STUDY IQ PUBLICATIONS

NCERT SIMPLIFIED SERIES

- Focus on Core Concepts
- Crisp and Clear Language
- Subject-wise Organization
- New NCERT Updated Content
- Practice Questions for Assessment

SCIENCE & TECHNOLOGY

Summary Notes

From Classes 6-11

For UPSC & other competitive exams

Preface

Dear Aspirants,

Welcome to "**NCERT Simplified**" a comprehensive guide designed to provide a concise and focused overview of the National Council of Educational Research and Training (NCERT) textbooks. This book is tailored to meet the needs of aspirants preparing for competitive examinations like SSC, UPSC, and other government-related exams. Published by **StudyIQ**, this book aims to simplify the vast NCERT syllabus and equip you with the essential knowledge to ace your exams.

In the realm of competitive examinations, NCERT textbooks are regarded as the foundation for building a strong understanding of various subjects. They are trusted by educators and students alike for their well-structured content and accuracy. However, with an ever-expanding syllabus, it becomes challenging for aspirants to cover every detail. Recognizing this need, "**NCERT Simplified**" is crafted as the ideal companion to streamline your preparation and maximize your chances of success.

Key Features of the Book:

1. **Comprehensive Summary:** We have retained the core concepts, theories, and principles while eliminating redundant details, so you can focus on mastering the essential knowledge.
2. **Subject-wise Organization:** The book is divided into distinct sections, each dedicated to a specific subject, such as History, Geography, Economics, Polity, Society and more.
3. **Crisp and Clear Language:** We understand that clarity and simplicity are crucial in the learning process. Thus, our language is crafted to be lucid and accessible, making complex ideas easier to grasp. This writing style not only aids in a quick review but also facilitates better retention of information.
4. **Practice Questions:** Alongside the summaries, "**NCERT Simplified**" includes thoughtfully selected practice questions to assess your understanding and reinforce your learning.

As you embark on your journey to crack competitive examinations, "NCERT Simplified" promises to be your reliable companion. We hope this book empowers you with the knowledge, confidence, and skills required to excel in your exams and achieve your dreams.

Wishing you all the best!
Team **StudyIQ**

Contents

Class : 6th Science

Class : 7th Science

Class : 8th Science

Class : 9th Science

Class : 10th Science

Class : 11th Biotechnology

SAMPLE PAGES

- **Fats** also provide us with energy. In fact, fats provide significantly more energy than the same amount of carbohydrates.
  - **Sources of Fats From Plants:** Nuts, Til, Groundnuts
  - **Sources of Fats From Animals:** Meat, Eggs, Fish, Milk, Ghee, Butter, Cream
- **Proteins** are required for our bodies growth and repair. Protein-rich foods are frequently referred to as **"body-building foods**."
  - **Sources of Proteins From Plants:** Gram, Moong, Tuar dal, Soybeans, Peas, Gram.
  - **Sources of proteins from animal sources:** Meat, Fish, Paneer, Eggs.

Vitamins

- **Vitamins** help to protect our bodies from disease. Vitamins also help to maintain the health of our eyes, bones, teeth, and gums.
  - **Types of Vitamins:** Vitamin A, Vitamin C, Vitamin D, Vitamin E, Vitamin K and a vitamin group known as Vitamin B-complex.
  - **Vitamin A** protects our skin and eyes.
  - **Vitamin C** aids the body's defence against a variety of diseases.
  - **Vitamin D** aids our bodies in the utilisation of calcium for bones and teeth. Foods that are high in various vitamins.

Sources of Vitamins			
Some sources of Vitamin A	**Some sources of Vitamin B**	**Some sources of Vitamin C**	**Some sources of Vitamin D**
Papaya, Carrot, Mango, Milk, Fish oil	Rice, Wheat, Liver	Guava, Green Chilli, Lemon, Amla, Tomato, Orange	Fish, Egg, Liver, milk, Butter

Minerals

- Our bodies require trace amounts of minerals.
- Minerals are necessary for proper body growth and health maintenance.

Sources of Minerals			
Iodine	**Phosphorous**	**Iron**	**Calcium**
Ginger, Fish etc	Banana, Milk, Green chilies etc	Apple, Spinach etc	Milk, eggs etc

DIETARY FIBRE AND WATER

- Aside from nutrients, our bodies require dietary fibres and water.
- **Dietary fibres** are also referred to as roughage.
- **Roughage:** Plant products in our foods primarily provide roughage.
  - **Source of Roughage:** It is primarily found in **whole grains and pulses, potatoes, fresh fruits and vegetables.**
  - **Role of Roughage** does not provide any nutrients to our bodies, but it is an important component of our food and adds bulk to it. This aids our bodies in eliminating undigested food.
- **Role of Water:** Water aids our bodies in absorbing nutrients from food.
  - It also aids in the **elimination of wastes** from the body such as urine and sweat.
  - **Sources of Water:** Normally, we get most of the water our bodies require from the liquids we consume, such as water, milk, and tea.
    - In addition, most cooked foods contain water.

BALANCED DIET

- A balanced diet includes a variety of foods and provides all the necessary nutrients for good health.
- It is essential to have the right amounts of nutrients, avoiding excessive or inadequate intake.
- **Roughage and water** should be included in the diet for proper digestion and overall well-being.
- Nutrient-rich foods such as pulses, groundnuts, soybeans, sprouted seeds, fermented foods, fruits, and vegetables are beneficial.
- **Proper cooking** is crucial to preserve nutrients in the food.

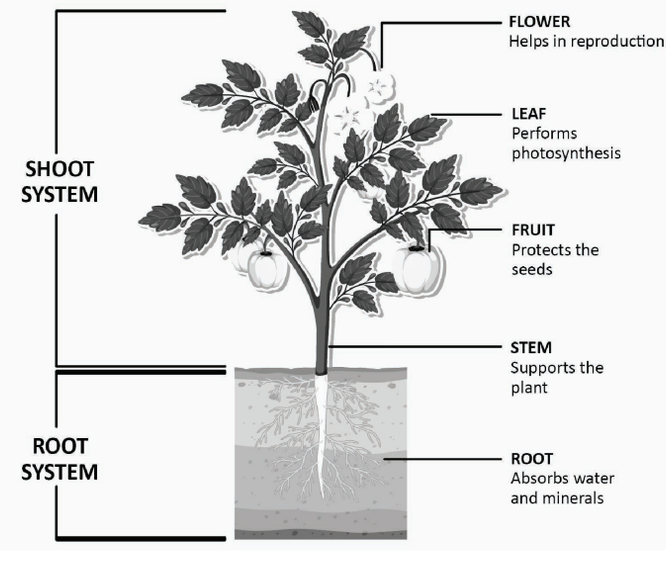
4

GETTING TO KNOW PLANTS

INTRODUCTION

- A wide variety of plants can be found everywhere. Some are small or tall, have thick or tender stems, and various types and colours of leaves, flowers, and fruits.
- However, all these plants share root, stem, leaves, buds, flowers, and fruits, despite differences in colour, size, or shape.

Parts of a Plant



CLASSIFICATION OF PLANTS

Based on the Structure of the Plant

- **Herbs:** Plants with **green and tender stems** are called herbs. They are usually short and may not have many branches.
- **Shrubs:** Some plants develop **branches near the base of the stem.** The stem is hard but not very thick. Such plants are called shrubs.
- **Trees:** Some plants are very tall and **have hard and thick stems**. The stems have branches in the upper part, much above the ground. Such plants are called trees.

Based on the Type of Stems

- **Creepers:** Plants with **weak stems** that cannot stand upright but spread on the ground.
- **Climbers:** Plants with weak stems **that take support and climb up** are called climbers.

PARTS OF A PLANT

Stem

- Stems bear leaves, branches, buds, flowers, and fruits.
- The stem helps in the **upward movement of water.**
- The water and minerals go to leaves and other plant parts attached to the stem.

Leaf

- The part of the **leaf by which it is attached to the stem** is called the **petiole**.
- The broad, green part of the leaf is called the **lamina.**
- **Veins** are the lines that run through the leaf. The **midrib** is the visible central main line in the leaf.
- **Leaf venation** refers to the design created by the veins of the leaf. There are two types of venations:
  - **Reticulate Venation:** A net-like pattern formed by veins on both sides of the midrib. **Example:** Mango leaf.
  - **Parallel Venation:** The veins in this type of venation are parallel to each other. **Example:** Grass leaf.
- **Functions of Leaf:** Leaves serve two important functions in a plant.
  - **Transpiration:** This is the process by which the leaves lose water in the form of water droplets through evaporation.
    - This keeps the **plant's water balance stable**, allowing it to survive.
    - The process can be seen by tying a polythene bag around a leaf and after a few hours, water droplets can be seen.

INCREASING AND REDUCING FRICTION

INCREASING THE FRICTION

- We can increase friction by **increasing the contact between two surfaces**.
  - When we **apply brakes** on a bicycle or car, for example, the brake pads are pressed against a moving part of the wheel, resulting in increased friction force.
- Friction can also be increased **by increasing the roughness of the surfaces** with which they come into contact.
  - **Threading shoes and tires**, for example, is done to increase friction, allowing them to move on the road without slipping.
  - **Rubbing soil** for better grip of opponents in kabbadi.

REDUCING THE FRICTION

- When oil, grease, or graphite is applied between moving parts of a machine, a thin layer forms, preventing moving surfaces from rubbing against each other.
- To a large extent, **the interlocking of irregularities is avoided.** The movement becomes more fluid.
- **Lubricants** are substances that help to reduce friction. It may not be advisable to use oil as a lubricant in some machines.
  - To reduce friction, an **air cushion** is placed between the moving parts.

WHEELS REDUCE FRICTION

- The resistance to motion experienced by one body as it rolls over the surface of another is known as **rolling friction**. Friction is reduced by rolling.
  - It is always **more convenient to roll than to slide** one body over another.
- That is why it is convenient to pull luggage equipped with rollers. Because rolling friction is less than sliding friction, most machines replace sliding with rolling using ball bearings.
  - **Ball bearings** are commonly used between the hubs and axles of ceiling fans and bicycles.

FLUID FRICTION

- Despite the fact that air is very light and thin, it exerts frictional force on objects moving through it. Similarly, when objects move through water or other liquids, they create friction.
- **Fluids** are the common name for gases and liquids in science. As a result, fluids exert frictional force on objects moving through them. Fluid frictional force is also referred to as **drag**.
- The frictional force on an object in a fluid is **proportional to its speed relative** to the fluid. The frictional force is also **affected by the shape of the object and the fluid's properties**.
- Efforts are, therefore, made to minimise friction. So, objects are given special shapes. For example, **the shape of an aeroplane**.

QUESTIONS

1. Which of the following is done by Friction?

1. Produce heat. **2. Wears out soles of shoes.**

3. Fix a nail in the wall **4. Prevents a moving object from stopping.**

Select the correct code using the options given below:

(a) 1,2 and 3 only (b) 2,3 and 4 only (c) 1,2 and 4 only (d) 1,2,3 and 4

Answer: (a)

2. With reference to Friction, consider the following statements:

1. The rolling friction is smaller than the sliding friction.

2. Fluid friction can be minimized by giving suitable shapes to bodies moving in fluids.

Which of the statements given above is/are not correct?

(a) 1 only (b) 2 only (c) Both 1 and 2 (d) Neither 1 nor 2

Answer: (d)

NEED OF CHEMINFORMATICS

- The use of computational and informational techniques to understand problems of chemistry is known as cheminformatics.
- Pharmaceutical companies use cheminformatics for in **silico drug design, synthesis, and testing of novel drugs.**
- The industry employs cheminformatics to **predict chemical properties, efficacy, and toxicity** before introducing chemicals to the market.

PHARMACOPHORE

- A pharmacophore describes molecular features for **ligand recognition.**
- **IUPAC** defines it as **steric and electronic features** for optimal interactions with a target.
- It explains how diverse ligands interact with a single receptor.
- A **3D pharmacophore** includes spatial features like **charged groups, rings, and hydrophobic regions**.
- **Pharmacophore** is a conceptual framework, not a physical molecule, **defining molecular properties for interaction with a target.**

JOURNEY OF A DRUG

- **Introduction:** Nature provides a rich source of active compounds with therapeutic potential.
  - **Scientific methods** narrow down compounds for further investigation.
  - Drug discovery and development is a **lengthy, costly, and risky process**.
  - The drug discovery pipeline, from lab to market, involves several stages.
- **Virtual screening:** It employs computational methods to select compounds for specific purposes.
  - Virtual screening uses **scoring, ranking, and filtering** to extract useful structures from large databases.
  - Filters are applied at different steps **to eliminate undesirable compounds**, gradually narrowing down the selection.

Note

- Pfizer tested **UK92480,** a drug meant for heart complications, in the **early 1990s.**
- The drug was expected to **relax blood vessels.**
- Unexpectedly, the drug had an effect on the reproductive system.
  - **Pfizer** developed the drug into a blue pill known as **Viagra.**

Origin of Saccharin

- In **1879, Russian Chemist Dr. Constantin Fahlberg** had an accidental discovery. He developed a chemical method to produce saccharin.

Common terminologies in cheminformatics

- **High Throughput Screening (HTS):** A large scale automated process where millions of compounds are tested for a desired property.
- **Hits:** Activity observed during high-throughput screening, generally defined by percent activity of new compounds in comparison to well defined and known compounds.
- **False positive:** During screening, one may observe situations where a compound is found active in an assay but may turn out to be inactive towards a certain biological target.
- **Lead compound:** A compound that is biologically and pharmacologically active with desired properties, and that can be processed further.
- **Library:** An inventory of compounds that fulfill the criteria for screening against specific cellular targets.
- **New Chemical Entity :** A novel molecule discovered in the lab that has not yet entered clinical trials.
- **Off target activity:** Molecular interactions between chemical compounds and cellular molecules that do not bind the target.

QUESTION

1. With reference to CAS (Chemical Abstracts Service), consider the following statements:

1. It is a division of American Chemical Society that has the world's largest collection of chemistry insights.

2. PubChem is a database of chemical molecules.

Which of the statements given above is/are not correct?

(a) 1 only (b) 2 only (c) Both 1 and 2 (d) Neither 1 nor 2

Answer: (d)