

AI RoboGenius

1

TEACHER'S MANUAL

Extended Support for Teachers



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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

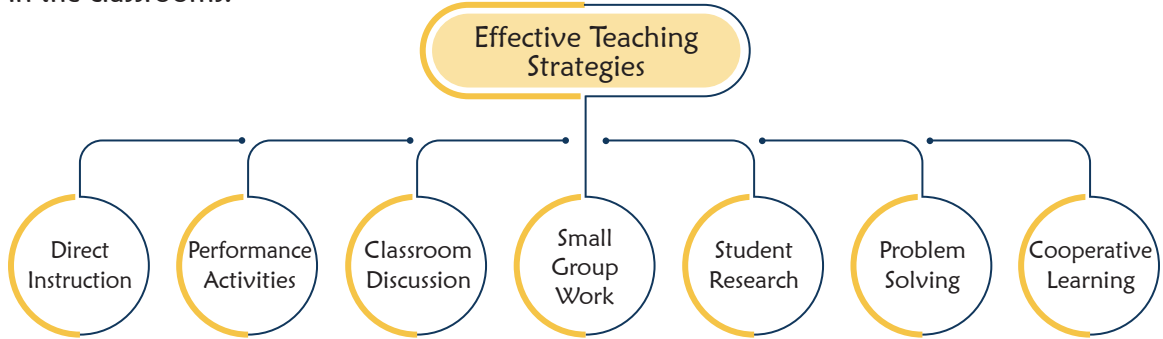
- May show increased gender stereotyping of attitudes and behaviour
- May have a conventional moral orientation

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. ”

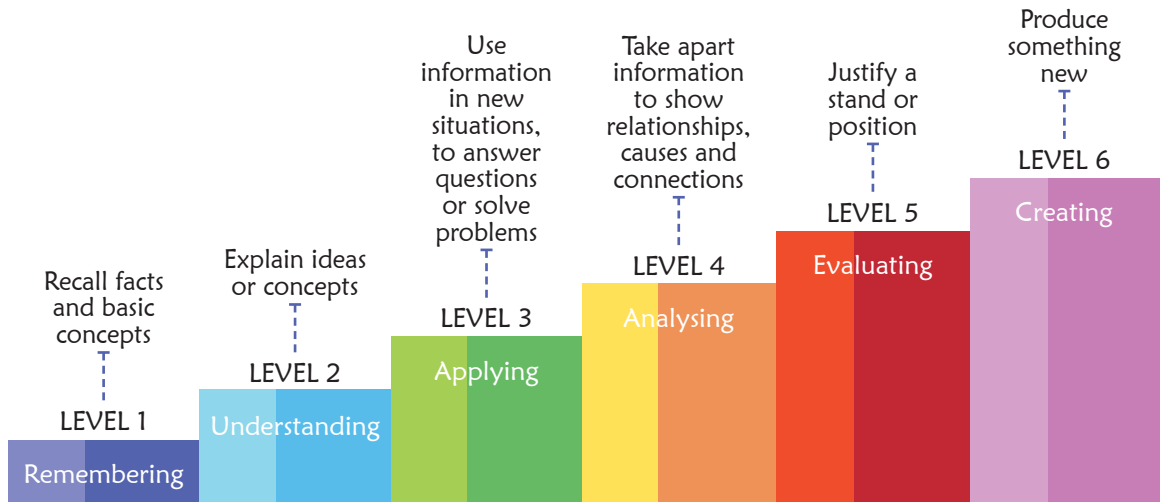
Teaching Strategies

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 Natural vs Artificial

Teaching Objectives

Students will learn about:

- ✦ Natural Things
- ✦ Artificial Things
- ✦ Difference Between Natural and Artificial Things
- ✦ Machine
- ✦ Robot
- ✦ Artificial Intelligence (AI)

Number of Sessions

Theory	Practical
2	1

Teaching Plan

Discuss examples of natural things such as the Sun, trees, animals and the Moon (illustrated with images).

Explain that these things come from nature and are not created by humans.

Discuss how natural things help in life on Earth (e.g., Sun provides warmth, trees give us oxygen).

Discuss examples of artificial things such as refrigerators, cars and air conditioners (show corresponding images).

Discuss how computers are also machines but special because they can do many different tasks.

Highlight the difference between natural and artificial things by explaining that natural things grow, while artificial things cannot grow.

Define a machine as a human-made object that makes work easier (e.g., scissors, refrigerator).

Define a robot as a special type of machine that can act like a human.

Explain AI as when a machine can think, learn and make decisions, just like humans. This is different from simple machines that only perform pre-programmed tasks.

Extension

Ask the students some questions based on this chapter.

- Q. What are natural things?
- Q. Can artificial things grow? Why or why not?
- Q. What is a machine? Can you give an example?
- Q. What makes a robot different from other machines?
- Q. How does AI help machines make decisions?

Evaluation

Guide the students to complete the sections, such as **Ask AIRO** provided on page **12**.

Encourage students to think ethically and answer the question given in the **ETHICS EDGE** section on page **13**.

Encourage the students to solve the question in the **VISUAL VAULT** section on page **13**.

Complete the **GAME** task on page **14** and **15**, answering questions related to the activity.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **16** and **17** in the main course book.

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

Suggested Activity

Ask students to find out how artificial things are used in their homes (e.g., what machines or robots are present). Have them create a simple poster showcasing their findings, listing the artificial things and their uses.

2

Natural and Artificial Intelligence

Teaching Objectives

Students will learn about:

- ✦ Natural Intelligence
- ✦ Artificial Intelligence

Number of Sessions	
Theory	Practical
2	0

Teaching Plan

Ask students, “What do you think intelligence means?” and “Can machines be intelligent like humans?”

Explain that natural intelligence is something humans and some animals have and it’s gifted by nature.

Define AI as intelligence that is created by humans. It allows machines and robots to think and learn, just like humans.

Discuss AI-powered devices that students may use or have seen, such as AI in toys (Aibo), factories, smartphones, televisions, etc. Show images of AI in toys, factories, televisions and smartphones.

Encourage students to share their experiences with AI, like using voice commands on their smartphones or TV.

Extension

Ask the students some questions based on this chapter.

- Q. What is natural intelligence?
- Q. What is artificial intelligence?
- Q. Can AI learn like humans? Give examples.
- Q. What makes AI different from human intelligence?
- Q. Name some devices that use AI.

Evaluation

Guide the students to complete the sections, such as **AI TASK** provided on page **21**.

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

After explaining the chapter, let the students do the **ROBO CHECK** on pages **23** and **24** in the main course book.

Encourage the students to complete the **AI DEEP THINKING** activity given on page **25**.

Take the students to the computer lab and let them practice the activity given in the **AI LAB** section on page **25** in the main course book. This will enhance their skills in creativity.

Suggested Activity

Take pictures of different hand gestures (e.g., thumbs up, peace sign, fist) and upload them to Google Teachable Machine. Train the model to recognise each gesture, test it with new images and present how the model works and how its accuracy was improved.

3

Meet the World of Robots

Teaching Objectives

Students will learn about:

- ✦ Robot
- ✦ What Robots Can and Cannot Do
- ✦ Components of a Robot

Number of Sessions	
Theory	Practical
2	1

Teaching Plan

Introduce robots as special machines that can do jobs humans tell them to do. Some robots look like humans or animals and others are just boxes with wheels.

Show examples of real-world robots, such as:

- Aibo (robotic dog that learns new skills),
- Sophia (a humanoid robot that talks and shows emotions),
- Roomba (robot vacuum cleaner),
- Paro (a therapeutic robot designed to look like a baby seal).

Explain that robots can move, clean, play games, help doctors and even teach.

Ask students to discuss examples of tasks that a robot might be good at versus tasks that humans are better at (e.g., robots can clean, but humans can comfort someone).

Explain to the students about the various components of robots and their functions and how each component plays a role in the robot's functioning.

Extension

Ask the students some questions based on this chapter.

- Q. What is a robot?
- Q. Name some things robots can do.
- Q. What can't robots do?
- Q. What are the different parts of a robot?
- Q. What is the role of AI in a robot?

Evaluation

Guide the students to complete the sections, such as **Ask AIRO** provided on page **31**.

Encourage students to think ethically and answer the question given in the **ETHICS EDGE** section on page **29**.

Complete the **GAME** task on page **32** To **34**, answering questions related to the activity.

Encourage the students to solve the question in the **VISUAL VAULT** section on page **30**.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **35** and **36** in the main course book.

Encourage the students to complete the activity like **CASE STUDY** given on page **36**.

Suggested Activity

Ask students to draw their own robot and label its parts (head, body, arms, legs/wheels). They should describe what tasks their robot can perform using each part.

Teaching Objectives

Students will learn about:

- ✦ Rodocodo
- ✦ Sequencing- Movement
- ✦ Sequencing- Rotation

Number of Sessions	
Theory	Practical
2	2

Teaching Plan

Ask students, "What would you tell a robot to do if you could code it?" and "What tasks could robots perform if they could follow your instructions?"

Introduce coding as the process of giving instructions to a computer or robot to tell it what to do.

Explain that Rodocodo is a fun game that helps learn coding by moving a robot (Rodocodo cat) to complete tasks. Through this game, students will understand basic programming concepts like sequencing and movement.

Discuss various components of Rodocodo help in creating a sequence of movements to guide the robot.

Explain that sequencing in coding means arranging actions in the correct order. For example, to move forward, you first tell the robot to move and then tell it to stop at the right place.

Demonstrate how students can drag and drop command blocks to move the robot through a simple course. Emphasise the importance of sequencing (e.g., first move forward, then turn right).

Explain that rotation refers to turning the robot in the correct direction to reach its goal (left or right).

Show students how to use turn blocks to rotate the robot in the right direction. Discuss the importance of choosing the correct direction and number of turns to ensure the robot reaches the destination.

Allow students to play Rodocodo and practice sequencing movements and rotations.

Guide students through the first level of Rodocodo to complete the task of moving the robot using simple movement commands. Discuss the feedback the game provides when the code is correct or needs fixing.

Extension

Ask the students some questions based on this chapter.

- Q. What happens when the blocks are in the wrong order?
- Q. If the cat moves in the wrong direction, what could you change in your code to correct it?
- Q. Why is it important to plan the cat's path before giving it commands?
- Q. Can you think of a situation in real life where sequencing is important? How does it affect the outcome?
- Q. How do rotations help the cat in completing its task?

Evaluation

Encourage the students to solve the question in the **VISUAL VAULT** section on page **41**.

Encourage students to think ethically and answer the question given in the **ETHICS EDGE** section on page **48**.

Guide the students to complete the sections, such as **Ask AIRO** provided on page **47**.

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 **53 to 55** 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.

Suggested Activity

Ask students to create a sequence that moves the Rodocodo cat through a maze. The students should work in groups and plan their steps in order to complete the maze successfully.

5

Conductors, Insulators & Circuit Logic

Teaching Objectives

Students will learn about:

- ✦ Circuits
- ✦ Types of Circuit
- ✦ Building Simple Circuit

Number of Sessions	
Theory	Practical
2	2

Teaching Plan

Begin by asking students where they see electricity used in their daily lives such as lights, fans, televisions and toys. Explain that electricity is a form of energy that helps many machines and devices work.

Explain the concept of a circuit as a path through which electricity flows from one point to another. Clarify that electricity can flow only when the circuit is complete.

Discuss the basic components of a circuit such as battery, wires, bulb and switch and explain how each part works together to make a device function.

Introduce the concept of conductors and insulators. Explain that conductors allow electricity to flow easily while insulators stop electricity from passing through them and help keep us safe.

Provide examples of conductors such as copper, steel and water and insulators such as rubber, plastic, wood and glass.

Discuss the two types of circuits: series circuit and parallel circuit. Explain that in a series circuit all parts are connected in one line while in a parallel circuit parts are connected in separate paths.

Demonstrate how to build a simple circuit using a battery, wires and a bulb. Show students that when the circuit is complete the bulb glows which indicates that electricity is flowing.

Extension

Ask the students some questions based on this chapter.

- Q. What is electricity?
- Q. What is a circuit?
- Q. Name the basic components of a circuit.
- Q. What is the difference between a conductor and an insulator?
- Q. What happens in a series circuit when one bulb stops working?

Evaluation

Guide the students to complete the sections, such as **Ask AIRO** provided on page **58**.

Encourage the students to solve the question in the **VISUAL VAULT** section on page **60**.

Encourage students to think ethically and answer the question given in the **ETHICS EDGE** section on page **58**.

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 **65** to **67** 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 **67** in the main course book.

Suggested Activity

Ask students to build a simple circuit using a battery, bulb and wires. Then ask them to test different materials such as wood, pencil and metal to observe which materials allow electricity to pass and which ones stop the flow of electricity. Students can record their observations and discuss which materials are conductors and which are insulators.

