

AI RoboGenius

6

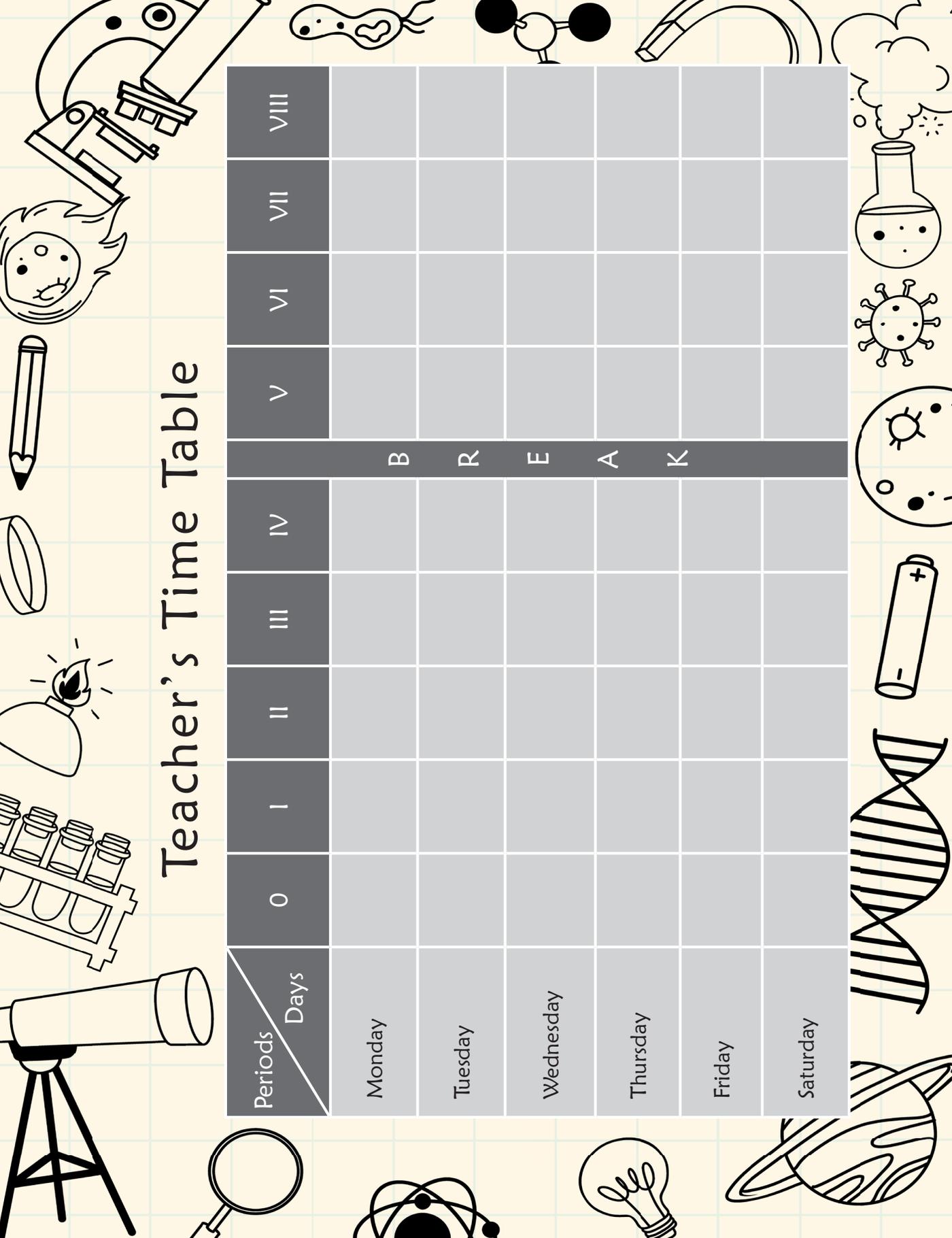
TEACHER'S MANUAL
Extended Support for Teachers



www.orangeeducation.in

Teacher's Time Table

Periods \ Days	0	I	II	III	IV	B R E A K					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

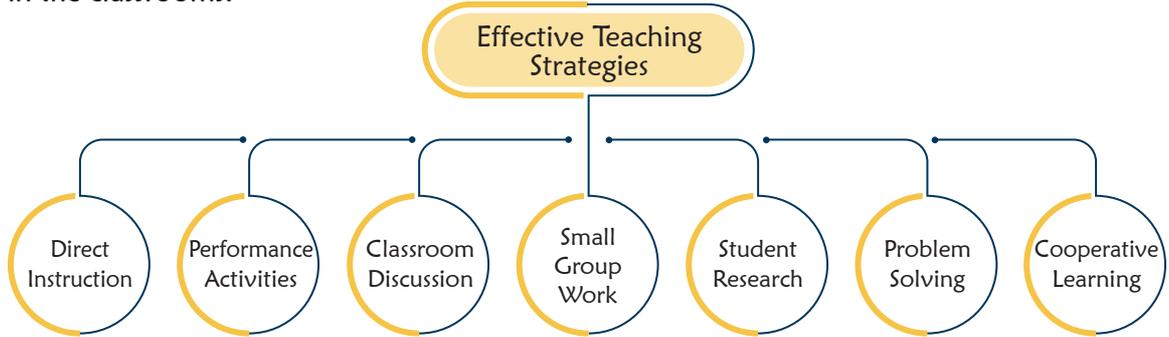
- May show increased gender stereotyping of attitudes and behaviour
- May have a conventional moral orientation

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. ”

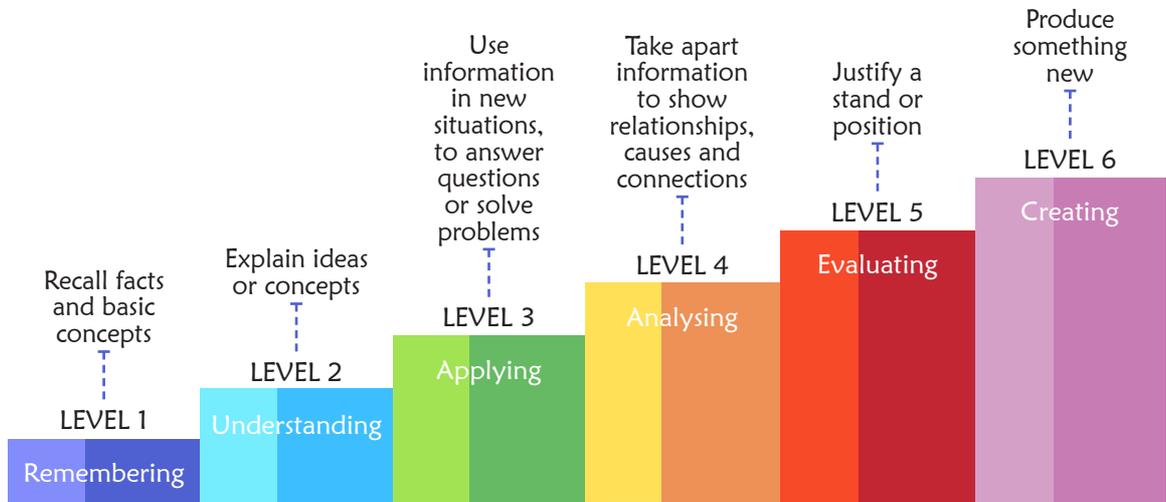
Teaching Strategies

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. ”

1 Exploring AI Domains

Teaching Objectives

Students will learn about

- ✦ Domains of AI
- ✦ Computer Vision (CV)
- ✦ Natural Language Processing (NLP)
- ✦ Statistical Data

Teaching Plan

Number of Periods	
Theory	Practical
2	1

Start by discussing what Artificial Intelligence (AI) is and how it helps machines think and make decisions like humans.

Explain that AI is divided into different domains, each focusing on a specific type of task (e.g., language recognition, learning, pattern recognition).

Discuss how AI helps machines understand and interpret images and videos, with examples like facial recognition, traffic monitoring, and self-driving cars.

Explain how NLP enables computers to understand and process human languages, including applications in voice assistants and language translation.

Discuss how AI helps in data analysis, decision-making, and predictions in everyday life, such as weather forecasting and sports analytics.

Show how each domain of AI is applied in the real world:

- Computer Vision (CV): AI in healthcare for analysing X-rays and in self-driving cars for detecting obstacles.
- Natural Language Processing (NLP): AI in voice assistants like Siri and Google Assistant.
- Statistical Data: AI in online shopping for product recommendations.

Discuss how AI is used in applications like Google Translate, Siri, and in medical image analysis.

Extension

Ask the students some oral questions based on this chapter.

- Q. How did you collect data for the model?
- Q. How can this model be used in real-life applications?
- Q. What challenges did you face while training the model?
- Q. How did the model recognise different objects?
- Q. What changes did you make to improve the model?
- Q. How did the data you collected help the model recognise objects?
- Q. What steps did you take to improve the accuracy of your model?

Evaluation

Guide the students to complete the sections, such as **AI TASK** provided on page **10**.

Encourage the students to solve the question in the **AI REBOOT** section provided on page **10**.

Ask the students to answer the following question in the **VIDEO SESSION** section on page **11**.

Complete the **AI GAME** task on page **13**, answering questions related Ai game activity.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **14 to 16** in the main course book.

Ask the students to complete the **AI IN LIFE** activity provided on page **16**.

Encourage the students to complete the **AI DEEP THINKING** activity given on page **16**.

Take the students to the computer lab and let them practice the activity given in the **AI LAB** section on page 16 in the main course book. This will enhance the ability of the students and serve as a creativity and technology literacy activity.

Suggested Activity

Create a simple PowerPoint or Google Slides presentation comparing Computer Vision (CV), Natural Language Processing (NLP), and Statistical Data.

Students should present how each domain can shape the future of technology and include examples of real-world applications.

2

Computer Vision and Its Applications

Teaching Objectives

Students will learn about

- ✦ Human Vision vs. Computer Vision
- ✦ Why is Computer Vision Important?

✦ Applications of Computer Vision in Everyday Life

Number of Periods	
Theory	Practical
2	1

Teaching Plan

Start by discussing how computer vision (CV) allows machines to see and interpret images, similar to human vision.

Explain that Computer Vision is a domain of Artificial Intelligence (AI) where machines use cameras, sensors, and software to recognize and understand the visual world around them.

Discuss how computer vision helps machines identify objects, people, movements, or scenes.

Compare human vision (which uses the eye and brain) to computer vision (which uses sensors and processors).

Discuss the differences in how humans and machines process and interpret visual data, such as human adaptability and emotional understanding vs. CV's accuracy and speed.

Explain that humans can recognize faces instantly, while CV needs large datasets and training to do so.

Discuss the benefits of CV, such as automation, more accurate results, and better decision-making in various industries like healthcare and traffic monitoring.

Talk about how CV is used in real-time applications like facial recognition, self-driving cars, and image processing in medical fields.

Show how CV is used in AR and VR to enhance experiences like virtual shopping or gaming.

Discuss how face recognition works and its uses in security and smartphones.

Explain how self-driving cars use CV to recognize traffic lights, pedestrians, and other road signs.

Show how CV is used in healthcare to analyse X-rays, MRI scans, and CT scans.

Explain how OCR allows machines to read text from images or documents, like Google Translate for real-time translations.

Explain how CV is used in stores for inventory management and cashier less checkout.

Extension

Ask the students some oral questions based on this chapter.

- Q. How does Computer Vision help self-driving cars navigate safely?
- Q. In which other areas can Computer Vision improve safety or efficiency?
- Q. How is facial recognition used in public places and what are its advantages?
- Q. How do we apply Computer Vision in healthcare, and what are its benefits?
- Q. Why is training data important for Computer Vision to function accurately?
- Q. Can Computer Vision detect objects under low light conditions? Why or why not?
- Q. How does Computer Vision help in industries like retail and transportation?



Evaluation

Guide the students to complete the sections, such as **AI TASK** provided on page **26**.

Encourage the students to solve the question in the **AI REBOOT** section on page **20**.

Ask the students to answer the following question in the **VIDEO SESSION** section on page **23**.

Complete the **AI GAME** task on page **21**, answering questions related to the AI game activity.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **27** and **28** in the main course book.

Ask the students to complete the **AI IN LIFE** activity provided on page **28**.

Encourage the students to complete the **AI DEEP THINKING** activity given on page **28**.

Take the students to the computer lab and let them practice the activity given in the **AI LAB** section on page **29** in the main course book. This will enhance their skills in creativity and technology literacy.

Suggested Activity

Create a presentation on the topic “Where Is Computer Vision Used?” Include 4–5 slides with images showcasing how AI-powered cameras in devices like phones, cars, hospitals, and gaming systems enable vision-based tasks.

3

Digital Citizenship

Teaching Objectives

Students will learn about

- ✦ Understanding Robots
- ✦ Mechanical and Electronic Components used in Robotics
- ✦ Robots and Electricity Connection
- ✦ Introduction to AI

Teaching Plan

Discuss what a robot is and how it performs tasks on its own or with minimal human help.

Introduce different types of robots, such as:

- **Industrial robots:** Used in factories for tasks like building cars or assembling parts.
- **Service robots:** Assist people in daily life, like cleaning robots or hospital robots delivering medicines.
- **Exploration robots:** Used for exploring dangerous places like outer space or deep oceans.
- **Humanoid robots:** Designed to look and act like humans, assisting in tasks and interacting with people.

Number of Periods	
Theory	Practical
2	1

Discuss how robots are made of two main components: Mechanical (e.g., motors, wheels, arms) and Electronic (e.g., microcontroller, sensors).

Discuss the importance of electricity in robots. Explain that robots need power to function—just like food gives humans energy.

Explore how electricity powers the robot's motors, microcontroller, and sensors, enabling movement and decision-making.

Mention how robots use batteries or solar panels for energy and how wires and circuits carry electrical signals.

Explain that Artificial Intelligence (AI) is the ability of machines to think and act like humans.

Discuss how AI is used in various devices, like smartphones (Siri), cameras (face recognition), and self-driving cars.

Introduce the difference between normal electronics (devices that follow fixed instructions) and AI electronics (devices that can adapt and make decisions based on what they sense).

Extension

Ask the students some oral questions based on this chapter.

- Q. How do robots move, and what parts help them perform tasks?
- Q. What are the main differences between industrial robots and humanoid robots?
- Q. Why is electricity crucial for robots to function?
- Q. How do sensors in robots help them understand their surroundings?
- Q. How does AI help robots act smart like humans?
- Q. What are the applications of robots in hospitals and factories?
- Q. Why do robots need a microcontroller, and how does it help them make decisions?

Evaluation

Guide the students to complete the sections, such as **Ask AIRO** provided on page **34**.

Encourage the students to complete the activity like **ETHICS EDGE** given on page **35**.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **36** and **37** in the main course book.

Encourage the students to complete the activity like **CASE STUDY** given on page **38**.

Suggested Activity

Design a robot by selecting its type and components. Sketch the robot and label its parts. Explain how AI helps your robot make decisions and perform tasks.



Teaching Objectives

Students will learn about

- ✦ Getting Started with Tinkercad
- ✦ Working with 3D Shapes in Tinkercad
- ✦ Designing a Simple Robot Model
- ✦ Designing a Robot Pet
- ✦ Building a Delivery Robot

Number of Periods	
Theory	Practical
2	1

Teaching Plan

Explain what Tinkercad is a free, easy-to-use online tool where students can design 3D objects, build circuits, and learn simple coding.

Guide students on how to sign up and create an account on Tinkercad.

Introduce the Tinkercad Dashboard and explain the main components of the 3D design workspace:

Teach students how to add, resize, and modify 3D shapes in Tinkercad. Discuss how shapes like spheres, cylinders, cones, and boxes can be used to create robot parts.

Discuss how to resize shapes using the Shape Properties Panel.

Explain the concept of grouping objects to simplify the design process. Students will learn how to group and ungroup shapes to make robots or other objects.

Discuss how to build the robot's head, body, arms, wheels, and other parts using Tinkercad's shapes and how to align and resize them.

Guide the students Step-by-steps to creating a robot model by using basic shapes.

Guide students in designing a Robot Pet using basic shapes such as boxes and spheres for the body, legs, and sensors.

Explain how to build a Delivery Robot by using shapes like boxes for the body and cylinders for the wheels.

Discuss adding sensors and headlights to the robot for functionality and aesthetic appeal.

Extension

Ask the students some oral questions based on this chapter.

- Q. How can you use different 3D shapes to build the head of a robot?
- Q. How can grouping shapes help in simplifying the design of a robot?
- Q. What are the main components of a robot that can be made using Tinkercad?

- Q. How does the Workplane in Tinkercad help with designing 3D shapes?
- Q. What is the purpose of Bundle Group in Tinkercad, and how does it differ from Union Group?
- Q. How would you design a robot pet with interactive features?
- Q. How would the Delivery Robot function in real life, and what are its practical uses?

Evaluation

Guide the students to complete the sections, such as **Ask AIRO** provided on page **46**.

Encourage the students to complete the activity like **ETHICS EDGE** given on page **48**.

Encourage the students to complete the **VIRTUAL TO REAL** activity given on page **49**.

Ask the students to answer the question in **CHALLENGE CHAIN** section on page **51**.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **53** and **54** in the main course book.

Take the students to the computer lab and let them practice the activity given in the **INNOVATION LAB** section on page **55** in the main course book. This will enhance their skills in creativity and technology literacy.

Suggested Activity

Students should build a robot model on Tinkercad with 4–5 shapes for the head, body, arms, legs, and wheels, adding features like sensors or antennas, and then explain their design.















