated object | - Moon |
| 4. | Unilluminated object | - Sun |

Q.5 Very short answer type questions

Classify the following objects or substances into opaque, transparent or translucent and luminous or non-luminous:

Air, water, piece of rock, aluminum sheet, mirror, wooden board, polythene sheet, smoke, plane glass sheet, bright torch, sun, firefly, moon.

Q.6 Short Answer Type Questions

1. If you place a mirror in front of your face in the dark, will you see your reflection in the mirror?
2. What is reflection? Write the laws of reflection?
3. In a plane mirror, the image of the right part of the object (object) appears as the left part, what is it called?

Q.7 Long Answer Type Questions

1. Into how many parts can objects be divided on the basis of light passing through them?
2. Explain multiple image with diagram.

Project work -

1. Observe shadow formation in sunlight.
2. Demonstrate the formation of shadow by torch light.
3. To study and observe transparency by shining light on glass, paper, wood.

# Chapter – 10

# Fun with Magnets

10.1 How the magnet was discovered

10.2 Magnetic and Non-magnetic Activity

10.3 Poles of a Magnet

10.4 Compass

10.5 Making a magnet from iron

10.6 Magnetic field of a magnet

Some of you must have seen magnets and also enjoyed playing with them. Have you seen (speakers) that stick to iron surfaces like cupboard or refrigerator doors? Some pins are seen sticking to the pin holders. In some pencil boxes, even without the arrangement of locks, when we close the lid, it closes tightly. Magnets are attached to such sticks, pin holders and pencil boxes.

## 10.1 How the magnet was discovered : -

It is said that there lived a shepherd in ancient Greece. His name was Manus. He used to go to the nearby mountains to graze his flock of sheep and goats. He used to keep a stick with him to control the sheep. An iron cap was attached to one end of the stick. One day he was surprised when he had to exert a lot of effort to lift this stick from the top of a rock on the mountain. The rock seemed to attract the stick towards itself. The rock was a natural magnet and attracted the iron cap on one end of the shepherd's stick. It is said that thus the natural magnet was discovered. Probably after the name of that shepherd, that stone was named Magnetite. Magnetite contains iron.

The substances which have the property of attracting iron are called magnets.

**पञ्चमहाभूतमयस्तारा-गण-पञ्जरे महीगोलः।**
**स्वेऽयस्कान्तान्तः स्थो लोह इवावस्थितो वृतः॥**

*(पञ्च सिद्धान्तिका)*

The round earth is stuck in the cage of a constellation like a piece of iron between two big magnets.

**निमित्तमात्रं तत्रासीन्निर्गुणः पुरुषर्षभः ।**
**व्यक्ताव्यक्तमिदं विश्वं यत्र भ्रमति लोहवत् ॥**

(श्रीमद्भागवत चतुर्थ स्कन्ध अथैकादशोऽध्याय 17)

In this shloka of Shrimad Bhagwat, it is said that a magnet attracts iron.

## 10.2 Magnetic and Non-magnetic Substances Activity

The substances which are attracted towards the magnet are called magnetic substances like – iron, cobalt, nickel etc.

The substances which are not attracted towards the magnet are called non-magnetic substances like plastic, glass, wood, leather etc.

Now-a-days artificial magnets of different shapes are made such as – spiral magnet, bar magnet, cylindrical magnet etc.

**आ विद्युन्मद्भिर्मरुतः स्वर्कै रथेभिर्यात ऋष्टिमद्भिरश्वपर्णैः ।**

*(ऋग्वेद - 1.88.1)*

Magnetic power is mentioned in Marut.

## 10.3 Poles of a magnet :-

Collect the iron filings by moving the magnet in the sand. Keep the magnet on a sheet of paper and drop iron filings on it. Most of the iron filings stick to both the ends of the magnet.

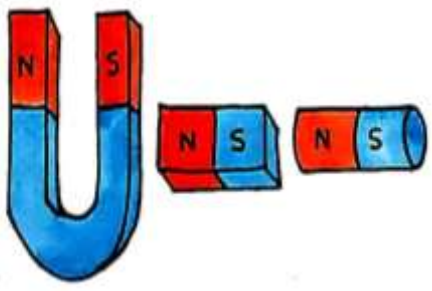



Figure 10.1 – Spiral magnet, bar magnet, cylindrical magnet

These two ends are called the poles of the magnet.

Hang the magnet by tying it to a thread and let it come to rest. The end of the magnet which is towards the north is called the north pole and the end which is towards the south is called the south pole. A freely suspended magnet always points north or south.

## 10.4 Compass (Compass ) :-

Figure 10.2 – Compass

Take a compass and observe it. It is a small container with a glass lid. A magnetic needle rotates freely in it. One end of this needle is the north pole and the other end is the south pole. The compass also has a dial. On which the directions are marked. Where we have to find the direction, the compass is kept there. When the compass needle comes to rest, it points in the north-south direction. Rotate the compass until the north-south direction marked on the dial comes at both ends of the needle.

Attraction and repulsion between magnets :- Suspend a bar magnet freely by a thread. Allow the magnets to come to rest. Bring the south pole of another bar magnet near the south pole of the magnet. what do you see The suspended magnet moves backwards i.e. repelled . Now bring the south pole (S) of the magnet near the north pole (N) of the suspended magnet . You see that the hanging magnet comes closer, that is, it is attracted.

Unlike poles of a magnet attract and like poles repel.

## 10.5 Making a magnet out of iron :-

We can make magnets by two methods.

1. Take an iron nail. Take one end of the bar magnet near the nail by rubbing it from one end to the other. Then lift the magnet and again move

it to the initial end of the nail. Repeat this sequence 30-40 times. Now take some alpines near this nail. alpine starts to get attracted to the nail. The property of magnetism comes in the nail.

2. Magnets can also be made from battery, copper wire and nail. Take an iron nail, wrap an insulated copper wire on it. Connect both the ends of the wire to the battery. Take the alpines near nails. The pin is attracted to the nail. Now after removing the battery and moving the pins near the nail again, it does not attract.

**Uses of Magnets**

1. In compass.
2. In making speakers.
3. In lifting heavy iron objects by electric crane.
4. In removing iron particles from the eye
5. Electric bell in electric motor.

Magnetism gets weakened over time.

**For this the following measures can be taken:-**

1. A wooden block should be placed between two bar magnets.
2. Pieces of soft iron should be placed on the ends of the magnet.
3. The magnet should not be dropped, heated, hurt.
4. Keep the magnet away from mobile, TV, music system, computer etc.

## 10.6 Magnetic field of a magnet

The force that magnetism magnetic substances is called magnetic field. The magnetic field is maximum near the poles of the magnet. If a magnetic substance is placed in the magnetic field of a magnet, then that substance is affected by the force of that magnetic field. The lines of force of a magnetic field can be drawn using a compass needle and a magnetic bar.

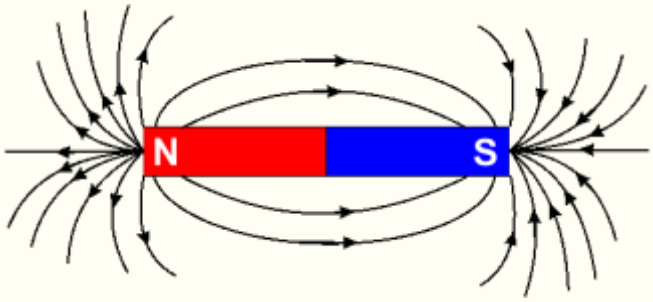



Figure 10.3 – Magnetic force lines

**Magnetic lines of force -** The magnetic lines of force start from the north pole of the magnet, enter the south pole of the magnet and again pass through the magnet and return to the north pole. Magnetic lines of force form closed curves. Magnetic field lines never cross each other.

What substances are magnets made of?

Magnets are made from pure iron (ductile iron), steel, aluminum, cobalt, nickel, iron alloys.

## Practice Questions

Q.1 Choose the correct option

1. Which of the following are magnetic substances –

   (a) Cobalt (b) Copper

   (c) Lead (d) Wood

2. The poles of a magnet are –

   (a) One (b) Two

   (c) Three (d) Four

3. Electric crane is used for –

   (a) In digging a pit (b) In lifting stone slabs

   (c) Lifting a heavy iron object (d) None of these

4. Which of the following is a magnetic substance –

   (a) Glass (b) Iron

   (c) Plastic scale (d) Wooden

Q.2 Fill in the blanks

1. A magnet has……..and……..poles.
2. A magnet made by man is called ……..
3. The magnet attracts the filings of ……..
4. Similar poles of a magnet are……..

Q.3 Mark True (✓) or False (✗) against the following statements.

1. There is an attraction between the unlike poles of a magnet.
2. When the compass needle comes to rest, it points east-west.
3. Plastic is a non-magnetic material.

Q.4 Match the correct pair.

| | Column 'A' | Column 'B' |
|---|---|---|
| 1. | Magnetic material | a. Wood |
| 2. | Nonmagnetic material | b. Iron |

3. Between like poles of a magnet — c. Attraction

4. Between opposite poles of a magnet — d. Repulsion

Q.4 Very short answer type questions

1. What are the substances which are attracted towards the magnet called?

Q.5 Short Answer Type Questions

1. What is a magnet?
2. In which direction does the magnet stay when it is suspended freely?
3. Write two uses of magnet?
4. What will be the effect on heating the magnet?
5. Draw a labeled diagram of a compass?
6. Where are the poles of a bar magnet located?
7. Write any two properties of a magnet?

Q.6 Long Answer Type Questions

1. Write the methods of making iron magnets.

Project work -

1. Demonstrate the property of attraction of a magnet using an experiment.
2. Use the knowledge of direction by suspending a magnet from a string.
3. Experimentally demonstrate repulsion and attraction between like and unlike poles respectively.

# आदर्श प्रश्नपत्र/ Model Que. Paper : I/23-24/ विज्ञान /
# वेदभूषण प्रथम-वर्ष / Vedabhushan First Year/
## कक्षा 6वीं / प्रथमा - I / Class 6th / Prathama - I
## वर्ष / Year 2023-24
## विषय - विज्ञान / Science

पूर्णांक/M.M. – 100 समय/Time – 3 घण्टे

| | |
|---|---|
| • सभी प्रश्न हल करना अनिवार्य हैं।<br>• सभी प्रश्न के उत्तर पेपर में यथास्थान पर ही लिखें।<br>• इस प्रश्न पत्र में कुल 38 प्रश्न हैं ,प्रत्येक प्रश्न के सामने निर्धारित अंक दिये गये हैं।<br>• उत्तीर्णता हेतु न्यूनतम %40अंक निर्धारित हैं।<br>• आदर्श प्रश्न पत्र का छात्रों को लिखित परीक्षा हेतु अभ्यास कराएँ। | • It is mandatory to attempt all the questions compulsorily.<br>• Write down the answers at the appropriate places provided.<br>• This question paper contains 38 questions. Marks for each question are shown on the side.<br>• The minimum pass marks are 40%.<br>• The model question paper should be used by the students for written examination practice. |

**सही विकल्प का चयन कीजिए / Choose the correct option - 10 × 2 = 20**

**नोट – दिए गए प्रश्नों मे आंतरिक विकल्पों (अ, ब, स, द) में से किसी एक का चयन करें –**

**Note – Select any one of the internal options (A, B, C, D) in the given questions -**

1. एक पत्थर को धागे के एक सिरे से बाँधकर घुमाने पर किस प्रकार की गति होती है -

   What kind of motion occurs when a stone is tied to one end of a thread and is rotated?

   (i) सरल रेखीय गति / Straight Line Motion
   (ii) आवर्त गति / Harmonic Motion
   (iii) वृत्ताकार गति / Circular Motion
   (iv) कम्पन गति / Vibratory Motion

   (अ) केवल (i) (ब) (i) और (ii)
   (A) Only (i) (B) (i) and (ii)
   (स) केवल (iii) (द) (i), (iii), (iv)
   (C) Only (iii) (D) (i), (iii), (iv)

2. निम्न में से शाकाहारी जन्तु है –

Which of the following is a Herbivorous Animal?

(i) गाय Cow (ii) बकरी Goat (iii) शेर Lion (iv) हिरण Deer

(अ) केवल (ii) (ब) (i), (ii) और (iv)

(A) Only (ii) (B) (i), (ii) and (iv)

(स) (i) और (iv) (द) केवल (iv)

(C) (i) and (iv) (D) Only (iv)

3. निम्न में से किससे ऊन प्राप्त होता है -

Wool is obtained from which of the following -

(i) भेड़ Sheep (ii) कुत्ता Dog (iii) ऊँट Camel (iv) बकरी Goat

(अ) केवल (iii) (ब) (i) और (ii)

(A) Only (iii) (B) (i) and (ii)

(स) (i), (ii) और (iv) (द) (ii) और (iv)

(C) (i), (ii) and (iv) (D) (ii) and (iv)

4. व्रीहमत्तं यवमत्तमथो माषमथो तिलम्। (अथर्ववेद - 6.140.2)

उपर्युक्त वेद मन्त्र में किन खाद्य पदार्थों का उल्लेख है –

Which food items are mentioned in the above Veda Mantra –

(i) चावल Rice (ii) जौ, उड़द Barley, Urad

(iii) गेहूँ Wheat (iv) तिल Sesame

(अ) केवल (ii) (ब) केवल (iv)

(A) Only (ii) (B) Only (iv)

(स) (ii) और (iii) (द) (i), (ii) और (iii)

(C) (ii) and (iii) (D) (i), (ii) and (iii)

5. निम्न में से अनाज के दानों से मिट्टी के कणों को पृथक करने की विधि है –

Which of the following is the method of separating soil particles from grain particals –

(i) थ्रेशिंग Threshing
(ii) निष्पावन Winnowing
(iii) हस्त चयन Handpicking
(iv) वाष्पन Evaporation

(अ) (i), (ii) और (iv)
(ब) केवल (iii)
(A) (i), (ii) and (iv)
(B) Only (iii)
(स) केवल (ii)
(द) (i), (ii) और (iii)
(C) Only (ii)
(D) (i), (ii) and (iii)

6. निम्न में से एक वर्षीय पादप है –

Which of the following is an annual plant –

(i) मक्का Maize
(ii) चना Gram
(iii) बरगद Banyan
(iv) नीम Neem

(अ) केवल (iii)
(ब) केवल (iv)
(A) Only (iii)
(B) Only (iv)
(स) (i), (ii), (iii) तीनों
(द) (i) और (ii)
(C) (i), (ii), (iii) all the three
(D) (i) and (ii)

7. **वेद नावः समुद्रियः ।** (ऋग्वेद - 1.25.7)

उपर्युक्त वेद मन्त्र में यातायात के किस साधन का उल्लेख है –

Which means of transport is mentioned in the above Veda Mantra?

(i) घोड़ा Horse
(ii) नौका Boat
(iii) बैल Bull
(iv) गधा Donkey

(अ) केवल (i)
(ब) केवल (ii)
(A) Only (i)
(B) Only (ii)
(स) केवल (iv)
(द) केवल (iii)

(C) Only (iv) (D) Only (iii)

8. कथन (A) – गर्दन और सिर को जोड़ने वाली सन्धि धुराग्र सन्धि कहलाती है ।

Assertion (A) – The joint connecting the neck and the head is called the pivot joint.

कथन (R) – धुराग्र सन्धि सिर को आगे पीछे या दायें बायें धुमाने में कार्य करती है ।

Reason (R) – The pivot joint serves to rotate the head forward, backward or left to right.

(अ) A एवं R दोनों सही है । R, A की सही व्याख्या करता है ।

(A) Both A and R are correct. R is the correct explanation of A.

(ब) A एवं R दोनों सही है । R, A की सही व्याख्या नही करता है ।

(B) Both A and R are correct. R does not explain A correctly.

(स) A सही है परन्तु R गलत है ।

(C) A is correct but R is incorrect.

(द) A गलत है परन्तु R सही है ।

(D) A is wrong but R is correct.

9. शरीर में स्वतः निरन्तर होने वाली गति है -

Self-perpetuating motion in the body is -

(i) पलकों का झपकना Blinking (ii) दौड़ना Running

(iii) चलना Walking (iv) पीछे मुड़कर देखना Looking back

(अ) केवल (iii) (ब) केवल (iv)

(A) Only (iii) (B) Only (iv)

(स) (i) और (ii) (द) केवल (i)

(C) (i) and (ii) (D) Only (i)

10. कथन (A) - शिशु का वयस्क बनना मन्द परिवर्तन का प्रकार है ।

Assertion (A) - The transformation of an infant into an adult is a slow type of change.

कथन (R) – दूध से दही बनना तीव्र परिवर्तन का प्रकार है ।

Reason (R) – Formation of curd from milk is a rapid type of change.

(अ) A एवं R दोनों सही है । R, A की सही व्याख्या करता है ।

(A) Both A and R are correct. R is the correct explanation of A.

(ब) A एवं R दोनों सही है । R, A की सही व्याख्या नही करता है ।

(B) Both A and R are correct. R does not explain A correctly.

(स) A सही है परन्तु R गलत है ।

(C) A is correct but R is incorrect.

(द) A गलत है परन्तु R सही है ।

(D) A is wrong but R is correct.

रिक्त स्थानों की पूर्ति कीजिए / Fill in the blanks – $5 \times 1 = 5$

11. अस्थियों की सन्धियाँ शरीर को ..... में सहायता करती है ।

Joints of bones help the body to .....

12. पृथिवी की अपनी धुरी पर गति ..... प्रकार की गति है ।

The motion of the earth on its axis is a ..... type of motion.

13. प्रकाश ..... रेखा में गमन करता है।

Light travels in ..... line.

14. चुम्बक में ..... ध्रुव होते है ।

Magnet has ..... poles.

15. कम्पास की सुई जब विरामावस्था में आती है तो वह ..... दिशा निर्देशित करती है ।

When the needle of a compass comes to rest, it points in the direction of .....

16 सही जोडी का मिलान कीजिए /Match the correct Column – 5 x 0.5 = 2.5

| स्तम्भ क /Column A | | स्तम्भ ख/Column B | |
|---|---|---|---|
| (i) | पारदर्शी वस्तु<br>Transparent Objects | (अ) | धातुएँ<br>Metals |
| (ii) | अपारदर्शी वस्तु | (ब) | वायु |

| | | | |
|---|---|---|---|
| | Opaque Objects | | Air |
| (iii) | प्रदीप्त वस्तु | (स) | चन्द्रमा |
| | Luminous Object | | Moon |
| (iv) | अप्रदीप्त वस्तु | (द) | सूर्य |
| | Non-luminous Object | | sun |
| (v) | पारभासी वस्तु | (य) | कागज |
| | Translucent material | | Paper |
| | | (र) | तेल लगा हुआ कागज |
| | | | Oiled Paper |

17. सही जोडी का मिलान कीजिए /Match the correct Column – 5 x 0.5 = 2.5

| | स्तम्भ क /Column A | | स्तम्भ ख/Column B |
|---|---|---|---|
| (i) | संघनन | अ) | समुद्री जल से नमक में परिवर्तन |
| | Condensation | | Change of sea water to salt |
| (ii) | निस्तारण | ब) | भारी अवयवों का तली में बैठ जाना |
| | Decantation | | Settling of heavy components to the bottom |
| (iii) | अवसादन | स) | जल वाष्प का द्रव अवस्था में परिवर्तन |
| | Precipitation | | Change of water vapor to liquid state |
| (iv) | वाष्पन | द) | अशुद्ध जल को मिट्टी सहित पलटने की प्रक्रिया |
| | Evaporation | | The process of inverting the impure water along with the soil |
| (v) | निस्यंदन | य) | हल्के अवयवों का तली में बैठ जाना |
| | Filtration | | Sedimentation of lighter components |
| | | र) | फल के रस से बीजों को पृथक करना |
| | | | Separation of seeds from the juice of the fruit |

18. निम्नलिखित कथनों पर विचार कीजिए – 5 x 0.5 = 2.5

Consider the following statements –

(i) कपास के वस्त्र, कपास के पौधों से प्राप्त होते हैं।

Cotton textiles are obtained from cotton plants.

(ii) पॉलीथीन, थर्मोप्लास्टिक है।

Polythene is a thermoplastic.

(iii) फ़लों का पकना भौतिक परिवर्तन है।

Ripening of fruits is a physical change.

(iv) लोहे पर जङ्ग लगना रासायनिक परिवर्तन है।

Rusting of iron is a chemical change.

(v) खनिज लवण भोजन को पचाने में सहायता करते हैं।

Mineral salts help in digestion of food.

उपर्युक्त (i से v तक) कथनों में से कौन-से सही है ?

Which of the statements given above (i to v) are correct?

(अ) i और iii (ब) i, ii, iv, v

(A) i and iii (B) i, ii, iv, v

(स) i और v (द) iii, iv, v

(C) i and v (D) iii, iv, v

19. निम्नलिखित कथनों पर विचार कीजिए – 5 x 0.5 = 2.5

Consider the following statements –

(i) कार्बोहाइड्रेट, शरीर की वृद्धि में सहायक होता है ।

Carbohydrate helps in the growth of the body.

(ii) चीता, एक माँसाहारी जन्तु है ।

Leopard is a carnivore animal.

(iii) प्राकृतिक रेशे, कृत्रिम रेशे की तुलना में ज्यादा मजबूत होते हैं।

Natural fibers are stronger than synthetic fibers.

(iv) कुत्ता, एक सर्वाहारी प्राणी है।

Dog is an omnivorous animal.

(v) दूध और जल के मिश्रण को निस्यंदन विधि द्वारा पृथक किया जा सकता है।

A mixture of milk and water can be separated by the method of filtration.

उपर्युक्त (i से v तक) कथनों में से कौन-से सही है ?

Which of the statements given above (i to v) are correct?

| | | | |
|---|---|---|---|
| (अ) | i और iv | (ब) | i, ii, v |
| (A) | i and iv | (B) | i, ii, v |
| (स) | ii और iv | (द) | i, iii, iv |
| (C) | ii and iv | (D) | i, iii, iv |

अति लघूत्तरीय प्रश्न (पूर्ण पंक्ति में उत्तर लिखना है) 5 x 2 = 10

Very Short Answer Type Questions (Answer to be written in full line)

20. प्रकाश के परावर्तन की परिभाषा उदाहरण सहित लिखिए ।

Write the definition of reflection of light with examples.

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21. चुम्बक के कोई दो उपयोग लिखिए।

Write any two uses of magnet.

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22. आवर्ती गति के दो उदाहरण लिखिए।

Write two examples of Periodic Motion.

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23. हमारे दैनिक जीवन में उपयोग होने वाले 4 विद्युत उपकरणों के नाम लिखिए।
Write the names of 4 electrical appliances used in our daily life.

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24. हमारे भोजन के मुख्य पोषक तत्त्वों के नाम लिखिए।
Write the names of the major nutrients of our food.

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**लघूत्तरीय प्रश्न** 5 x 3 = 15

**Short Answer Type Questions**

25. कपास तन्तु से बनने वाली चार वस्तुओं के नाम लिखिए ।
Write the name of four things which are made from cotton fibre.

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26. चुम्बक किसे कहते है? चुम्बक के कोई दो गुण लिखिए । चुम्बक के आकर्षण गुण से सम्बद्ध वेद मन्त्र या श्लोक लिखिए।
What is a magnet? Write any two properties of magnet. Write the Veda Mantra or Shloka related to the attractiveness of the magnet.

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मन्त्र या श्लोक/ Mantra or Shloka

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27. दैनिक जीवन में गोलीय दर्पणों के उपयोग लिखिए।

Write the uses of spherical mirrors in daily life.

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28. किसी व्यक्ति की लम्बाई 1.65 मीटर है तो इसे सेण्टीमीटर तथा मिलीमीटर में व्यक्त कीजिए ।

If the height of a person is 1.65 metres, express it in centimetres and millimetres.

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29. चिकित्सा के क्षेत्र में उपयोग आने वाले 4 उपकरणों के नाम लिखिए ।

Write the names of 4 instruments used in the field of medicine.

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**विवरणात्मक प्रश्न** 5 x 4 = 20

**Descriptive Questions**

30. पक्षी की गति समझाइए । सम्बद्ध वेद मन्त्र या श्लोक लिखिए ।

Explain the motion of a bird. Write the related Veda mantra or Shloka.

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मन्त्र या श्लोक /Mantra or Shloka

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31. पौधो के विभिन्न भागों के कार्यों को समझाइए । सम्बद्ध वेद मन्त्र या श्लोक लिखिए ।

Explain the functions of different parts of plants. Write the related Veda mantra or Shloka.

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मन्त्र या श्लोक/ Mantra or Shloka

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32. भौतिक एवं रासायनिक परिवर्तन को उदाहरण सहित समझाइए ।

Explain physical and chemical changes with examples.

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33. थर्मोप्लास्टिक और थर्मोसेटिंग के मध्य अन्तर स्पष्ट कीजिए ।

Explain the difference between thermoplastic and thermosetting.

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34. संश्लेषित रेशे क्या है ? संश्लेषित रेशों के प्रकार लिखिए ।

What is synthetic fiber? Write the types of synthetic fibres.

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**दीर्घ उत्तरीय प्रश्न** 4 x 5 = 20

**Long Answer Type Questions**

35. मानव कंकाल तन्त्र का नामांकित चित्र बनाकर समझाइए । सम्बद्ध वेद मन्त्र या श्लोक लिखिए ।

Explain the human skeletal system with a labeled diagram. Write the related Veda mantra or Shloka.

चित्र/Diagram

व्याख्या/Explanation

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मन्त्र या श्लोक/ Mantra or Shloka

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36. वस्तुओं में से प्रकाश गुजरने के आधार पर वस्तुओं को कितने भागों में बाँटा जा सकता है ?

Into how many parts can objects be divided on the basis of light passing through them?

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37. वायु, जल तथा थल पर उपयोग किए जाने वाले परिवहन के साधनों में प्रत्येक तीन-तीन उदाहरण दीजिए।

Give three examples each of the means of transport used on air, water and land.

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38. दिशा सूचक यन्त्र का नामांकित चित्र बनाकर, कार्यप्रणाली को समझाइए ।

With the help of labeled diagram of compass, explain its working.

चित्र/Diagram

व्याख्या/Explanation

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