RoboGenius Pro

4

Teacher's Manual

Extended Support for Teachers

ORANGE
www.orangeeducation.in

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."

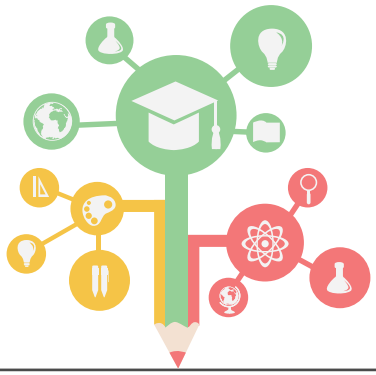
Age 9 - 11 Years	
Physical	• Motor skills develop resulting in enhanced reflexes
Cognitive	• Applies several memory strategies at once • Cognitive self-regulation is now improved
Language	• Ability to use complex grammatical constructions enhances • Conversational strategies are now more refined
Emotional/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

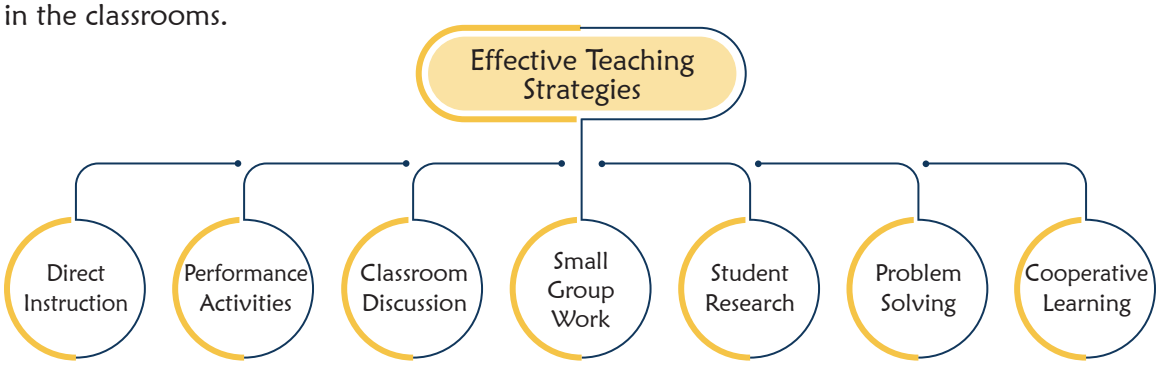
After the class

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

"Knowing yourself is the beginning of all wisdom."

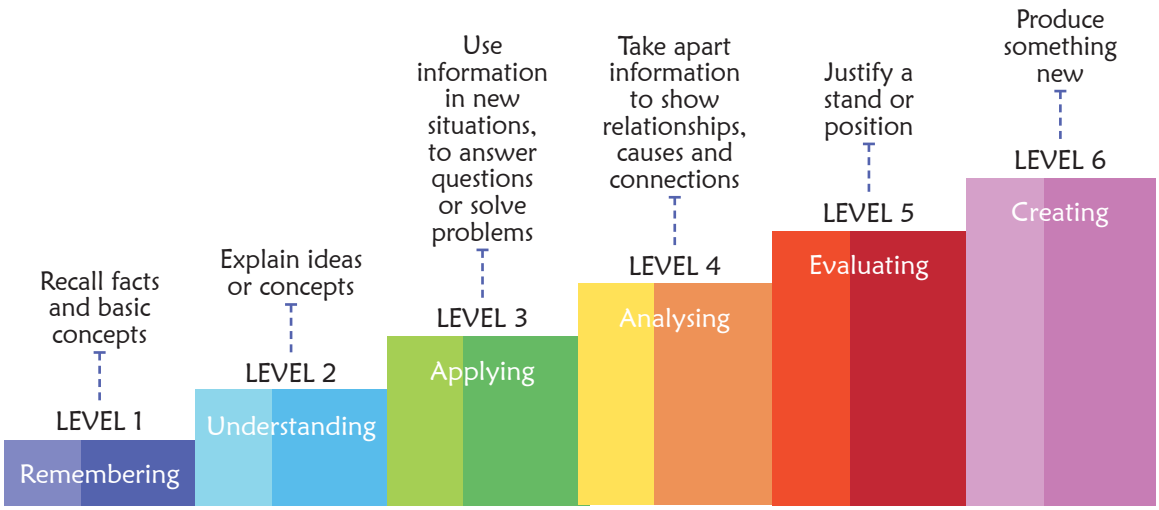
Teaching Strategies

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 4

LESSON PLAN

1 Introduction to Robots, AI and Micro:bit

Teaching Objectives

Students will learn about:

- Introduction to Robot
- Artificial Intelligence
- Robots Around Us
- Advantages and Challenges of Robots
- Meet the Micro: bit – A Tiny Computer for Big Ideas

Number of Sessions	
Theory	Practical
2	1

Teaching Plan

Introduce the definition of robots. Explain how robots can sense their environment, make decisions and perform actions.

Discuss Artificial Intelligence and how it helps machines think and make decisions independently.

Explain various robots in real-world applications.

Explain the advantages of robots, such as high accuracy, ability to work in hazardous environments and helping with repetitive tasks.

Introduce Micro:bit, a small programmable computer. Demonstrate its capabilities like detecting movement, measuring temperature and interacting with sensors.

Extension

Ask the students some questions based on this chapter.

Q. What is a robot?

Q. What is Artificial Intelligence (AI)?

Q. Name some real-life robots and their functions.

Q. What are the advantages of robots?

Q. What are some of the challenges robots face?

Q. What is the micro:bit used for?

Evaluation

Guide the students to complete the sections, such as **ASK AIRO** provided on page **9**.

Encourage students to think ethically and answer the question given in the **ETHICS EDGE** section on page **11**.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **13** to **15** in the main course book.

Encourage the students to complete the activity like **CASE STUDY** given on page **15**.

Suggested Activity

Ask the students to research and collect more examples of robots and AI applications beyond those mentioned in the chapter.

2 Logical Thinking and Early Algorithms

Teaching Objectives

Students will learn about:

- Learning Sequencing
- Timing your Instructions
- First, Next, Last: Order of Commands

Number of Sessions	
Theory	Practical
2	1

Teaching Plan

Explain the concept of sequencing as arranging steps in the right order.

Emphasise how sequencing ensures tasks are done in the correct order to achieve the desired outcome.

Discuss how timing ensures that actions happen at the right moment to avoid errors.

Highlight how the order of commands impacts the task's success, using examples like cleaning a room.

Extension

Ask the students some questions based on this chapter.

Q. What is sequencing?

Q. Can you think of an example where sequencing is important in your daily life?

Q. What could happen if the steps of a task are done in the wrong order?

Q. Why is timing important in tasks like baking a cake or programming a robot?

Q. Can you give an example of when good timing can make a process more efficient?

Evaluation

Encourage the students to solve the question in the **VISUAL VAULT** section on page **18**.

Guide the students to complete the sections, such as **Ask AIRO** provided on page **18**.

Complete the **GAME** task on page **21** and **22**, answering questions related to the activity.

Encourage students to think ethically and answer the question given in the **ETHICS EDGE** 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 activity like **CASE STUDY** given on page **24**.

Suggested Activity

Provide students with images or written descriptions of actions (such as cleaning a room or cooking a dish) and ask them to arrange them in the correct order.

3 Coding with Micro:bit

Teaching Objectives

Students will learn about:

- Introduction to MakeCode Editor
- Start with MakeCode Micro:bit
- Blocks in Micro:bit
- Writing your First Program
- Build a Light Blinking Project

Number of Sessions	
Theory	Practical
2	2

Teaching Plan

Start by introducing the MakeCode Editor, an open-source platform where students can learn coding using a fun and interactive approach.

Explain the two types of coding available in MakeCode: block-based programming (visual) and text-based programming.

Demonstrate how to navigate the MakeCode interface, including the workspace, categories of blocks and how to drag and drop blocks to create programs.

Discuss the concept of switching between block-based and text-based coding and the features of the MakeCode Editor.

Explain the categories of blocks in Micro:bit, including Basic, Input, Logic, Loops and Variable.

Demonstrate how to create a simple program that displays a message on the Micro:bit.

Guide students through creating a light blinking project that makes an icon blink on the Micro:bit screen. This will help them practice sequencing, timing and using the **forever** loop.

Extension

Ask the students some questions based on this chapter.

Q. What is the MakeCode Editor?

Q. What are the key features of the MakeCode Editor?

Q. What do you understand by block-based programming and text-based programming?

Q. How can you switch between block-based programming and text-based programming in MakeCode?

Q. What is the purpose of the Micro:bit simulator in the MakeCode Editor?

Evaluation

Guide the students to complete the sections, such as **Ask AIRO** provided on page **26**.

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

Ask the students to answer the question in **CHALLENGE CHAIN** section on page **37**.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **41** to **43** 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 **43** in the main course book.

4 Sensors in Micro:bit

Teaching Objectives

Students will learn about:

- Motion Sensor
- Compass Sensor
- Shake to Change the Display Icon
- Tilt the Micro:bit to Control an Arrow
- Find the Directions

Number of Sessions	
Theory	Practical
2	2

Teaching Plan

Explain that a sensor is an electronic device used to detect changes, such as movement, light, sound or temperature.

Introduce the concept of the motion sensor, explaining its role in detecting movement, shaking and tilting.

Discuss its use in the accelerometer of the Micro:bit, which can track movement along the X, Y and Z axes.

Explain the compass sensor's ability to detect magnetic fields and determine the direction the Micro:bit is facing.

Use examples like navigation systems and compass-based games.

Guide students through a activity where shaking the Micro:bit changes the display icon (happy, sad, surprised).

Demonstrate student will create a program where tilting the Micro:bit left or right will move an arrow on the screen.

Teach students how to use the compass sensor to find the direction the Micro:bit is facing and display the corresponding cardinal direction (N, S, E, W).

Extension

Ask the students some questions based on this chapter.

Q. What is a sensor?

Q. How does the motion sensor work?

Q. What is the function of the compass sensor?

Q. How can you change the displayed icon on the Micro:bit?

Q. What does the tilt sensor do?

Evaluation

Guide the students to complete the sections, such as **Ask AIRO** provided on page **48**.

Encourage students to think ethically and answer the question given in the **ETHICS EDGE** section on page **52**.

Ask the students to answer the question in **CHALLENGE CHAIN** section on page **60**.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **61** and **62** 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 **63** in the main course book.

Suggested Activity

Divide the students into small teams and ask them to create an interactive game using the sensors, where the user has to shake the Micro:bit to score points.