TOUCHPAD

Artificial Intelligence Ver. 3.0

9

Teacher's Manual

Extended Support for Teachers

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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 • Shows mature throwing and catching patterns • Writing is now smaller and more readable • Drawings are now more detailed, organised and have a sense of depth
Cognitive	• Attention continues to improve, becomes more selective and adaptable • Recall, scripted memory, and auto-biographical memory improves • Counts on and counts down, engaging in simple addition and subtraction • Thoughts are now more logical
Language	• Vocabulary reaches about 10,000 words • Vocabulary increases rapidly throughout middle childhood
Emotional/ Social	• Ability to predict and interpret emotional reactions of others enhances • Relies more on language to express empathy • Self-conscious emotions of pride and guilt are governed by personal responsibility • Attends to facial and situational cues in interpreting another's feelings • 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 • Cognitive self-regulation is now improved
Language	• Ability to use complex grammatical constructions enhances • Conversational strategies are now more refined
Emotional/ Social	• Self-esteem tends to rise • Peer groups emerge

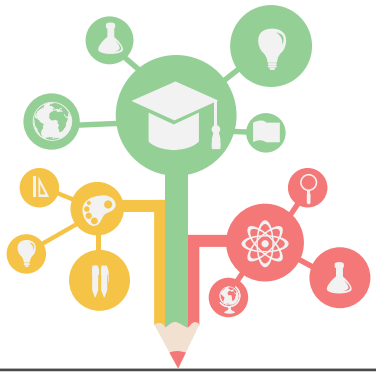
Age 11 - 20 Years

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

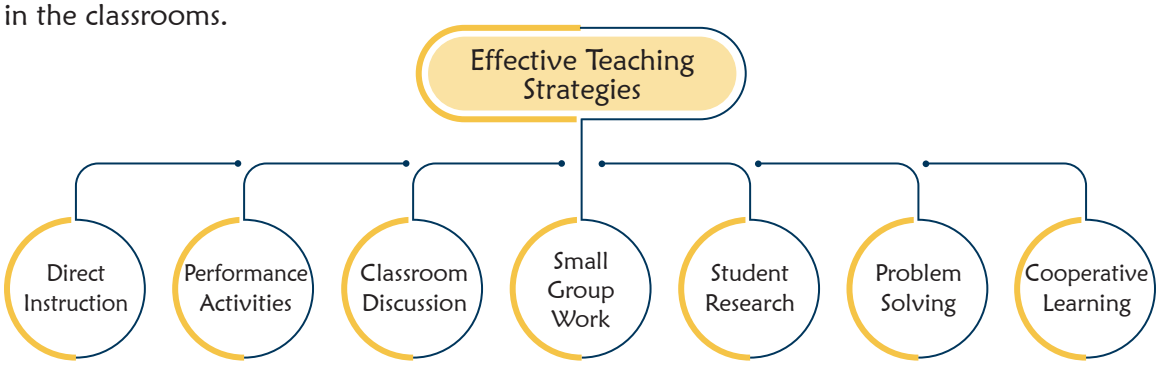
After the class

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

> "Knowing yourself is the beginning of all wisdom."

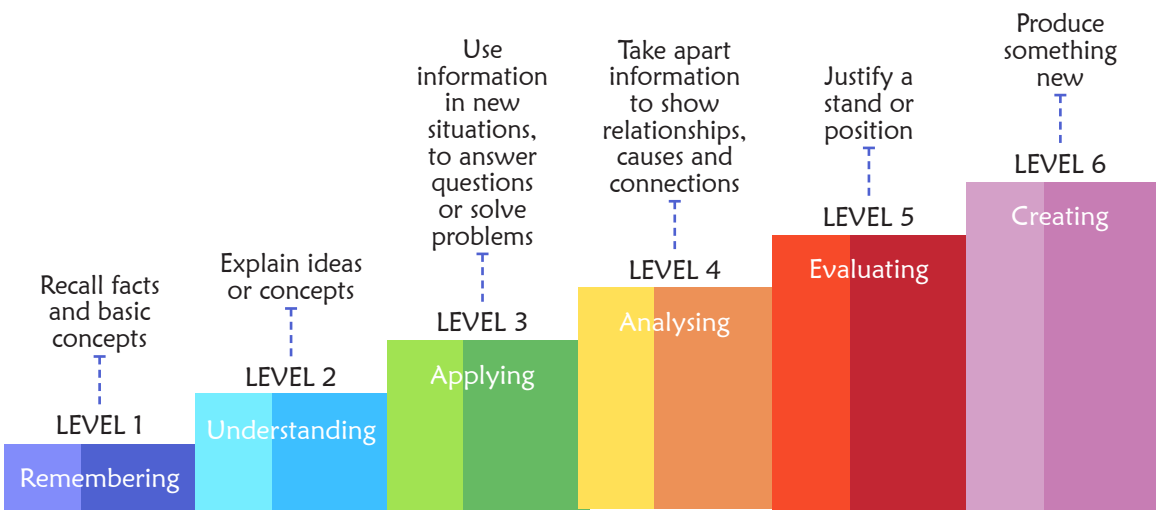
Teaching Strategies

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 9

LESSON PLAN

Part-A: Employability Skills

1 Communication Skills-I

Teaching Objectives

Students will learn about

- Understand what communication is and identify its key elements.
- Explain the importance and functions of effective communication.
- Describe the types of communication: verbal, non-verbal and visual.
- Recognise different perspectives and barriers in communication.
- Apply the 7 Cs of effective communication.
- Demonstrate public speaking using the 3Ps technique.
- Develop writing skills, including sentence construction, punctuation and paragraphing.
- Identify and use parts of speech and articles correctly.

Number of Periods	
Theory	Practical
4	2

Teaching Plan

Introduction (Engagement)

Question-Based Discussion:

- What is communication?
- Have you ever been misunderstood while trying to say something? Why do you think that happened?
- How do we communicate without speaking?

Relatable Analogy:

- Share a short mime skit or visual puzzle. Ask students what they understood and how.
- Use this to introduce the idea that communication is more than just words.

Lesson Delivery (Explanation & Demonstration)

1. **What Is Communication?**

   Explanation:

   - Communication is the process of conveying messages using signs, symbols, speech, gestures, or writing.

Demonstration:

- Sender, Message, Encoding, Channel, Receiver, Decoding, Feedback

Activity:

- Role-play activity: One student gives instructions (sender), another performs a task (receiver). Others observe how feedback is given.

2. **Importance of Communication**

Key Purposes:

- Information, Motivation, Persuasion, Clarity

Activity:

- Divide students into pairs. One explains how to tie a shoelace using only gestures. Discuss clarity and effectiveness.

3. **Perspectives and Factors Affecting Communication**

Explanation:

- Discuss how past experiences, language barriers, feelings, culture, etc., influence how we interpret messages.

Activity:

- Case Study: "Teacher explained well, but students still didn't understand." Why? (Discuss perspectives)

4. **The 7 Cs of Effective Communication**

C's Covered:

- Clear, Concise, Concrete, Correct, Coherent, Complete, Courteous

Activity:

- Students correct a poorly written message using the 7 Cs checklist.

5. **Types of Communication**

Types:

- Verbal (oral, written), Non-verbal (body language, facial expressions, touch), Visual (charts, signs, mind maps)

Activity:

- Communication Challenge: Deliver a message through each type and let others guess the content.

6. **Verbal Communication: Oral and Written**

Explanation:

- Oral: Face-to-face, phone calls
- Written: Emails, notes, books

Activity:

- Write a thank-you note (written) and perform a short dialogue (oral) on a topic like "My First Day at School."

7. **Non-Verbal Communication**

Modes:

- Body language, facial expressions, eye contact, touch, posture

Activity:

- Game: "Guess the Emotion" – Students express feelings using only facial expressions and gestures.

8. **Visual Communication**

Examples:

- Road signs, maps, infographics

Activity:

- Students design a poster (e.g., "Say No to Plastic") and present the message visually.

9. **3P's of Public Speaking**

Components:

- Prepare, Practice, Perform

Activity:

- Prepare a 1-minute speech. Practice in small groups and perform in front of the class. Focus on voice, posture and gestures.

10. **Writing Skills**

Topics Covered:

- Capitalisation, punctuation marks (.,!?,'), use of commas and apostrophes

Activity:

- Students correct a paragraph with deliberate punctuation and capitalisation errors.

11. **Phrases and Sentences**

Explanation:

- Phrase: Group of words with incomplete meaning
- Sentence: Group of words with complete meaning

Activity:

- Categorise: Identify whether each example is a phrase or a sentence.

12. **Paragraph Writing**

Structure:

- Topic sentence, supporting details, conclusion

Activity:

- Write a paragraph on "My Favourite Hobby" using the proper structure.

13. **Parts of Speech**

Included:

- Noun, Pronoun, Verb, Adjective, Adverb, Conjunction, Preposition, Interjection

Activity:

- Sentence Builder Game: Given a few words, form a grammatically correct sentence and label parts of speech.

14. Use of Articles

Types:

- Definite (The), Indefinite (A, An)

Activity:

- Fill-in-the-blanks: Insert the correct article in a paragraph.

Extension

Ask the students some oral questions based on this chapter.

Q. Why do some people communicate more effectively than others?

Q. Can we communicate without using any language?

Q. How do cultural differences affect communication?

Creative Task:

- Create a communication comic strip showing effective vs. ineffective communication.

Evaluation

- **Written Quiz:** On elements, types, 7 Cs, punctuation, and parts of speech.
- **Oral Task:** Deliver a 2-minute speech using the 3Ps technique.
- **Worksheet:** Fill in the blanks, correct errors, match definitions, and categorise phrases/sentences.

Suggested Activity

"My Communication Diary" Project:

Over one week, students maintain a diary noting:

- How they communicated (type)
- Who they communicated with
- Was the message understood?
- Any barriers or challenges?

Present summaries in class.

2 Self-Management Skills-I

Teaching Objectives

Students will learn about

- Understand the meaning and importance of self-management.
- Identify key self-management skills such as self-awareness, motivation, control, and problem-solving.
- Recognise the impact of self-confidence on personal and professional life.
- Describe factors influencing self-confidence including physical, social, and cultural elements.

- Apply self-reflection techniques to identify strengths and weaknesses.
- Build habits that improve personal organisation, hygiene, goal-setting, and emotional regulation.

Number of Periods	
Theory	Practical
4	2

Teaching Plan

Introduction (Engagement)

Question-Based Discussion:

- How do you plan your day before school?
- What helps you stay calm when things don't go as planned?
- Have you ever succeeded at something because you believed in yourself?

Relatable Analogy:

Compare life to a "daily mission" or "video game level" — where success depends on how well you manage time, focus, energy, and emotions.

Lesson Delivery (Explanation & Demonstration)

1. **Introduction to Self-Management**

   Key Concepts:

   - Meaning of Self-Management: Managing your thoughts, actions, and emotions to reach personal and professional goals.
   - Positive outcomes: Goal achievement, self-reliance, focus, discipline, and emotional balance.

   Activity:

   - Reflection Journal – Ask students to write one situation where they successfully managed themselves (e.g., completed homework on time).

2. **Self-Management Skills**

   Topics Covered:

   - **Self-Awareness –** Knowing your feelings, habits, and behaviours.
   - **Self-Confidence –** Trusting your abilities and judgement.
   - **Self-Motivation –** Inner drive to do things without being pushed.
   - **Self-Control –** Managing emotions and reactions.
   - **Self-Commitment –** Dedication to your personal growth and goals.
   - **Problem Solving –** Analyzing and overcoming obstacles.
   - **Positive Thinking –** Optimism in tough situations.
   - **Stress Management –** Controlling stress through techniques.
   - **Time Management –** Planning time wisely.
   - **Organisational Skills –** Structuring tasks effectively.

   Activity:

   - Role Play – Divide students into pairs. One plays a student with poor self-management; the other helps them improve through advice and actions.

3. **Knowing Yourself**

Topics Covered:

- Understanding your purpose, interests, beliefs, likes/dislikes, strengths, and weaknesses.

Activity:

- "Who Am I?" Worksheet – Students list their key strengths, hobbies, values, and emotions. Discuss in groups.

4. **Identifying Strengths and Weaknesses**

Topics Covered:

- Examples of strengths: discipline, creativity, respect, sports.
- Examples of weaknesses: laziness, stage fear, negative thinking.

Steps to Identify:

- Ask peers and family for feedback.
- Reflect on tasks you enjoy vs avoid.
- Observe past successes and challenges.

Activity:

- Strength & Weakness Chart – Students list 5 strengths and 3 weaknesses, then write one improvement strategy for each weakness.

5. **Self-Confidence**

Topics Covered:

- Meaning and role of self-confidence.
- Steps to build confidence:
  - Focus on achievements
  - Positive attitude
  - Set achievable goals
  - Act confidently

Qualities of a Self-Confident Person:

- Hardworking, positive, committed, focused.

Activity:

- Self-Confidence Booster Cards – Students write motivational messages or goals and share with peers to boost morale.

6. **Factors Affecting Self-Confidence**

Topics Covered:

- Physical Factors: Hygiene, body language, appearance.
- Social Factors: Family, peers, teachers.
- Cultural Factors: Traditions, customs, gender roles.

Activity:

- Case Study Discussion – Read a scenario about a student who lacks confidence due to cultural limitations. Ask students how to support them.

7. Tips for Building Self-Confidence

Key Tips:

- Get rid of negative thoughts.
- Think positively.
- Practice hygiene.
- Use past experiences as learning.
- Know yourself.
- Stay happy with little achievements.
- Set goals and stay consistent.

Activity:

- Vision Board Creation – Students create a board with images and affirmations representing their goals and dreams.

Extension

Ask the students some oral questions based on this chapter.

Q. How does positive thinking help in difficult times?

Q. Can cultural values affect someone's confidence?

Q. What habits can help you improve self-awareness?

Creative Task:

- Students prepare a skit on "A Day in the Life of a Self-Managed Student" showcasing time management, emotional control, and goal setting.

Evaluation

Quiz:

- Multiple-choice and fill-in-the-blank questions on types of self-management skills, qualities of confident people, and identification of weaknesses.

Practical Assessment:

- Students submit a weekly log reflecting how they applied self-management skills in daily life.

Assignment:

- Write a paragraph on "My Strengths and How I Use Them".

Suggested Activity

Self-Management Campaign:

Students create posters, slogans, and short presentations to raise awareness about self-management in their school environment. Display the best work on the class noticeboard.

3 ICT Skills-I

Teaching Objectives

Students will learn about

- Understand the concept and importance of Information and Communication Technology (ICT).
- Identify the role of ICT in personal and professional life.
- Recognise ICT tools and components such as hardware, software, data, and people.
- Understand input, output, processing, and storage devices.
- Use Windows 10 OS for basic desktop operations and file management.
- Comprehend the Internet's working, its components, terminologies, protocols, and applications.

Number of Periods	
Theory	Practical
4	3

Teaching Plan

- How do you use technology in your daily life?
- What do you think happens when you press the power button on a computer?
- What do you use to access the Internet?
- Can computers communicate with each other without human intervention?

Relatable Analogy:

Ask students to imagine a kitchen where ingredients (input) are processed (cooking) to produce food (output). Use this to explain the Input-Process-Output cycle in computing.

Lesson Delivery (Explanation & Demonstration)

1. Introduction to ICT and Its Role

Topics:

- Definition of IT, CT, and ICT
- ICT in personal life: education, communication, healthcare, entertainment
- ICT in professional life: e-banking, e-commerce, remote working, record maintenance

Activity:

- Students will make a mind map showing how ICT is used in different areas of their life.

2. ICT Tools and Components

Topics:

- ICT tools: computers, smartphones, internet, TV/radio
- Six components: Data, Information, People, Procedures, Hardware, Software
- Software types: System and Application Software
- Input, Processing, Output, and Storage devices
- Introduction to memory types: RAM, ROM, Secondary Storage

Activity:

- Bring sample devices (mouse, USB, keyboard) and have students classify them into hardware/ software and input/output.

3. Understanding Operating Systems

Topics:

- What is an Operating System?
- Types: UNIX, DOS, Windows, Linux, Mobile OS
- Functions: Memory, File, Device, Process, and Security Management

Activity:

- Pair activity to match OS types to their characteristics using flashcards.

4. Booting and Desktop Operations

Topics:

- Cold and Warm Booting
- Windows 10 startup process
- Desktop, Taskbar, Start Menu, System Tray
- Changing wallpaper, screen saver, date/time
- Adjusting speaker volume

Demonstration:

- Live demo or simulated video of booting up Windows and performing desktop customisation.

5. Files, Folders, and Windows Explorer

Topics:

- File vs Folder
- Creating, Renaming, Deleting, Copying, Moving
- Searching files and folders

Activity:

- Hands-on session: Assign tasks like creating folders, renaming files, and organising documents using File Explorer.

6. Mouse and Keyboard Operations

Topics:

- Mouse operations: Click, Double Click, Right Click, Drag-Drop, Hover
- Common keyboard shortcuts (Ctrl + C, Ctrl + V, etc.)

Activity:

- Speed challenge – students compete to complete basic operations using mouse and keyboard shortcuts.

7. Internet and Its Components

Topics:

- Internet history and working (ARPANET, HTTP, IP address, TCP/IP)
- Terminologies: URL, Webpage, Website, Homepage, DNS, etc.

- Protocols: HTTP, HTTPS, FTP, SMTP
- Applications: Email, Chatting, Video Conferencing, e-Learning, Social Networking

Group Activity:

- Create a skit showing how data travels from one computer to another using protocols and DNS.

Extension

Ask the students some oral questions based on this chapter.

Q. How does ICT simplify healthcare and education?

Q. What are the differences between system software and application software?

Q. Why is understanding operating systems important?

Creative Task:

Ask students to create a digital poster on "Why ICT is essential in today's world" using any application of their choice (e.g., MS PowerPoint, Canva).

Evaluation

- **MCQ quiz** covering types of devices, components of ICT, and OS functions.
- **Practical** assessment: Create, rename, move and delete folders and files.
- **Worksheet:** Label and match different hardware and software components.
- **Oral quiz:** Rapid-fire questions on Internet terminologies and functions.

Suggested Activity

ICT in Action:

- Students will create a pictorial "ICT Dictionary" where each student is assigned a term (like Router, Email, Printer, Firewall, etc.) to explain with diagrams and usage examples.
- Combine all entries into a class e-book.

4 Entrepreneurial Skills-I

Teaching Objectives

Students will learn about

- Understand the definition and types of businesses.
- Differentiate among business forms such as sole proprietorship, partnership, corporation, and LLC.
- Identify and explain the key characteristics and roles of an entrepreneur.
- Outline the process of starting a business and developing entrepreneurship.
- Recognise the challenges and rewards of being an entrepreneur.
- Differentiate between a businessman and an entrepreneur.

Number of Periods	
Theory	Practical
3	2

Teaching Plan

Introduction (Engagement)

Question-Based Discussion:

- What would you like to do when you grow up—start your own business or get a job?
- Have you heard of any start-up stories that inspired you?
- What do you think the difference is between a businessman and an entrepreneur?

Analogy/Relatable Example:

- Share the "Go Green" example from the textbook where a group of students started selling plants.

Visual Prompt: Show a picture of a busy market street and ask students:

- Which shops do you think are small businesses?
- How many of them provide a product vs. a service?

Lesson Delivery (Explanation & Demonstration)

1. **Understanding Business and Its Types**

   Concepts:

   - Business: A continuous economic activity for profit by producing or selling goods/services.
   - Types:
     - **Manufacturing:** Uses raw materials to produce goods (e.g., Maruti Suzuki).
     - **Service:** Offers expertise or help (e.g., HDFC Bank, Zomato).
     - **Merchandising:** Buys from wholesaler, sells at retail (e.g., grocery store).
     - **Hybrid:** Combines two or more types (e.g., restaurant with delivery).

   Activity:

   - Ask students to identify which type of business their family or neighbours run.

2. **Forms of Business Organisation**

   Explanation:

   - **Sole Proprietorship:** One owner, full control, easy setup.
   - **Partnership:** Two or more owners, shared responsibilities.
   - **Corporation:** Large business with separate legal entity (e.g., Microsoft).
   - **LLC:** Blend of various forms, suited for small businesses.

   Activity:

   - Group Comparison: Use a table to compare advantages and disadvantages of each form.

3. **Steps to Start a Business**

   Steps:

   1. Plan your business idea.
   2. Secure finances.
   3. Choose a legal structure.

4. Pick a location.
5. Build your team.
6. Identify customers.
7. Promote your business.
8. Take long-term feedback.

Activity:

- Case Study: Students work in groups to create a plan for a small café or online store using the 8 steps.

4. Entrepreneurship and Entrepreneur

Concepts:

- Entrepreneur: A person who undertakes the risk to start an innovative business.
- Entrepreneurship: The process of starting and managing a new business idea.
- Enterprise: The actual business started.

Activity:

- Write down one business idea they think is innovative and why.

5. Entrepreneurship Development Process

Key Steps:

- Idea generation.
- Structured evaluation.
- Developing a plan.
- Gathering resources.
- Organising hierarchy.
- Managing efficiently.
- Planning future growth.

Activity:

- Diagram Task: Students draw the entrepreneurship development process as a flowchart.

6. Characteristics of an Entrepreneur

Concepts:

- Risk-taking
- Innovative
- Visionary leadership
- Open-mindedness
- Flexibility
- Product knowledge

Activity:

- Self-assessment checklist: "Do I have the qualities of an entrepreneur?"

7. **Role of Entrepreneurs**

Economic Roles:

- National development.
- Employment generation.
- Resource mobilisation.

Social Roles:

- Improves quality of life.
- Creates equality.
- Provides regional development.

Activity:

- Think-Pair-Share: "How can entrepreneurs improve society?"

8. **Core Skills, Challenges, and Rewards**

Core Skills:

- Communication, discipline, social networking, decision-making.

Challenges:

- No fixed income.
- Emotional and physical stress.
- Market risks.

Rewards:

- Be your own boss.
- Live your passion.
- Flexibility of time.
- Own your profits.

Activity:

- Divide the class: One group lists challenges, the other lists rewards. Then present.

9. **Difference Between Businessman and Entrepreneur**

Aspect	Businessman	Entrepreneur
Approach	Traditional	Innovative
Market Role	Market Player	Market Leader
Risk Factor	Low	High
Focus	Profit	Society, Customers, Profit

Activity:

- Students role-play one scenario each for a businessman and an entrepreneur.

Extension

Ask the students some oral questions based on this chapter.

Q. Why is entrepreneurship important in today's world?

Q. Can anyone be an entrepreneur?

Q. What kinds of businesses are best for your community?

Creative Task:

Students design a flyer or poster promoting their own imaginary start-up idea.

Evaluation

Quiz Topics:

- Types of businesses.
- Steps in entrepreneurship development.
- Entrepreneurial characteristics.
- Difference between business forms.

Short Answers:

- Define Entrepreneurship.
- Name two challenges of being an entrepreneur.
- Mention any two types of business and examples.

Practical Assessment:

- Create a simple business plan using the "Steps of Starting a Business."

Suggested Activity

"My First Start-Up" Project:

- Students work in groups to come up with a unique business idea.
- They follow all 8 steps to plan the business and present it to the class as a pitch.
- Include a name, logo, slogan, and basic marketing strategy.

5 Green Skills-I

Teaching Objectives

Students will learn about

- Define Environment, Ecosystem, and explain their importance.
- Describe the Relationship between Society and Environment.
- Identify different types of Natural Resources and understand their classification.
- Recognise the need and methods for Natural Resource Conservation.
- Understand and apply the concept of 3Rs – Reduce, Reuse, Recycle.
- Analyse factors causing environmental imbalance and their impact.
- Understand the meaning, components, and benefits of the Green Economy.

✦ Explore the significance of Green Skills, Green Jobs, and Green Projects in India.

Number of Periods	
Theory	Practical
4	2

Teaching Plan

- What does the word "environment" mean to you?
- How do you interact with your environment daily?
- Have you ever heard of the 3Rs? Can you name them?
- Do you think saving the environment is connected to jobs and the economy?

Relatable Analogy

Use the analogy of a garden to explain the environment and ecosystem. Just like a garden has living plants, insects, soil, and water—our environment is a larger version of this, where everything is connected.

Lesson Delivery (Explanation & Demonstration)

1. **Understanding Environment & Ecosystem**
   - Explain what constitutes the **Natural and Man-Made Environment**.
   - Describe the **components of the ecosystem** – Biotic and Abiotic.
   - Differentiate between **Natural and Artificial Ecosystems**.

   Activity:
   - Ask students to list and categorise elements of their school environment into biotic and abiotic.
2. **Relationship Between Society and Environment**
   - Discuss how society depends on natural resources and also affects the environment.
   - Use examples such as farming, urbanisation, and industrialisation.

   Activity:
   - Group activity to draw a mind map showing how daily human activities (e.g. transport, food, clothing) are connected to nature.
3. **Natural Resources and Their Classification**
   - Define Natural Resources and explain **Renewable, Non-renewable, Exhaustible, and Inexhaustible** types.
   - Introduce **World Nature Conservation Day** and its importance.

   Activity:
   - Give students flashcards with resource names; they classify them into the correct category.
4. **Natural Resource Conservation**
   - Discuss conservation methods for:
     - Water (rainwater harvesting, judicious use)
     - Soil (afforestation, contour ploughing)
     - Energy (use of alternatives like solar energy)

- Food (storage, heating, cooling, drying)
- Forests (afforestation, fire control, selective cutting)

Activity:

- Students can prepare posters with tips for saving one type of resource.

5. **Saving the Environment Using 3R's**
   - Explain Reduce, Reuse, Recycle with real-life examples.
   - Discuss difference between reuse and recycle.

   Activity:

   - Trash-to-Treasure: In groups, students will create a useful product using discarded items.
6. **Factors Causing Environmental Imbalance**
   - Explain how human activities like **deforestation**, **mining**, **population growth** contribute to imbalance.
   - Describe **pollution types (air, water, soil)** and **global warming**.

   Activity:

   - Case study: Show students an image of a polluted river and ask them to identify possible causes and effects.
7. **Green Economy**
   - Define Green Economy.
   - Discuss the 6 components:
     - Renewable Energy
     - Green Buildings
     - Green Transport
     - Water Management
     - Waste Management
     - Land Management
   - Highlight its **Environmental, Economic, and Social Benefits**.

   Discussion:

   - Is a green economy possible in your town or village? What would it look like?
8. **Green Skills and Green Jobs**
   - Define **Green Skills** and explain their need in today's world.
   - List examples of **Green Jobs** like:
     - Solar Panel Technician
     - Environmental Scientist
     - Green Architect

   Case Study:

   - Discuss the Green Skills Development Programme (GSDP) started by the Government of India.

9. Green Projects in India

- Introduce innovative projects:
  - Digital Green
  - SayTrees
  - Feeding India
  - Fourth Partner Energy

Activity:

- Research & Presentation: In pairs, students research one Green Project and present its impact.

Extension

Ask the students some oral questions based on this chapter.

Q. How can you personally reduce waste in your school?

Q. Are green jobs really the future? Why?

Q. What will happen if we don't conserve our natural resources?

Creative Task: Design your own Green Project. Include:

- Objective
- Materials required
- Target problem
- Expected outcome

Evaluation

Quiz Topics:

- Environment and Ecosystem
- Natural Resources
- 3Rs
- Green Economy Components
- Green Skills & Jobs

Assignments:

- Worksheet on categorising resources.
- Poster-making on "Save Our Soil" or "Stop Global Warming".
- Roleplay/skit on a green job (e.g., a student acting as a Solar Technician).

Suggested Activity

Green School Initiative

Divide students into teams for a week-long "Green Audit" of school practices:

- Water usage
- Electricity consumption
- Waste disposal
- Suggestions for improvement

CLASS 9

LESSON PLAN

Part B-Subject Specific Skills

1 AI Reflection, Project Cycle and Ethics

Teaching Objectives

Students will learn about

- Define the concept of Intelligence and Artificial Intelligence.
- Explain Types of AI: Weak AI, Strong AI, and Super AI.
- Explore "AI Around Us" and differentiate what is AI and what is not.
- Understand Domains of AI: Data Statistics, Computer Vision, NLP.
- Analyse the AI Project Cycle and its stages.
- Understand the importance of Ethics in AI.
- Apply problem-solving methodologies using the 4W Problem Canvas and Problem Statement Template.
- Conduct data acquisition and explore system maps.
- Identify advantages and disadvantages of AI.

Number of Periods	
Theory	Practical
3	2

Teaching Plan

Introduction (Engagement)

- Question-Based Discussion:
  - What is the difference between Intelligence and Artificial Intelligence?
  - Can machines really think like humans? How?
  - Where do we see AI in our daily life?
  - Why should we worry about ethics in AI?
- **Relatable Analogy:**
  - Relate AI Project Cycle to "Planning a trip" or "Cooking a recipe". Explain how each stage plays a role just like we plan a journey: identifying where to go (Problem Scoping), collecting information (Data Acquisition), exploring maps (Data Exploration), choosing transport (Modelling), checking routes (Evaluation), and finally going on the trip (Deployment).

Lesson Delivery (Explanation & Demonstration)

1. **Understanding Intelligence & Artificial Intelligence**
   - Define Intelligence: Ability to learn, recognise, and solve problems.
   - Define Artificial Intelligence: Simulating human intelligence into machines.

   Activity:
   - Ask students to name any AI device they have used or heard of.
   - Discuss "World Famous AI Machines" like Sophia, IBM Watson, Google's Driverless Cars.
2. **Types of AI**
   - Explain Weak AI, Strong AI, Super AI.
   - Give examples (Siri, Google Assistant, Hypothetical Super AI).

   Activity:
   - Discussion on: "How intelligent will AI become by 2030?"
3. **AI Around Us & What is Not AI**
   - Discuss real-life AI examples (Smartphones, Navigation, Social Media Filters).
   - Clarify misconceptions about what is not AI (e.g., simple automation).

   Activity:
   - Group task: List "AI" and "Not AI" items from daily life.
4. **Exploring AI Domains**
   - Data Statistics: Example – Weather forecasting.
   - Computer Vision: Example – Face recognition in phones.
   - Natural Language Processing: Example – Virtual assistants, chatbots.

   Hands-on Activity:
   - Play Quick Draw / Semantris / Emoji Scavenger Hunt.
   - Discuss how machines understand images, data, and language.
5. **AI Project Cycle**
   - Introduce stages:
     - Problem Scoping
     - Data Acquisition
     - Data Exploration
     - Modelling
     - Evaluation
     - Deployment

   Activity:
   - Case Study: Cleaning Oceans (Map it to AI Project Cycle).
6. **Ethics in AI**
   - Major concerns:
     - Job displacement, Privacy risks, Bias, Environmental impacts.

- Ethical Frameworks:
  - Rights-based, Utility-based, Virtue-based ethics.

Debate:

- Should AI be allowed to make decisions in law enforcement?

Case Study:

- AI in Healthcare: Biases in mental health prediction.

Extension

- **Discussion Questions:**
  - How can AI reduce environmental impacts?
  - Should AI replace humans in creative fields?
  - What should be the ethical responsibilities of AI creators?
- **Creative Task:**
  - Prepare a presentation: "Is AI Beneficial or Harmful for Society?"

Evaluation

- **Quiz:**
  - Cover key concepts: Intelligence, AI Types, AI Cycle, Domains, Ethics.
- **4W Problem Canvas:**
  - Apply to any chosen theme (e.g., Traffic Management or Health Monitoring).
- **Practical Lab:**
  - Use Google AutoDraw / Chatbots / Image Recognition tools.
- **System Mapping:**
  - Create a system map for restaurant food wastage estimation.

Suggested Activity

AI in Action:

- Group project: Students design an AI solution for real-world issues (e.g., waste management, education).
- Present using the AI Project Cycle.

2 Data Literacy

Teaching Objectives

Students will learn about

- Define data and data literacy and explain its importance in the digital age.
- Understand the Data Pyramid (DIKW) and its stages.
- Learn the process of acquiring, processing, and interpreting data.

- Identify the importance of data security and privacy.
- Explore tools like Tableau for data presentation.
- Develop critical thinking and analytical skills through hands-on activities.
- Recognise the ethical considerations in data acquisition and use.

Number of Periods	
Theory	Practical
3	2

Teaching Plan

Introduction (Engagement)

Question-Based Discussion:

- What is data? Can you give examples from daily life?
- Why is it important to understand how to use and protect data?
- What is the difference between data security and data privacy?
- How do you think data helps in making decisions in businesses, education, and daily life?

Relatable Analogy:

- Use the Traffic Light example from the Data Pyramid to explain how raw data transforms into actionable decisions (Data > Information > Knowledge > Wisdom).
- Show a short video on Data Literacy:
  YouTube Video on Data Literacy

Lesson Delivery (Explanation & Demonstration)

1. **Introduction to Data Entry**
   - Explain what data is (raw facts and figures).
   - Define Data Literacy = Data + Literacy: Understanding, interpreting, analysing, and communicating with data.
   - Discuss why Data Literacy is essential for critical thinking and decision-making.

   Activity:

   - Ask students to reflect on how they use data daily (e.g., while shopping online).
2. **The Data Pyramid and Its Stages (DIKW Pyramid)**
   - Discuss stages: **Data > Information > Knowledge > Wisdom**.
   - Use "Planning a Picnic" and "Traffic Light" examples.
   - Show visual pyramid representation.

   Activity:

   - Task students to build their own data pyramid for "Preparing a Speech for Technology Day".
3. **Importance and Impact of Data Literacy**
   - Explore how data literacy improves decision-making, fosters innovation, and impacts fields like:
     - Business
     - Education
     - Healthcare

- Public Policy
- Social Equity

Activity: Pair Work

- Impact of News Articles:
  - Students search and evaluate sources from trending news.
  - Rank sources by accuracy and reliability.

4. Becoming Data Literate

- Steps to become data literate:
  - Data sourcing
  - Data analysis tools
  - Statistical knowledge
  - Data visualisation tools (Tableau)
  - Data cleaning & manipulation

Activity:

- Scenario-based discussion: Buying a video game online – how data helps in decision-making.

5. Data Security and Privacy

- Define data privacy and data security.
- Differences and importance.
- Best practices:
  - Strong passwords
  - Multi-factor authentication
  - Data encryption
  - Regular audits

Activity:

- Watch Cyber Safety Video:
  Online Security Tips
- Discussion: Refer to CBSE Cyber Safety PDF and list do's and don'ts.

6. Acquiring, Processing, and Interpreting Data

- Explain data acquisition (Discovery, Augmentation, Generation).
- Differentiate between types of data: Qualitative (Textual) and Quantitative (Numeric).
- Steps of data processing and interpretation.

Activity:

- Treasure Hunt Scenario: Students write observations and categorise them as Data Discovery, Augmentation, or Generation.
- Data Categorisation: Textual or Numeric data activity.

7. Usability, Features, and Preprocessing of Data

- Discuss:
  - Usability factors: Structure, Cleanliness, Accuracy.

- Data features: Independent vs Dependent variables.
- Data Preprocessing steps.

Activity:

- Kaggle Activity: Explore Titanic Dataset and observe data features.

8. **Data Presentation Using Tableau**
   - Introduction to Tableau and its features.
   - Step-by-step guide to creating a bar graph in Tableau.
   - Demonstrate colour, label changes, and exporting workbooks.

   Activity:

   - Students list their favourite songs and categorise by genre.
   - Create a bar graph showing favourite genres.

Extension

Discussion Questions:

- How is data used in your daily life?
- Why is it important to verify data sources?
- How can we ensure data privacy while using social media?

Creative Task:

- Prepare a poster on "Best Practices for Data Security and Privacy".

Evaluation

1. **Quiz** on key concepts (Data Pyramid, Data Security, Data Types).
2. **Practical Lab:** Tableau task – Create a student performance chart.
3. **Worksheet:** Classify given data points as Qualitative or Quantitative.
4. **Homework:** Reflective questions:
   - How does data literacy help in problem-solving?
   - Why is data privacy critical in the AI era?

Suggested Activity

Data Storytelling Project:

- Students will work in pairs to collect data on school events (e.g., attendance, feedback).
- Use Tableau or charts to present their findings.
- Share stories drawn from their data analysis.

3 Maths for AI – Statistics & Probability

Teaching Objectives

Students will learn about

- Understand the relationship between Mathematics and Artificial Intelligence.
- Identify patterns in numbers and images.
- Explain the significance of Statistics and Probability in AI applications.
- Analyse real-world applications of Statistics and Probability.
- Apply logical reasoning and problem-solving skills to recognise patterns.
- Demonstrate understanding of probability using examples like dice, coins, and cards.

Number of Periods	
Theory	Practical
3	2

Teaching Plan

Introduction (Engagement)

Question-Based Discussion:

Begin the lesson by asking:

- How do you think AI recognises numbers, images, or speech?
- Have you noticed patterns in daily life, like weather patterns or number sequences?
- How do you think Maths helps AI make predictions or decisions?

Relatable Analogy:

Compare AI learning patterns to solving puzzles or spotting sequences in games like Sudoku or "Connect the Dots".

Use examples such as:

- Patterns in nature: Fibonacci sequence in flowers.
- Everyday predictions: Weather forecasts using statistics.

Lesson Delivery (Explanation & Demonstration)

1. Mathematics and AI – The Connection

- Explain how Mathematics is the backbone of AI, providing models and algorithms.
- Discuss number patterns (e.g., arithmetic, geometric, Fibonacci).
- Show visual patterns in images:
  - Repeating shapes
  - Symmetry
  - Colour patterns
  - Progressions

Activity: Pattern Recognition

- **Task:** Students observe given number and image patterns and identify the rules.

- **Example:** Find missing numbers in series: 0, 1, 4, 25, 36, ?

2. Essential Mathematics for AI

Explain key mathematical areas for AI:

- **Statistics & Probability** (exploring and predicting data).
- **Linear** Algebra (for data processing).
- **Calculus** (to optimise AI models).
- **Graph Theory & Algorithm Design** (for data representation).

Interactive Discussion:

- Use simple charts/graphs to show how AI predicts outcomes.
- Share examples of Netflix recommendations and weather forecasts.

3. Understanding Statistics

- Define Statistics as the collection, exploration, and analysis of data.
- Explain the steps: Data Collection → Exploration → Cleaning → Analysis → Conclusion.

Activity: Case Study

- School performance analysis:
  - Study habits vs grades.
  - Discussion: How data helps improve student learning.

Real-life Applications:

- **Sports:** Player performance analytics.
- **Education:** Test score analysis.
- **Disaster Management:** Risk assessment and preparedness.
- **Weather Forecasting:** Analysing climate data.

Task:

- Ask students to explain two applications of statistics in education.

4. Understanding Probability

- Define Probability as the chance of an event occurring.
- Introduce the basic formula:
  P(A) = (Number of Favourable Outcomes) / (Total Number of Possible Outcomes)

Examples:

- Coin toss: Head or tail.
- Rolling a die: Probability of getting an even number.
- Drawing cards: Probability of drawing a heart.

Experiential Activity:

- Use simple props like coins, dice, and cards to explore:
  - Certain events
  - Likely/unlikely events
  - Impossible events
  - Equal probability events

Real-life Applications:

- Sports: Predicting outcomes.
- Finance: Investment risks.
- Traffic: Estimating congestion.
- Medicine: Predicting disease spread.

Extension

Discussion Questions:

- How does AI use probability to make decisions?
- Can you think of events around you where probability is involved?
- What could be the impact of using inaccurate data in AI predictions?

Creative Task:

- Students design a poster or presentation explaining how probability is used in daily life (e.g., games, weather, finance).

Evaluation

- **Quiz:** Conduct a short quiz on:
  - Definitions of statistics and probability.
  - Types of number patterns.
  - Real-life applications of probability.
- **Practical Task:**
  - Activity with dice and coins to calculate probabilities.
  - Analyse a dataset (provided by the teacher) to draw conclusions.
- **Reflective Task:**
  - Students describe a scenario where AI could use statistics or probability to solve a problem.

Suggested Activity

AI in Action:

- Students work in teams to design an AI system using statistics and probability.
- Example topics:
  - Predicting weather changes.
  - Estimating traffic congestion.
  - Analysing student performance data.
- Teams present their AI project using:
  - Identified patterns
  - Use of statistical methods
  - Probability-based predictions

4 Introduction to Generative AI

Teaching Objectives

Students will learn about

- Understand the concept of Generative AI and differentiate it from Conventional AI.
- Explain the types of Generative AI: GANs, VAEs, RNNs, and Autoencoders.
- Recognise real vs AI-generated images and describe identification techniques.
- Explore the applications and tools of Generative AI in fields like art, music, language, and coding.
- Discuss the ethical considerations and societal impacts of Generative AI.
- Develop responsible approaches towards using Generative AI technologies.

Number of Periods	
Theory	Practical
3	2

Teaching Plan

Introduction (Engagement)

Question-Based Discussion:

- Have you ever seen an image and wondered if it is real or created by a computer?
- Can AI create art or music? How does it compare to human creativity?
- What are some tools you've heard of that can create images or texts?
- Should we trust everything AI creates, like news, images, or videos?

Relatable Analogy:

- Compare Generative AI to an artist who learns by observing thousands of paintings and then creates new masterpieces from memory.
- Use the "father and kids" story from the unit to explain how generative and discriminative models learn differently.

Lesson Delivery (Explanation & Demonstration)

1. Introduction to Generative AI

- Define Generative AI and explain its working.
- Show examples of AI-generated images vs real images.
- Explain prompts and how they guide AI outputs (Text or Image prompts).

Activity:

- Show students a mix of real and AI-generated images and ask them to identify which is which, providing reasons (Problem-Solving & Logical Reasoning Task from the book).

2. Types of Generative AI

Explain the following with illustrations:

- **Generative Adversarial Networks (GANs):**
  - Generator and Discriminator networks.
  - Examples: Creating human-like portraits, converting images from day to night.

- **Variational Autoencoders (VAEs):**
  - Concept of latent space, encoder-decoder mechanism.
  - Examples: Creating new faces, composing music.
- **Recurrent Neural Networks (RNNs):**
  - Specialised in handling sequences (text, music).
  - Examples: Autocomplete, predictive text.
- **Autoencoders (AEs):**
  - Encoding-decoding to clean noisy images.
  - Differences and similarities with VAEs.

Activity:

- Draw comparison table between AEs and VAEs.
- Short video session: Play assigned video links from the book (GANs, The Next Rembrandt, AI-generated music).

3. **Applications of Generative AI**

Discuss how Gen AI is used in:

- **Art** (DeepArt, AI Portraits, The Next Rembrandt)
- **Music** (AIVA composer)
- **Language** (ChatGPT, translation, content generation)
- **Coding** (Copilot, Gemini, Runway ML)

Hands-on Activities:

- Visit https://artbreeder.com/ and create an image of a boy standing in the rain.
- Use https://runwayml.com/ to generate a video from text commands.
- Chat with Gemini at https://gemini.google.com/ and explore its features.

4. **Ethical Considerations & Responsible Use**

Discuss:

- **Ownership** and copyright issues.
- **Biases** in AI-generated outputs.
- **Misinformation** risks (fake news, deepfakes).
- **Job displacement** and economic impact.
- **Environmental concerns** from high computational demands.

Activity:

- Group discussion: "Is Generative AI a Boon or a Bane?"
- Case study discussion: Analyse how biases in Generative AI can lead to unfair outcomes.

Extension

Discussion Questions:

- Can AI-generated art ever replace human-created art?
- How do we ensure AI tools are used responsibly?
- What are the impacts of Generative AI on employment and society?

Creative Task:

- Students will prepare a presentation on "The Future of Generative AI" highlighting tools, benefits, risks, and ethical considerations.

Evaluation

- **Quiz:** Covering types of Generative AI, applications, and ethical concerns.
- **Practical Task:** Use GAN Paint (https://ganpaint-v2.vizhub.ai/) to create customised images.
- **Assignment:** Write answers to:
  - What is deepfake? Give examples.
  - Provide examples of biases in Generative AI.
  - Explain supervised vs unsupervised learning with examples.
- **Practical Lab:** Use AI tools like ChatGPT, Runway ML, or Artbreeder for hands-on exploration.

Suggested Activity

Generative AI in Action:

- Students work in teams to design a Generative AI project (e.g., creating art pieces, personalised music, story generation).
- Present their project by explaining:
  - Problem statement.
  - AI approach used (GANs, VAEs, etc.).
  - Ethical considerations and potential impact.

5 Introduction to Python

Teaching Objectives

Students will learn about

- Understand the concept of programming and its importance in problem-solving.
- Define algorithms and flowcharts and differentiate between them.
- Understand control structures (Sequential, Selection, and Repetition).
- Get familiar with Python: installation, character set, statements, and tokens.
- Understand variables, data types, and operators in Python.
- Write and execute basic Python programs.
- Develop basic problem-solving skills using Python.
- Explore the role of Python in Artificial Intelligence.

Number of Periods	
Theory	Practical
3	2

Teaching Plan

Question-Based Discussion:

- Have you ever wondered how a computer solves problems?
- Can computers think and make decisions on their own?
- What steps do we follow before writing a program?
- Why is Python considered such a popular language in Artificial Intelligence?

Relatable Analogy:

- Explain computer problem-solving as cooking a recipe: understand what dish (problem) we are making, gather ingredients (inputs), follow step-by-step instructions (algorithm), and check the taste (evaluate output).

Lesson Delivery (Explanation & Demonstration)

1. **Introduction to Programming**
   - **Definition:** Step-by-step instructions given to a computer to solve problems.
   - **Concept of Program:** Written in a programming language.
   - **Activity:** Ask students to think of day-to-day tasks (like making tea) and list them step by step as a program.
2. **Problem Solving Techniques**
   - **Steps:**
     - Understand the problem.
     - Analyse the problem (inputs, outputs, constraints).
     - Develop solution (algorithm, flowchart).
     - Coding and implementation.
   - **Activity:** Write an algorithm for preparing a sandwich.
3. **Algorithm & Flowchart**
   - **Explain:**
     - Definition, advantages, disadvantages.
     - Flowchart symbols and examples.
   - **Activity:** Students create an algorithm and flowchart for calculating Simple Interest.
4. **Control Structures**
   - **Sequential Flow:** Step-by-step execution.
   - **Selection Flow:** Decision-making using if-else.
   - **Repetition Flow:** Loops to repeat instructions.
   - **Activity:** Students write an algorithm to print numbers 1 to 10 using a loop.
5. **Introduction to Python**
   - What is Python?
     - High-level, easy to learn, popular in Artificial Intelligence.

- **Installation Process:**
  - Guide students to install Python.
- **Python IDLE:** Interactive and Script mode.
- **Activity:** Open Python IDLE and run a simple print command.

6. **Python Character Set & Statements**
   - **Characters:** Letters, digits, special characters, whitespaces.
   - **Statements:** Simple, multiline, multiple statements.
   - **Activity:** Write multiline statements in Python and execute.
7. **Tokens in Python**
   - **Keywords, Identifiers, Literals, Operators, Punctuators**
   - **Activity:** Execute import keyword and display Python keywords.
8. **Operators and Expressions**
   - Arithmetic, Relational, Logical, Assignment, Augmented Assignment Operators.
   - **Activity:** Solve expressions applying operator precedence.
9. **Variables & Data Types**
   - **Variables:** Naming rules, assigning values.
   - **Data Types:** Numbers, Strings, Lists, Tuples, Dictionaries, Sets.
   - **Activity:** Students declare different data types and print them.
10. **Input and Output Functions**
    - print() and input() functions.
    - **Activity:** Write a program to input two numbers and print their sum.
11. **Errors in Python**
    - Syntax, Logical, and Runtime errors.
    - **Activity:** Intentionally write an error and discuss the output.
12. **Role of Python in AI**
    - Built-in libraries for AI.
    - Community support and scalability.
    - **Discussion:** Why is Python preferred for AI applications?

Extension

Discussion Questions:

- Can algorithms solve all types of problems?
- How can we make our Python programs free from errors?
- How does Python support AI development?

Creative Task:

- Students create a simple calculator program in Python supporting +, –, *, / operations.
- Presentation: "Python in Real Life – AI Applications".

Evaluation

- **Quiz:** Define algorithm, flowchart, tokens in Python.
- **Practical Lab:**
  - Write Python programs: Calculator, Check even/odd number.
- **Worksheet:** Differentiate between algorithm and flowchart.
- **Problem Canvas Activity:** Students apply problem-solving steps to design a Python solution for daily life problems (e.g., temperature converter).

Suggested Activity

Python in Action:

- Group activity: Design a Python program to manage school library records (use lists and dictionaries).
- Presentation using flowcharts and algorithms.