# TRACKPAD

Ver. 2.1

8

# Teacher's Manual

Extended Support for Teachers

ORANGE
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# Teacher's Time Table

| Periods / Days | 0 | I | II | III | IV | BREAK | V | VI | VII | VIII |
|---|---|---|---|---|---|---|---|---|---|---|
| Monday | | | | | | | | | | |
| Tuesday | | | | | | | | | | |
| Wednesday | | | | | | | | | | |
| Thursday | | | | | | | | | | |
| Friday | | | | | | | | | | |
| Saturday | | | | | | | | | | |

# Development Milestones in a Child

Development milestones are a set of functional skills or age-specific tasks that most children can do at a certain age. These milestones help the teacher identify and understand how children differ in different age groups.

**Age**
**5 - 8 Years**

| | |
|---|---|
| Physical | • First permanent tooth erupts<br>• Shows mature throwing and catching patterns<br>• Writing is now smaller and more readable<br>• Drawings are now more detailed, organised and have a sense of depth |
| Cognitive | • Attention continues to improve, becomes more selective and adaptable<br>• Recall, scripted memory, and auto-biographical memory improves<br>• Counts on and counts down, engaging in simple addition and subtraction<br>• Thoughts are now more logical |
| Language | • Vocabulary reaches about 10,000 words<br>• Vocabulary increases rapidly throughout middle childhood |
| Emotional/ Social | • Ability to predict and interpret emotional reactions of others enhances<br>• Relies more on language to express empathy<br>• Self-conscious emotions of pride and guilt are governed by personal responsibility<br>• Attends to facial and situational cues in interpreting another's feelings<br>• Peer interaction is now more prosocial, and physical aggression declines |

"If you cannot do great things, do small things in a great way."

## Age 9 - 11 Years

| | |
|---|---|
| Physical | • Motor skills develop resulting in enhanced reflexes |
| Cognitive | • Applies several memory strategies at once<br>• Cognitive self-regulation is now improved |
| Language | • Ability to use complex grammatical constructions enhances<br>• Conversational strategies are now more refined |
| Emotional/ Social | • Self-esteem tends to rise<br>• Peer groups emerge |

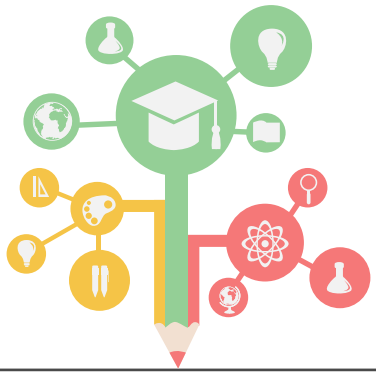
## Age 11 - 20 Years

| | |
|---|---|
| Physical | • If a girl, reaches peak of growth spurt<br>• If a girl, motor performance gradually increases and then levels off<br>• If a boy, reaches peak and then completes growth spurt<br>• If a boy, motor performance increases dramatically |
| Cognitive | • Is now more self-conscious and self-focused<br>• Becomes a better everyday planner and decision maker |
| Emotional/ Social | • May show increased gender stereotyping of attitudes and behaviour<br>• May have a conventional moral orientation |

Managing the children's learning needs according to their developmental milestones is the key to a successful teaching-learning transaction in the classroom.

"Family is the most important thing in the world."

# Teaching Pedagogies



Pedagogy is often described as the approach to teaching. It is the study of teaching methods including the aims of education and the ways in which such goals can be achieved.

## Lesson Plans

A lesson plan is the instructor's road map which specifies what students need to learn and how it can be done effectively during the class time. A lesson plan helps teachers in the classroom by providing a detailed outline to follow in each class.

A lesson plan addresses and integrates three key components:

- Learning objectives
- Learning activities
- Assessment to check the student's understanding

A lesson plan provides an outline of the teaching goals:

**Before the class**

1. Identify the learning objectives.
2. Plan the lesson in an engaging and meaningful manner.
3. Plan to assess student's understanding.
4. Plan for a lesson closure.

**During the class**

Present the lesson plan.

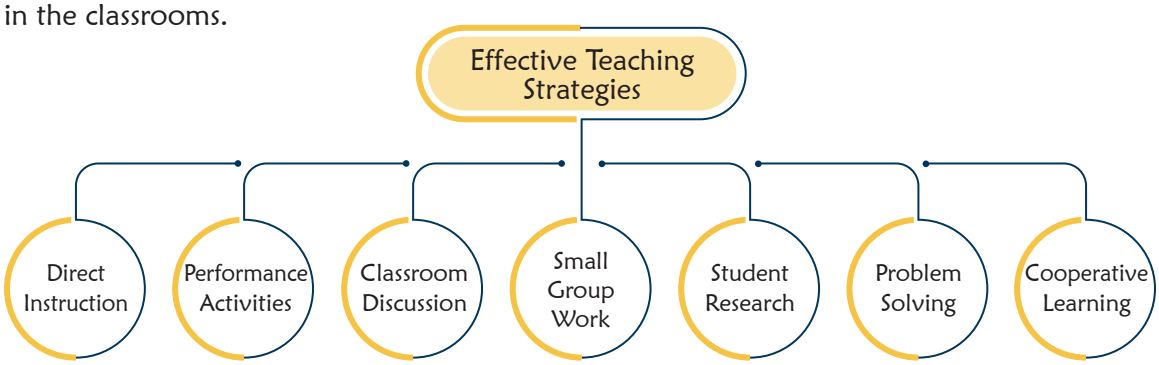
**After the class**

Reflect on what worked well and why. If needed, revise the lesson plan.

"Knowing yourself is the beginning of all wisdom."

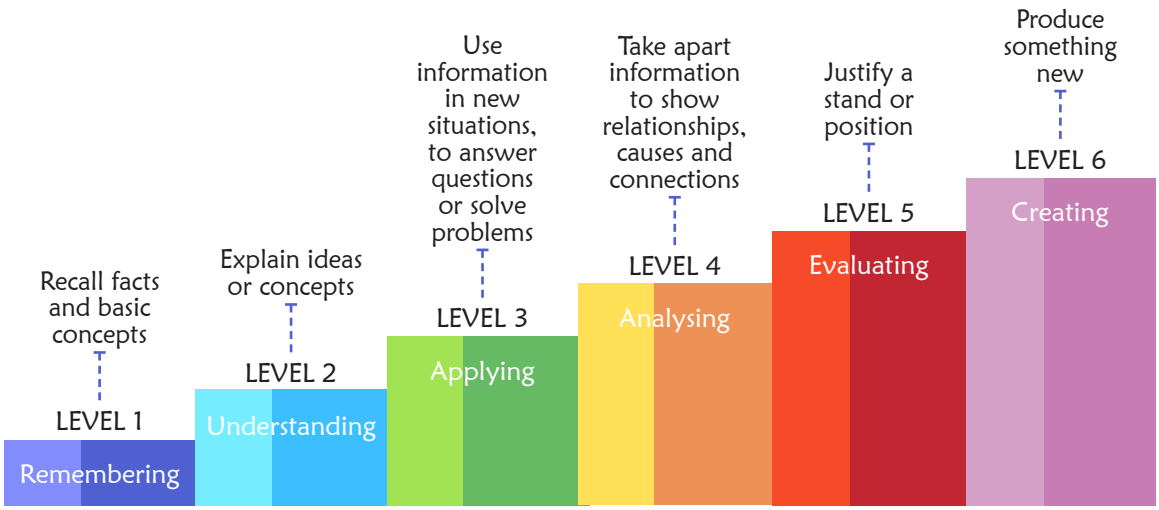
## Teaching Strategies

Numerous strategies have evolved over the years to facilitate the teaching-learning process in the classrooms.




## Bloom's Taxonomy

Bloom's Taxonomy was created by Dr Benjamin Bloom and several of his colleagues, to promote higher forms of thinking in education instead of rote learning. There are three domains of learning: cognitive (mental), affective (emotional), and psychomotor (physical). However, when we refer to Bloom's Taxonomy we speak of the cognitive domain. Bloom's Taxonomy is a list of cognitive skills that is used by teachers to determine the level of thinking their students have achieved. As a teacher, one should attempt to move students up the taxonomy as they progress in their knowledge.




Teachers should focus on helping students to remember information before expecting them to understand it, helping them understand it before expecting them to apply it to a new situation, and so on.

> "If you have no confidence in self, you are twice defeated in the race of life."

CLASS 8

# LESSON PLAN

## 1 Networking Concepts

### Teaching Objectives

Students will learn about

- Computer Network
- Components of a Communication System
- Requirements for Computer Networking
- Types of Networks
- Topologies
- Protocols
- Need for Computer Networking
- Network Terminologies
- Network Architecture
- Networking Transmission Media

| Number of Periods | |
|---|---|
| Theory | Practical |
| 2 | 0 |

### Teaching Plan

Before starting the chapter, ask the students to read the comic given in page number 7 to understand the recap of the topic.

While teaching this chapter, tell the students that the process of connecting computers and peripheral devices with each other to exchange data is called computer networking.

Tell the students about the meaning and basics of computer network.

Share with the students the need for computer network – for resource sharing and for communication.

Discuss with the students the advantages of a computer network.

Introduce network terms like Server (host computer) and Client (dependent on server).

Explain the different types of servers to the students covering dedicated server, print server, database server, network server and web server.

Tell the students about the components required for a network covering NIC, hub/switch, router, modem and networking cable.

Share with the students that on the basis of geographical area covered, the networks can be classified into LAN (Local Area Network), MAN (Metropolitan Area Network), WAN (Wide Area Network), PAN (Personal Area Network) and CAN (Campus Area Network).

Introduce Topology as geometric arrangement of computers or nodes in a network.

Ask the students to solve the exercise **I Know** given on page number 15.

Explain the difference between different types of topologies covering bus topology, ring topology, star topology, tree topology and mesh topology.

Tell the students that the network architecture defines the overall design of the computer network.

Share with the students the two types of network architectures as Peer-to-Peer network and Client-Server network.

Share with the students about the wireless networking technologies detailing about Wi-Fi and Bluetooth.

Introduce Protocol as a set of rules that govern the communication between the computers on a network.

Discuss briefly about the different types of protocols explaining about HTTP, HTTPS, FTP, TC/IP, POP3, IMAP and SMTP.

Ask the students to solve the exercise **Quiz Bee** given on page number 19.

## Extension

Ask the students some oral questions based on this chapter.

Q. Define computer network.

Q. What is the need for a computer network?

Q. What are the advantages of a computer network?

Q. Define server / client.

Q. What are the different types of computer servers?

Q. What are the components required for a network?

Q. Define LAN / MAN / WAN / PAN / CAN.

Q. Define Topology.

Q. Name different types of topologies.

Q. What is meant by protocol?

## Evaluation

After explaining the chapter, let the students do the exercises given on Page 20, 21 and 22 in the main course book as Assess Yourself. Tell them to solve the critical thinking skill developing exercise as Coding Zone given on Pages 23 and 24.

Take the students to the computer lab and let them practice the activity given in the Lab Activity section on Page 22 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

### Suggested Activity

Ask the students to make models of different types of topologies using marbles and used wire pieces / straws.

## 2 Animation in Krita

### Teaching Objectives

Students will learn about

- Krita
- Creating a simple animation

| Number of Periods | |
|---|---|
| Theory | Practical |
| 2 | 3 |

### Teaching Plan

Before starting the chapter, ask the students to read the comic given in page number 25 to understand the recap of the topic.

Begin with introduction of Krita as a free and easy-to-use digital painting software.

Let them know about the components of Krita.

Ask the students to solve the exercise **I Know** given on pages 28.

Ask the students to read the **Quiz Bee** given on pages 32.

### Extension

Ask the students some oral questions based on this chapter.

Q. What is Krita?

Q. Name the components of Krita.

Q. What is the function of Tool Options Docker in Krita?

Q. What is the function of Layers Docker in Krita?

Q. What are layers in Krita?

Q. How do layers help in editing?

Q. What is animation?

Q. Name some basic concepts of animation in Krita.

Q. What is stage in animation mode of Krita?

Q. What is timeline used for in Krita?

Q. What are frames in Krita?

Q. Define keyframes.

### Evaluation

After explaining the chapter, let the students do the exercises given on pages 33 and 34 in the main course book as **Assess Yourself**. Tell them to solve the critical thinking skill developing exercise as Coding Zone given on Page 36.

Take the students to the computer lab and let them practice the activity given in the Lab Activity section on Page 35 and SDG activity on page 35 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

### Suggested Activity

Ask the students to create an animation where two cars are coming on a road from opposite directions and crash in the center.

## 3 Dynamic Web Pages in HTML5

### Teaching Objectives

Students will learn about

- JavaScript—A Scripting Language
- Features of JavaScript
- Using JavaScript
- Creating a Web Page with Internal JavaScript
- Creating a Web Page with External JavaScript
- Statements in JavaScript
- Input and Output in JavaScript
- Some more programs

| Number of Periods | |
|---|---|
| Theory | Practical |
| 2 | 3 |

### Teaching Plan

Before starting the chapter, ask the students to read the comic given in page number 38 to understand the recap of the topic.

Introduce the students with JavaScript as a scripting language used to design a web page.

Demonstrate the features of JavsScript which explains that it is used in both client and server side applications.

Tell the students about using JavaScript and the methods of for the same which are:

- Internal JavaScript
- External JavaScript

Ask the students to solve the exercise **I Know** given on page number 40.

Explain the students how to create a web page with internal JavaScript in detailed steps.

Demonstrate the students how to create a web page with external JavaScript in detailed manner.

Ask the students to solve the exercise **Quiz Bee** given on page number 43.

Explain the statements in javaScript to students and tell them the involved statements which are:

- Keyword
- Variables
- Operators
- Expressions
- Comments

Tell the students that JavaScript allows us to take input and display output with the help of different methods.

Explain some more programs for practice using the JavaScript language.

## Extension

Ask the students some oral questions based on this chapter.

Q. What is JavaScript?

Q. What are features of JavaScript?

Q. How to use JavaScript?

Q. Define:

a. Internal JavaScript b. External JavaScript

Q. How to create a web page with internal JavaScript?

Q. How to create a web page with external JavaScript?

Q. What are statements in JavaScript?

Q. Define:

a. Keywords b. Variables c. Operators

d. Expressions e. Comments

Q. Define input in JavaScript.

Q. Define output in JavaScript.

## Evaluation

After explaining the chapter, let the students do the exercises given on Page 48 and 49 in the main course book as Assess Yourself. Tell them to solve the critical thinking skill developing exercise as Coding Zone given on Page 50.

Take the students to the computer lab and let them practice the activity given in the Lab Activity section on Page 50 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

### Suggested Activity

Ask the students to create a program to display product of three numbers and display the result. Take the input from the user.

## 4 Latest IT Trends

### Teaching Objectives

Students will learn about

- E-commerce
- Blockchain
- Augmented Reality and Virtual Reality
- 3D Printing
- Electronic Funds Transfer
- Artificial Intelligence
- Internet of Things
- RPA (Robotic Process Automation)

| Number of Periods | |
|---|---|
| Theory | Practical |
| 2 | 0 |

### Teaching Plan

Before starting the chapter, ask the students to read the comic given in page number 76 to understand the recap of the topic.

Introduce the students with E-commerce along with the history of commerce.

Define the types of e-commerce used in daily life which are:

- **Business-to-Business (B2B)**
- **Business-to-Consumer (B2C)**
- **Consumer-to-Consumer (C2C)**

Ask the students to solve the exercise **Quiz Bee** given on page number 53.

Explain the **Applications of E-Commerce** to the students in detail which are:

- **E-Shopping**
- **E-Banking**
- **M-Commerce**

Explain the meaning of **Electronic Fund Transfer** and the purpose in daily life.

Ask the students to solve the exercise **I Know** given on page number 54.

Define the meaning of Blockchain and its purpose in daily life.

## Extension

Ask the students some oral questions based on this chapter.

Q. What is e-commerce?

Q. What is electronic fund transfer?

Q. What is blockchain?

Q. What is an Artificial Intelligence?

Q. What is an Augmented Reality?

Q. What is an Virtual Reality?

Q. What is an Internet of Things?

Q. What is an 3D Printing?

Q. What is an RPA?

## Evaluation

After explaining the chapter, let the students do the exercises given on Page 62 and 63 in the main course book as Assess Yourself. Tell them to solve the critical thinking skill developing exercise as Coding Zone given on Page 64.

Take the students to the computer lab and let them practice the activity given in the Lab Activity section on Page 64 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

## Suggested Activity

Ask the students to try any digital assistant like Alexa or Siri and ask "What is Virtual Reality?".

# 5 Cloud Computing

## Teaching Objectives

Students will learn about

- What is Cloud Computing?
- Cloud Storage Service Providers
- Accessing OneDrive using App
- Creating Files or Folder on OneDrive
- Sharing Files
- Types of Cloud Services
- How does Cloud Computing Work?
- Storing Data using Cloud Computing
- Accessing using Web Browser
- Uploading File or Folder on OneDrive
- File Shared with You

| Number of Periods | |
|---|---|
| Theory | Practical |
| 2 | 2 |

## Teaching Plan

Before starting the chapter, ask the students to read the comic given in page number 65 to understand the recap of the topic.

Explain the students the meaning of Cloud Computing with the help of relatable example.

Define the benefits of cloud computing with the students.

Demonstrate the students how does cloud computing work and tell them that it is divided into two sections:

- **Front end**
- **Back end**

Share the information about the Cloud storage service providers with the students which are:

- **DropBox**
- **ZipCloud**
- **iCloud**
- **Google Drive**

Tell the students how to store data using Cloud Computing in detailed steps. Also, share how to access OneDrive on older versions of Windows.

Explain the detailed steps with the students for:

- **Creating files on OneDrive**
- **Uploading files or folders on OneDrive**

Ask the students to solve the exercise **I Know** given on page number 73.

Share the steps to share the files with the students while demonstrating the same in the lab. Also tell them how to access the file which are shared with you.

Explain the types of Cloud Services with the students which are:

- **Public Cloud**
- **Private Cloud**
- **Hybrid Cloud**
- **Community Cloud**

Ask the students to solve the exercise **Quiz Bee** given on page number 74.

## Extension

Ask the students some oral questions based on this chapter.

Q. What is cloud computing?

Q. What are benefits of cloud computing?

Q. How does cloud computing work?

Q. What are some cloud storage providers?

Q. How to store data using cloud computing?

Q. How to access Onedrive using App and browser.

Q. How to create and upload file or folder on OneDrive.

Q. How to share files in drive?

Q. Define the following:

a. Public Cloud

b. Private Cloud

c. Hybrid Cloud

d. Community Cloud

## Evaluation

After explaining the chapter, let the students do the exercises given on Page 75, 76 and 77 in the main course book as Assess Yourself. Tell them to solve the critical thinking skill developing exercise as Coding Zone given on Page 77.

Take the students to the computer lab and let them practice the activity given in the Lab Activity section on Page 77 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

## Suggested Activity

Ask the students to search about some more examples of online storage service providers.

# 6 Algorithmic Intelligence

## Teaching Objectives

Students will learn about

- Multiple Conditions in a Program
- Loops in a Program

| Number of Periods | |
|---|---|
| Theory | Practical |
| 1 | 1 |

## Teaching Plan

Before starting the chapter, ask the students to read the comic given in page number 81 to understand the recap of the topic.

Begin with introduction of multiple conditions in a program based on algorithmic intelligence.

Let them know that the conditional statements are used in a program to instruct the computer to make a decision.

Make the students aware of multiple conditions like If... And/Or... followed by Then... Else.

Make the students understand that a loop is used to execute instructions or a block of code multiple times, without writing it repeatedly.

Explain to the students that a loop is a sequence of instructions when repeated for a fixed number of times or until the condition is true.

Also let them know that there are two types of loops. They are Counting loops and Conditional loops.

Ask the students to solve the exercise **Quiz Bee** given on page number 85.

### Extension

Ask the students some oral questions based on this chapter.

Q. What are conditional statements used for?

Q. What is the result of the computer's decision for a condition?

Q. What is the result of 'If... And' condition in a program based on algorithmic intelligence?

Q. What is the result of 'If... Or' condition in a program based on algorithmic intelligence?

Q. What is a loop?

Q. What is a loop used for?

Q. What is infinite loop?

Q. How many types of loops are there in a program? Name them.

### Evaluation

After explaining the chapter, let the students do the exercises given on Page 85, 86 and 87 in the main course book as Assess Yourself.

Take the students to the computer lab and let them practice the activity given in the Lab Activity and SDG Activity section on Page 88 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

### Suggested Activity

Ask the students to write any if-then-else conditional statements.

## 7 Control Structures in Python

### Teaching Objectives

Students will learn about

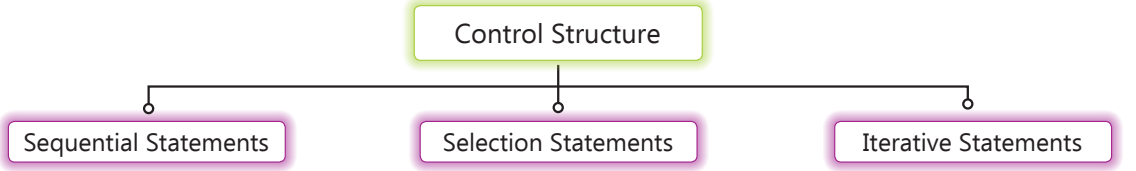
- Control Structure
- Selection Statements
- Jump Statements
- Sequential Statements
- Iterative Statements
- Some more Programs

| Number of Periods | |
|---|---|
| Theory | Practical |
| 2 | 3 |

## Teaching Plan

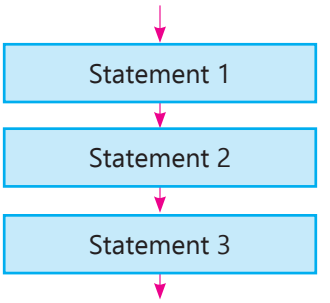
Before starting the chapter, ask the students to read the comic given in page number 89 to understand the recap of the topic.

Define the meaning of Control Structure in Python to the students which are:




Define each of them in detail along with their syntax.

Explain the **Sequential Statements** with syntax:




Define the **Selection Statements** along with the types and syntax:

i. **if statement**
ii. **if-else**
iii. **if-elif-else-statement**

Also, demonstrate the use of these with the help of some programs.

Explain the **Iterative Statement** to the students along with the syntax and types:

i. **For loop**
ii. **While loop**

Also, demonstrate the use of these with the help of some programs.

Ask the students to solve the exercise **I Know** given on page number 95.

Explain the meaning of **Jump Statements** and its types:

i. **Break Statement**
ii. **Continue Statement**

Also, demonstrate the use of these with the help of some programs.

Share some more programs with the students to make them learn better.

## Extension

Ask the students some oral questions based on this chapter.

Q. What is control structure?

Q. What are sequential statements?

Q. What are selection statements?

Q. What are iterative statements?

Q. What are jump statements?

## Evaluation

After explaining the chapter, let the students do the exercises given on Page 102, 103 and 104 in the main course book as Assess Yourself. Tell them to solve the critical thinking and technology literacy skill developing exercise as Coding Zone given on Page 106.

Take the students to the computer lab and let them practice the activity given in the Lab Activity section on Page 105 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

## Suggested Activity

Ask the students to create a program to display odd number in between 1 to 30 using the continue statement.

# 8 Functions, String and List in Python

## Teaching Objectives

Students will learn about

- Introduction to Python Functions
- List
- String
- Some More Programs

| Number of Periods | |
|---|---|
| Theory | Practical |
| 2 | 2 |

## Teaching Plan

Before starting the chapter, ask the students to read the comic given in page number 107 to understand the recap of the topic.

While teaching this chapter revise Python for the students and repeat the features of Python from the earlier class.

Demonstrate to the students the steps involved in using the **FUNCTIONS** using programs and syntax which are:

- **Name of the function**
- **Arguments**
- **Statements**
- **Return Value**

Explain the features of Functions and the components of **Python function** in detail.

Share the detail about the types of Python Function with the students which are:

- **Built-In Functions**
- **User-Defined Functions**

Explain the detailed steps with the students regarding how to:

- **Create a function**
- **Calling a function**

Define the meaning of **String** and the types of strings along with examples of:

- **Creating Strings**
- **Multiline Strings**
- **Using Escape Sequences with Strings**
- **Traversing a String**
- **String Operators**
- **String Built-In Functions**

Ask the students to solve the exercise **Quiz Bee** given on page number 114.

Define the meaning of **List** and the types of strings along with examples of:

- Creating a List: Empty List, Mixed Data Type List and Nested List
- Accessing a List
- List Functions: append( ), extend( ) and del( )

Ask the students to solve the exercise **I Know** given on page number 118.

Share some more programs with the students to make them learn better.

## Extension

Ask the students some oral questions based on this chapter.

Q. What is Python Function

Q. What are the components of Python Function?

Q. What are types of function in Python?

Q. What is a string?

Q. What is a list?

Q. Define the types of list.

Q. Define the list functions.

## Evaluation

After explaining the chapter, let the students do the exercises given on Page 121, 122 and 123 in the main course book as Assess Yourself. Tell them to solve the critical thinking and technology literacy skill developing exercise as Coding Zone given on Page 124.

Take the students to the computer lab and let them practice the activity given in the Lab Activity section on Page 136 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

### Suggested Activity

Ask the students to create a program to calculate the area using:

i. append( )

ii. extend( )

# 9 Artificial Intelligence and Its Domains

### Teaching Objectives

Students will learn about

- Categories of Artificial Intelligence
- Advantages of Artificial Intelligence
- Risk and Barriers of Artificial Intelligence
- Domains of Artificial Intelligence

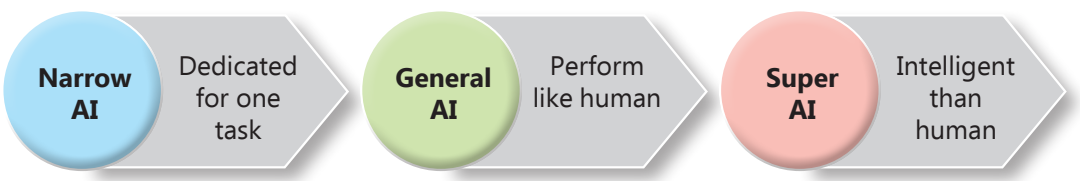
| Number of Periods | |
|---|---|
| Theory | Practical |
| 2 | 0 |

### Teaching Plan

Before starting the chapter, ask the students to read the comic given in page number 126 to understand the recap of the topic.

Define the categories of AI in brief to the students:

- Narrow AI
- General AI
- Super AI




Tell the students about the advantages of AI in detail:

- **Process Automation**
- **Accuracy**
- **Quick Decision Making**
- **Quicker Data Analysis**

- **Take Decisions Rationally**
- **Ability to Complete Dangerous Tasks**

Ask the students to solve the exercise **I Know** given on page number 129.

Share the risk and barriers of AI with the students:

- **High cost of creation**
- **Unemployment**
- **No out-of-the-box thinking**
- **Making human lazy**
- **No emotions**

Explain the **Domains of AI** with the students along with the examples for better understanding:

- **DATA**
- **COMPUTER VISION**
- **NATURAL LANGUAGE PROCESSING**

Ask the students to solve the exercise **Quiz Bee** given on page number 132.

## Extension

Ask the students some oral questions based on this chapter.

Q. What is AI?

Q. Define the categories of AI:

i. Narrow AI ii. General AI iii. Super AI

Q. What are the advantages of AI?

Q. What are the risks of AI?

Q. Explain the domains of AI.

Q. Define Data.

Q. Define Computer Vision.

Q. Define NLP.

## Evaluation

After explaining the chapter, let the students do the exercises given on Page 133, 134 and 135 in the main course book as Assess Yourself. Tell them to solve the critical thinking skill developing exercise as Coding Zone given on Page 136.

Take the students to the computer lab and let them practice the activity given in the Lab Activity section on Page 135 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

## Suggested Activity

Ask the students to play an online game which is based on NLP and Computer Vision.

# 10 Fields of Artificial Intelligence

## Teaching Objectives

Students will learn about

- Most Common Fields which use AI
- AI in Apps
- Concept of Smart Living

| Number of Periods | |
|---|---|
| Theory | Practical |
| 2 | 0 |

## Teaching Plan

Before starting the chapter, ask the students to read the comic given in page number 137 to understand the recap of the topic.

Explain the most common fields which use AI in detail to students for better understanding.

Define these fields with examples:

- **Smartphone Industry**
- **Banking and Financial Sector**
- **Autonomous Vehicles**
- **Navigation**
- **Healthcare**
- **Social Media Platforms**
- **E-Commerce**
- **Security and Surveillance**
- **Autonomous Drones**
- **Education**

Ask the students to solve the exercise **Quiz Bee** given on page number 140.

Explain the students about the use of AI in Apps:

- **Siri**
- **Google Assistant**
- **Socratic**
- **Youper**
- **Alexa**
- **ELSA Speak**
- **Fyle**
- **Ola/Uber**

Tell the students about the concepts of Smart Living in detail with proper examples:

- Smart Homes: With benefits of smart home and Devices used in smart homes.
- Smart Cities: Benefits of smart cities and challenges of establishing smart cities

Ask the students to solve the exercise **I Know** given on page number 146.

## Extension

Ask the students some oral questions based on this chapter.

Q. Explain the most common fields which use AI:

i. Smartphone Industry
ii. Social Media Platforms
iii. Banking and Financial Sector
iv. E-Commerce
v. Autonomous Vehicles
vi. Security and Surveillance
vii. Navigation
viii. Autonomous Drones
ix. Healthcare
x. Education

Q. Define the concept of smart living.
Q. Define smart homes.
Q. Write the benefits of smart homes.
Q. Write the devices used in smart homes.
Q. Define smart cities.
Q. Write the benefits of smart cities.
Q. Write the challenges of establishing smart cities.

## Evaluation

After explaining the chapter, let the students do the exercises given on Page 147 and 148 in the main course book as Assess Yourself. Tell them to solve the critical thinking skill developing exercise as Coding Zone given on Page 149.

Take the students to the computer lab and let them practice the activity given in the Lab Activity section on Page 149 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

## Suggested Activity

Ask the students to look around their environment to search for smart home devices and in your locality.

# 11 Introduction to SDGs and Data Science

## Teaching Objectives

Students will learn about

- Challenges before Sustainable Development
- Sustainable Development Goals (SDGs)
- Data Science
- Why Data Science?
- Role of Data Scientist
- Solving Problems with Data Science
- Tools for Data Science
- AI and Data Science

| Number of Periods | |
|---|---|
| Theory | Practical |
| 2 | 0 |

## Teaching Plan

Before starting the chapter, ask the students to read the comic given in page number 150 to understand the recap of the topic.

Explain the students about the challenges before sustainable developments in details.

Explain all 17 SD goals in detail with the students:

1. No Poverty
2. Zero Hunger
3. Good Health and Wellbeing
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reduced Inequalities
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land

16. Peace Justice and Strong Institutions
17. Partnerships for the Goals

Explain the meaning of Data Science to the students along with the following:

- Big Data
- Categories of Data: Structured, Unstructured, Natural Language, Machine Generated, Graph-based or Network, Audio, video, and images and Streaming Data

Tell the students why we need data science and the aim for its use.

Ask the students to solve the exercise **I Know** given on page number 156.

Show the students about the role of Data Scientist.

Explain how can we solve problems with Data Science with following approaches:

- Descriptive Analytics
- Predictive Analytics

Ask the students to solve the exercise **Quiz Bee** given on page number 157.

Define the tools used for Data Science which are:

- R Scripting Language
- Structured Query Language (SQL)
- Python
- Hadoop
- Tableau

Explain the students about the mechanism of AI and Data Science in brief.

## Extension

Ask the students some oral questions based on this chapter.

Q. What is SDG?
Q. Define all 17 SDGs in brief.
Q. What is Data Science?
Q. What is Big Data?
Q. Define the categories of Data.
Q. Explain why we need Data Science.
Q. Define the role of data Scientist.
Q. Explain the two approaches of solving problem with data Science.
Q. Explain the tools for Data Science.
Q. Explain the relation between AI and Data Science.

## Evaluation

After explaining the chapter, let the students do the exercises given on Page 159 and 160 in the main course book as Assess Yourself. Tell them to solve the critical thinking skill developing exercise as Coding Zone given on Page 161.

Take the students to the computer lab and let them practice the activity given in the Lab Activity section on Page 160 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

## Suggested Activity

Ask the students to make a chart on SDG and involve all of them with examples.