

# AI RoboGenius

4

## TEACHER'S MANUAL

Extended Support for Teachers

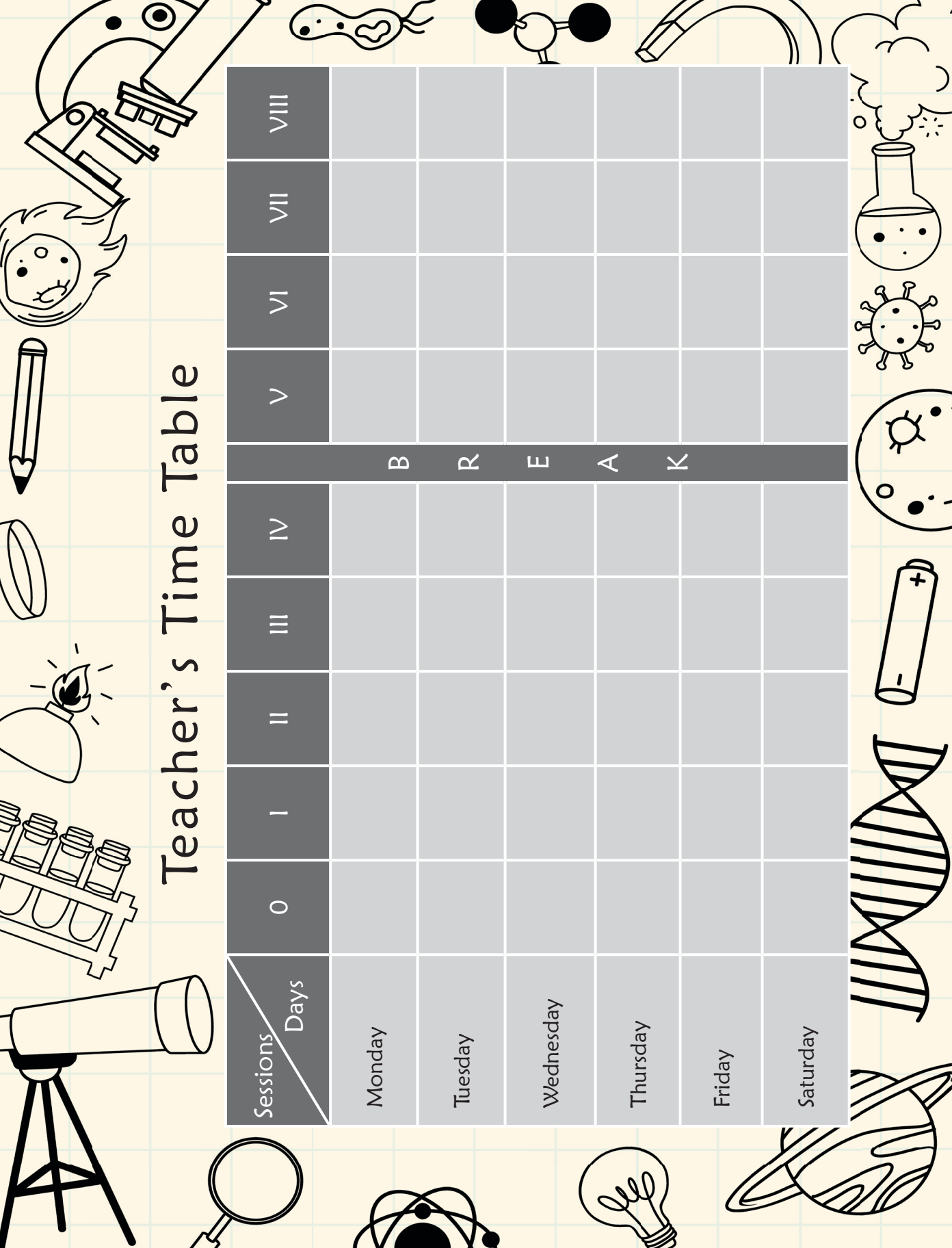


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# Teacher's Time Table

Sessions	0	I	II	III	IV	V	VI	VII	VIII
Days									
Monday									
Tuesday									
Wednesday									
Thursday									
Friday									
Saturday									

B R E A K



# 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

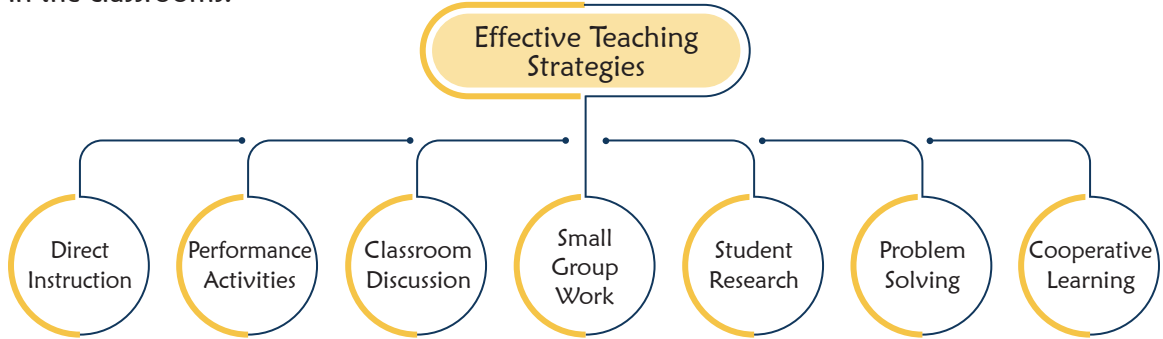
Managing the children's learning needs according to their developmental milestones is the key to a successful teaching-learning transaction in the classroom.

“ Family is the most important thing in the world. ”



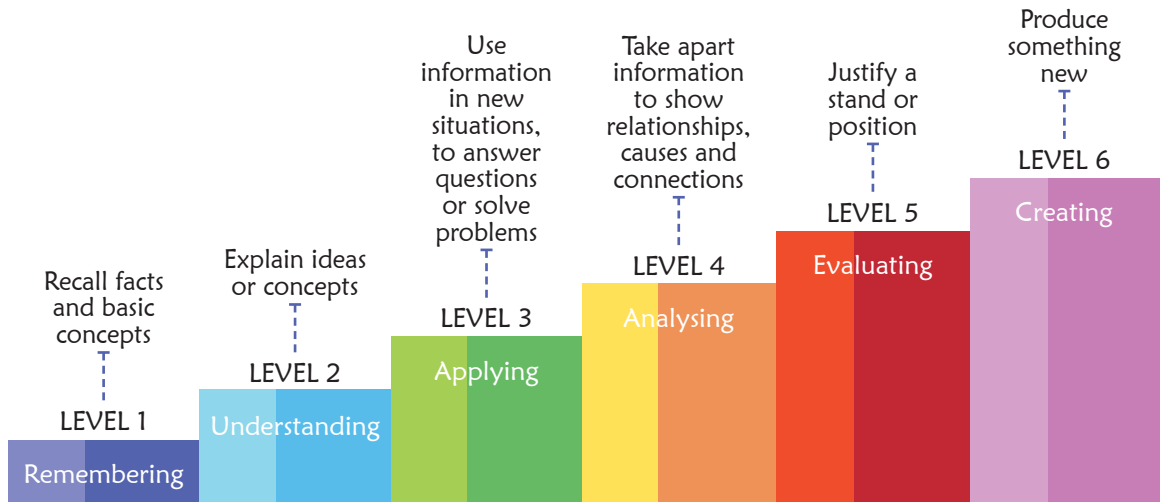
# Teaching Strategies

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

## Human vs Artificial Intelligence

## Teaching Objectives

Students will learn about:

- ✦ What is Intelligence?
- ✦ Human Intelligence
- ✦ Artificial Intelligence
- ✦ Are Computers Smarter?
- ✦ Similarities between Humans and Machines
- ✦ Differences between Humans and Artificial Intelligence

## Number of Sessions

Theory	Practical
2	1

## Teaching Plan

Ask students to reflect on their daily tasks and how they use their intelligence to perform activities.

Define intelligence as the ability to calculate, reason and perceive relationships and analogies.

Discuss various forms of intelligence like: Understanding spoken and written language, logical reasoning and recognition of patterns, sounds, etc.

Discuss the functions of the human brain and its remarkable capabilities, such as learning from experience, solving problems and recognising patterns.

Introduce artificial intelligence as machines mimicking human actions and learning from experience.

Explain how AI involves training machines to perform tasks like humans, focusing on problem-solving and pattern recognition.

Define artificial intelligence as systems designed to think, learn and make decisions based on experience.

Explain how AI is still evolving, with examples of AI applications in daily life.

Discuss the idea of machines becoming smarter over time. Mention popular movies and the public fear of AI becoming too powerful.

Discuss the similarities between humans and machines.

Compare human intelligence and AI based on their capabilities.

## Extension

Ask the students some questions based on this chapter.

- Q. Discuss the various forms of intelligence.
- Q. Explain the functions of the human brain that contribute to human intelligence.
- Q. Describe the capabilities of artificial intelligence.
- Q. What are the ethical considerations when developing AI systems?
- Q. Explain the key differences between Human Intelligence and Artificial Intelligence.

## Evaluation

After explaining the chapter, let the students do the **ROBO CHECK** on pages **12** to **13** in the main course book.

Encourage the students to complete the **AI DEEP THINKING** activity given on page **13**.

Take the students to the computer lab and let them practice the activity given in the **AI Lab** section on page **13** in the main course book. This will enhance their skills in communication.

## Suggested Activity

Have students explore how AI is used in home automation, healthcare and entertainment. Discuss how each system works based on machine learning, pattern recognition or decision-making algorithms.

# 2

## Smart World with AI

### Teaching Objectives

Students will learn about:

- ✦ What are AI Applications?
- ✦ AI in Our Everyday Lives
- ✦ Places Where AI is Used
- ✦ The Future of AI

Number of Sessions	
Theory	Practical
2	1

### Teaching Plan

Define AI applications as software programs that use AI techniques to perform tasks requiring human intelligence.

Ask students if they have ever used a virtual assistant like Siri, Alexa or Google Assistant.

How does AI improve efficiency and make tasks easier?

Discuss how Siri, Google Assistant and Alexa are examples of AI helping us by responding to commands and performing various tasks.

Explain how Google Maps uses AI to provide real-time traffic updates and suggest the best routes. Discuss how AI is used in smart homes to control devices such as lights, thermostats and security cameras.

Explain how AI in smart cars processes information from sensors and cameras for safer driving.

Discuss how AI in wearables tracks health metrics like steps, heart rate, sleep quality and movement.

Discuss how AI is used across various industries such as healthcare, education, agriculture, entertainment, banking and sports to improve efficiency, solve problems and automate tasks.

Discuss the future potential of AI, emphasising its growth and integration into more industries like language translation, transportation, healthcare, education and military operations.

Discuss how AI helps vehicles follow traffic laws, control speed, avoid obstacles and make driving decisions without human intervention.

Explain how smart cities use advanced AI technologies to manage and improve various city systems, such as traffic, pollution and energy consumption.

### Extension

Ask the students some questions based on this chapter.

- Q. Explain what AI applications are and how they use AI techniques to perform tasks that require human intelligence.
- Q. How does AI help in the healthcare and education sectors? Can you think of other areas where AI could be useful?
- Q. What makes self-driving cars safer and more efficient than traditional vehicles?
- Q. How can AI enhance personalised learning and fitness tracking?
- Q. Describe how AI tools can support the creation of music, art, animations and stories.

### Evaluation

Complete the **AI GAME** task on page **20**, answering questions related to the activity.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **21** and **22** in the main course book.

### Suggested Activity

Have students research AI-powered features in their smartphones and smartwatches and present how these devices use AI to improve their functionality and user experience.



### 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 **25**.

Encourage students to think ethically and answer the question given in the **ETHICS EDGE** section on page **27**.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **29 to 31** in the main course book.

Encourage the students to complete the activity like **CASE STUDY** given on page **31**.

## Suggested Activity

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

# 4 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 **34**.

Encourage students to think ethically and answer the question given in the **ETHICS EDGE** section on page **38**.

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

Complete the **GAME** task on page **37** to **38**, answering questions related to the activity.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **39** to **40** in the main course book.

Encourage the students to complete the activity like **CASE STUDY** given on page **40**.

## 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.

# 5 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 **42**.

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

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 **57 to 59** 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 **59** in the main course book.

# 6 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 **64**.

Encourage students to think ethically and answer the question given in the **ETHICS EDGE** section on page **68**.

Ask the students to answer the question in **CHALLENGE CHAIN** section on page **76**.

After explaining the chapter, let the students do the **ROBO CHECK** on pages **77** to **78** 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 **79** 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.