AI RoboGenius

2

Teacher's Manual

Extended Support for Teachers

ORANGE
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Teacher's Time Table

Sessions / 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."

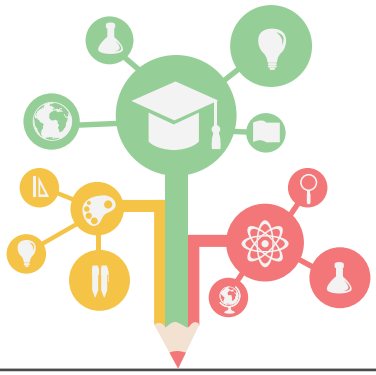
Age 9 - 11 Years	
Physical	• Motor skills develop resulting in enhanced reflexes
Cognitive	• Applies several memory strategies at once • Cognitive self-regulation is now improved
Language	• Ability to use complex grammatical constructions enhances • Conversational strategies are now more refined
Emotional/ 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.

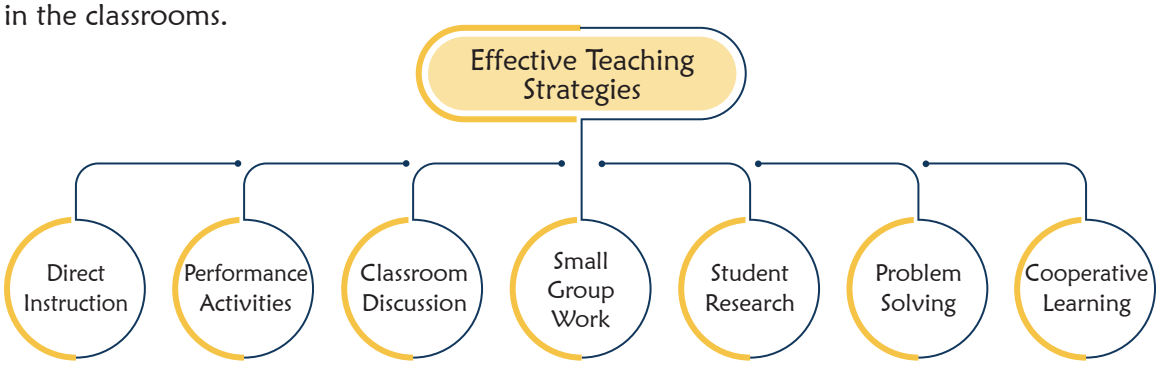
After the class

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

"Knowing yourself is the beginning of all wisdom."

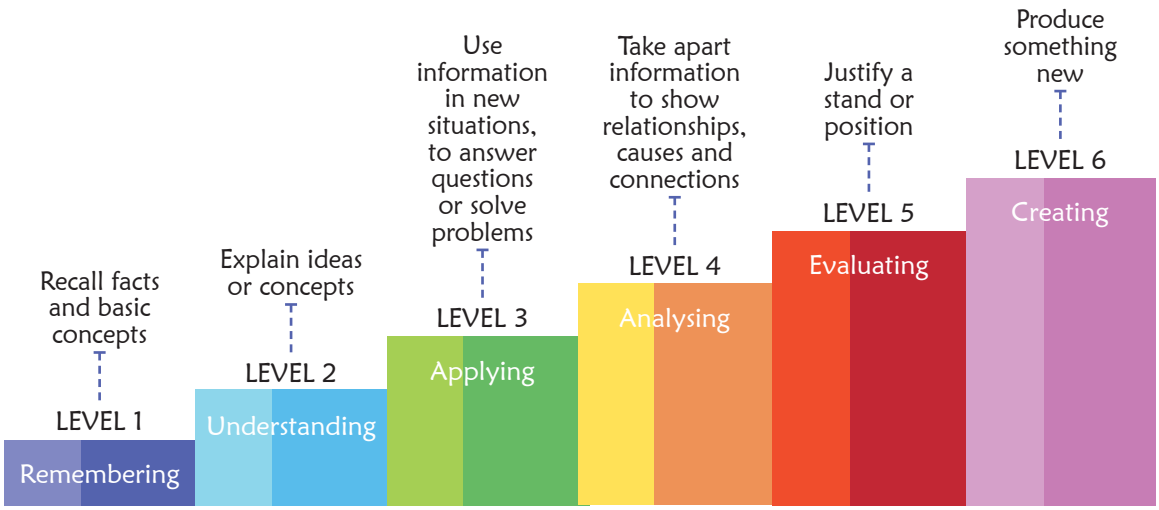
Teaching Strategies

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 2

Lesson Plan

1 Simple and Complex Machines

Teaching Objectives

Students will learn about:

- Simple machines and their types
- Complex machines and their components
- How simple and complex machines make work easier
- Examples of machines used in everyday life

Number of Sessions	
Theory	Practical
2	1

Teaching Plan

Start by explaining the concept of machines and discussing how they help in performing tasks more efficiently.

Ask students to discuss examples of machines they have encountered in daily life (e.g., levers, pulleys, bicycles).

Introduce the concept of simple machines. Discuss the five types: Lever, Pulley, Inclined Plane, Wheel and Axle and Wedge.

Explain that simple machines require no electricity or motors to function, but instead rely on manual effort.

Illustrate each type of simple machine with practical examples (e.g., a see-saw for a lever, a ramp for an inclined plane).

Introduce complex machines, explaining that they are combinations of two or more simple machines (e.g., a bicycle, scissors, crane).

Discuss how complex machines often require external energy sources like electricity, fuel or human effort.

Show images and diagrams of simple and complex machines, including a bicycle (wheel and axle, lever, pulley), scissors (levers, wedge), escalator (pulleys and inclined planes), wheelbarrow (wheel and axle and lever), crane (pulleys, levers and wheels and axles).

Extension

Ask the students some questions based on this chapter.

Q. What is a simple machine?

Q. How does a pulley make work easier?

Q. What is the difference between a simple and complex machine?

Q. How does a bicycle use more than one type of simple machine?

Q. Why do we use inclined planes to lift objects?

Q. What are some examples of simple machines used in daily life?

Q. Name a big machine that uses pulleys, levers and wheels and axles to lift, move and place heavy objects.

Q. Name a complex machine that uses pulleys and inclined planes to move people up and down.

Evaluation

Ask the students to complete the activity like **Ask AIRO** given on page **10**.

Encourage students to think ethically and answer the question given in the **ETHICS EDGE** section on page **12**.

Encourage them to practice building a simple pulley system following the **HANDS-ON** activity given on page **13** and **14**.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **15** to **17** in the main course book.

Encourage the students to complete the activity like **CASE STUDY** given on page **17**.

Suggested Activity

Have students create a simple machine at home using everyday materials (like a pulley using string and cardboard) and document how it works.

Encourage them to sketch a diagram of a complex machine, identifying the simple machines it is made of (e.g., a bicycle, scissors, etc.).

2 AI in Games and Movies

Teaching Objectives

Students will learn about:

- What Artificial Intelligence (AI) is and how it works in games
- How AI makes games fun and interactive
- How AI is used in movies to make characters and actions realistic
- Simple AI-based games and movies they can explore

Number of Sessions	
Theory	Practical
2	3

Teaching Plan

Start by explaining AI in simple terms—how computers can think and act like humans.

Discuss how AI helps in video games, such as making characters move and respond like people. Use CodeMonkey Jr. and Emoji Scavenger Hunt as examples of games where AI helps kids play and learn.

Explain to the students that they can play the Emoji Scavenger Hunt game to see how AI works in real-time using their parent's mobile devices, but only after getting permission from them.

Explain that Shadow Art uses AI to analyse hand movements and help children create shadow puppets.

Introduce Data Games, where students play fun games to learn math, logic and data analysis, developing coding skills while having fun.

Describe how AI is used in movies like Wall-E and Big Hero 6 to create robots that can act like people, showing emotions like love and care.

Discuss how robots in movies, like in Robots, work with humans and how AI helps them do tasks that are hard for humans to do.

Extension

Ask the students some questions based on this chapter.

Q. How does AI help robots in movies act like humans?

Q. What is your favourite AI game?

Q. Can AI help robots have emotions, like in Wall-E?

Q. How do AI characters in games help us learn?

Q. What kind of robot would you like to see in a movie?

Q. Name the types of games that help students learn math, logic and develop coding skills while having fun.

Evaluation

Encourage the students to solve the question in the **AI REBOOT** section on page **22**.

Guide the students to complete the sections, such as **AI TASK** provided on page **22**.

Ask the students to answer the question after watching the video in the **VIDEO SESSION** section on page **28**.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **29** and **30** in the main course book.

Take the students to the computer lab and let them practice the activity given in the **AI LAB** section on page **30** in the main course book. This will enhance their skills in critical thinking.

Suggested Activity

Students can play an AI game, such as CodeMonkey Jr., to see how AI makes the game fun.

Ask the students to draw their own robot, thinking about how it might use AI to talk, move or help people.

After watching a short clip from Big Hero 6, have students discuss what they think the robot Baymax could do to help them if it were real.

Encourage students to talk about a robot or AI character they saw in a movie and what it could do.

3 Robot Helpers in the Real World

Teaching Objectives

Students will learn about:

- What robots are and how they work
- The key features and functions of robots
- Examples of robots in everyday life (home, school, hospitals, factories)
- The components of a robot
- The difference between machines and robots

Number of Sessions	
Theory	Practical
3	1

Teaching Plan

Start by explaining what robots are—a type of machine that can do tasks by itself like picking things up or moving. Emphasise how robots can act like humans and help with hard tasks.

Discuss the main features of robots, such as their ability to follow instructions, sense their surroundings, move, think (like a brain) and perform different jobs.

Explain with everyday examples like cleaning robots at home or factory robots assembling products.

Robot Uses in Everyday Life:

- **At Home:** Cleaning robots that vacuum floors.
- **In School:** Robots helping students learn through games.
- **In Manufacturing:** Robots helping to make things faster and better.
- **In Hospitals:** Surgical robots assisting doctors.
- **In Agriculture:** Robots helping farmers with tasks like planting seeds and checking crops.
- **In Hotels:** Robots guide guests, clean rooms and deliver food or water.

Introduce the basic functions of robots: Sense, Think and Act, explaining how robots gather information, process it and perform actions using sensors, processors and actuators.

Explain the main components of a robot: Sensors (detect inputs), Controller (the robot's brain), Body/Frame (holds all parts together), Power Supply (provides energy), End Effector (performs tasks) and Actuators (generate movement).

Explain the difference between a regular machine (like a fan or bicycle) and a robot. Highlight that robots can work by themselves, think and learn, unlike machines which need human control.

Extension

Ask the students some questions based on this chapter.

Q. What is a robot?

Q. How do robots help doctors in hospitals?

Q. How does a robot vacuum cleaner work?

Q. What kind of robot can help a farmer?

Q. What are some jobs robots do in factories?

Q. How is a robot different from a machine?

Q. Can robots sense things like humans?

Q. Name a robot that can help clean your house.

Evaluation

Encourage students to think ethically and answer the question given in the **ETHICS EDGE** section on page **34**.

Encourage the students to solve the question in the **VISUAL VAULT** section on page **38**.

Guide the students to complete the sections, such as **Ask AIRO** provided on page **39**.

Guide the students to complete the **GAME** task on page **39**.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **40** and **41** in the main course book.

Encourage the students to complete the activity like **CASE STUDY** given on page **42**.

Suggested Activity

Ask the students to draw a robot that could help at home or school. What tasks would it do?

After watching a short video on a robot, ask the students to discuss how the robot helps in various environments (home, factory, hospital, etc.).

4 Sequence it Right: Early Algorithm Thinking

Teaching Objectives

Students will learn about:

- Sequence: Thinking in Order
- Algorithmic Thinking
- Blocks in Rodocodo

- Debugging: Buggy Code in Rodocodo
- Loops: Patterns in Rodocodo
- Get Your Certificate

Number of Sessions	
Theory	Practical
2	2

Teaching Plan

Introduce the concept of sequence by explaining that it means doing things in the correct order, one step at a time, to achieve the desired result.

Use the example of brushing teeth: Pick up the toothbrush, add toothpaste, brush teeth, rinse mouth.

Explain how changing the order would make it not work properly and how computers also need to follow instructions in the right order.

Introduce algorithmic thinking as the process of breaking down tasks into small, simple steps to solve problems efficiently and logically.

Explain using examples like making lemonade or solving a puzzle. Show how breaking things into steps helps us think clearly.

Discuss how algorithmic thinking is used every day, not just by computers but by people too.

Introduce the concept of blocks in Rodocodo, where each block represents a specific action, such as moving, turning or collecting items, to help the cat reach its goal.

Introduce debugging in Rodocodo by explaining that it involves finding and fixing mistakes in the code to make sure the cat reaches its goal correctly.

Explain loops in Rodocodo as a way to repeat actions several times, simplifying patterns and saving time.

Demonstrate the students to play through the Rodocodo levels, correcting the code to make the cat reach the goal.

Extension

Ask the students some questions based on this chapter.

Q. What is the mean of sequence in programming?

Q. Can you give an example of a sequence from your daily routine?

Q. How does algorithmic thinking help us solve problems?

Q. Why is following the correct order important when completing tasks?

Q. How would you solve a puzzle step by step?

Q. What happens when the code is arranged incorrectly?

Q. How do loops improve the efficiency of coding?

Q. What do you understand by the term “debugging” in coding?

Q. In Rodocodo, how does a loop help the cat reach its goal?

Q. Why is it necessary to debug the code in Rodocodo?

Evaluation

Guide the students to complete the sections, such as **Ask AIRO** provided on page **54**.

Encourage students to think ethically and answer the question given in the **ETHICS EDGE** section on page **50**.

Encourage the students to solve the question in the **VISUAL VAULT** section on page **51**.

Ask the students to answer the question in **CHALLENGE CHAIN** section on page **53**.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **56** to **58** 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 **58** in the main course book.

Suggested Activity

Students will play a Rodocodo level with errors in the code. They need to identify and fix the mistakes by rearranging or adding blocks. After completing the task, they will explain how debugging helped the cat reach the goal correctly.

5 Build Circuits

Teaching Objectives

Students will learn about:

- Explore the Circuit Lab Online
- Connect Batteries, Light Bulbs and Wires
- Make Your Own Virtual Circuits

Number of Sessions	
Theory	Practical
2	1

Teaching Plan

Introduce the Circuit Lab Online as an interactive tool where students can explore and create electrical circuits.

Introduce PhET Lab, a virtual tool to explore and test electrical circuits using virtual components like batteries, bulbs and wires.

Discuss the flow of electricity in a circuit and how the circuit needs to be complete for the bulb to light up.

Explain the components of circuit: Battery (provides power), Light Bulb (converts electrical energy to light) and Wires (connect components together).

Demonstrate how to set up a simple circuit with a battery and light bulb using the PhET Lab.

Guide students to create their own virtual circuits using the PhET Circuit Lab by adding components like batteries, light bulbs and switches.

Encourage students to design and test various circuits, observing how changes in their setup affect the functionality.

Extension

Ask the students some questions based on this chapter.

Q. What happens when you connect a battery to a light bulb with wires?

Q. How does the switch help in turning the light on and off?

Q. Why is it important to complete the circuit for the bulb to light up?

Q. How does a battery supply power in the circuit?

Q. What would happen if you used a broken wire or a dead battery?

Q. How can you use different materials to test the circuit?

Evaluation

Guide the students to complete the sections, such as **Ask AIRO** provided on page **69**.

Encourage students to think ethically and answer the question given in the **ETHICS EDGE** section on page **67**.

Encourage the students to solve the question in the **VISUAL VAULT** section on page **67**.

Ask the students to answer the question in **CHALLENGE CHAIN** section on page **61**.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **69** to **70** 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 **71** in the main course book.

Suggested Activity

Create a circuit in the PhET Circuit Lab using a battery, light bulb and wires. Then, challenge them to replace one of the wires with different materials like a paper clip or coin to see which ones conduct electricity and make the light bulb light up. Students will test and record which materials work best for creating a functional circuit.