6

TOUCHPAD®

Artificial Intelligence

Teacher's Manual

Extended Support for Teachers

ORANGE®
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Teacher's Time Table

Periods / Days	0	I	II	III	IV		V	VI	VII	VIII
Monday						B				
Tuesday						R				
Wednesday						E				
Thursday						A				
Friday						K				
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 to 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 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 needs 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.

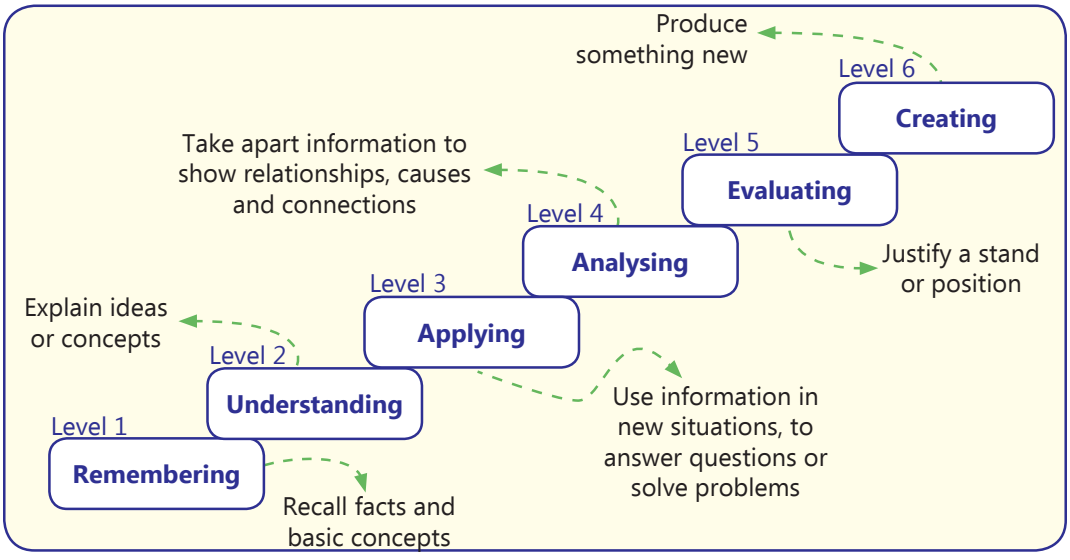
"Knowing yourself is the beginning of all wisdom."

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 6

LESSON PLAN

Artificial Intelligence

1. Human-Machine Interaction

Teaching Objectives

Students will learn about

- ☞ Brief History of Human-Machine Interaction
- ☞ Components of Human-Machine Interaction
- ☞ Stages of Human-Machine Interactions
- ☞ Different Types of Human-Machine Interaction
- ☞ Future of Human-Machine Interaction

Teaching Plan

Number of Periods	
Theory	Practical
2	1

Before starting the chapter, ask the students to read the conversation given in page number 7 to understand the recap of the topic.

Explain the meaning of Human-Machine Interaction and also tell the brief history of HMI to the students in details.

Define the components of HMI in brief to students:

S.No.	Humans	Computers
1.	Sensory Memory	Keyboard/Mouse/Touchpad
2.	Short-term memory	Speech Recognition
3.	Long-term memory	Text input devices
4.	Visual Perception	Eye-tracking
5.	Auditory perception	Display screens
6.	Speech and voice	Printing abilities

Explain the stages of HMI with proper examples to the students which are:

- Intention
- Selection
- Execution
- Evaluation

Define the different types of HMI to the students with examples:

- Menu Driven Interface
- Touch Sensitive Interface
- ENIAC
- Virtual Reality
- Smartwatch
- Dexmo Exoskel
- Voice User Interface
- QWERTY
- Trackball or DATAR
- Multi-Touch Technology
- Wii
- Command Line Interface
- Eye Tracking Device
- Gaming Joysticks
- 3D Printing
- Google Voice Search App

Share with the students about the scope and future of HMI in detail.

Ask the students to solve the task given on page number 9 as **AI Reboot**.

Ask the students to solve the task given on page number 16 as **AI Task**.

Make sure to ask the students to scan and watch the video given on page 16. Encourage the students to make presentation on the topic learned and discuss in class.

Extension

Ask the students some oral questions based on this chapter.

Q. What is HMI?

Q. What are the components of HMI?

Q. What are the stages of HMI? Define each in detail.

Q. Define the following:

a. Menu Driven Interface
b. Voice User Interface
c. Command Line Interface
d. Touch Sensitive Interface
e. QWERTY
f. Eye Tracking Device
g. ENIAC
h. Trackball or DATAR
i. Gaming Joysticks
j. Virtual Reality
k. Multi-Touch Technology
l. 3D Printing
m. Smartwatch
n. Wii
o. Google Voice Search App
p. Dexmo Exoskel

Evaluation

Encourage the students to walk-through the chapter and ask them to play the game given on page 17 and 18 on their own under the name **AI Game**.

After explaining the chapter, let the students do the exercises given on Page 19 and 20 in the main course book as **AI Quiz** and **Exercise**. Tell them to solve the critical and computational skill developing exercises as **AI in Life** and **AI Deep Thinking** given on Page 20.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on Page 20 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

Suggested Activity

Ask the students to search about examples of all the types of HMI.

2. Introduction to AI

Teaching Objectives

Students will learn about

- ☞ Understanding AI Through a Game
- ☞ Human Intelligence Vs Artificial Intelligence
- ☞ Need of AI
- ☞ Terminologies Associated with AI

Teaching Plan

Number of Periods	
Theory	Practical
2	1

Before starting the chapter, ask the students to read the conversation given in page number 21 to understand the recap of the topic.

Explain the understanding of AI through a game to the students.

State the difference between Human Intelligence Vs Artificial Intelligence to the students:

S.No.	Parameter	Human Intelligence	Artificial Intelligence
1.	Nature	It aims to adapt to new environment by utilizing combination of different cognitive processes.	It aims to mimic human behaviour and perform human like actions.
2.	Functioning	Human beings use the computing power, memory and thinking power of their brain.	AI machines rely on data, specific instructions and learnings that are fed into their system.

3.	Learning Power	Humans learn from various incidents and past experience. Humans also learn from their mistakes made via trial and error approach.	Machine learn from data and continuous training. AI does not learn from their mistakes made via trial and error approach.
4.	Decision making power	Humans can make rational decisions.	AI machine make decisions based on events, the data they are trained on, how they are related to a particular event.
5.	Human factor	Humans possess the unique ability to learn and apply their acquired knowledge in combination with logic, reasoning and understanding.	AI machines cannot understand the concept of "cause and effect" simply because they lack common sense.

Explain the need of AI to the students in brief with suitable examples.

Define the basic terminologies which are associated with AI to the students along with real world applications of the same:

- IoT
- Chatbot
- Cloud Computing

Ask the students to solve the task given on page number 24 and 27 as **AI Reboot**.

Ask the students to solve the task given on page number 28 as **AI Task**.

Extension

Ask the students some oral questions based on this chapter.

Q. What is Human Intelligence?

Q. Write the difference between Human Intelligence and AI.

Q. Why there is a need of AI?

Q. Write the real world applications of the following:

a. IoT

b. Chatbot

c. Cloud Computing

Evaluation

Encourage the students to walk-through the chapter and ask them to play the game given on page 29 and 30 on their own under the name **AI Game**.

After explaining the chapter, let the students do the exercises given on Page 30, 31 and 32 in the main course book as **AI Quiz** and **Exercise**. Tell them to solve the critical and computational skill developing exercises as **AI in Life** and **AI Deep Thinking** given on Page 32.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on Page 32 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

Suggested Activity

Ask the students to research more real world application of IoT and Cloud Computing.

3. AI in Apps

Teaching Objectives

Students will learn about

- ☞ Chatbot
- ☞ AI Enhanced Photo Editor
- ☞ Rideshare Apps
- ☞ Voice Assistants
- ☞ Navigational Apps
- ☞ Social Media

Teaching Plan

Number of Periods	
Theory	Practical
2	1

Before starting the chapter, ask the students to read the conversation given in page number 33 to understand the recap of the topic.

Explain the meaning of chatbot to the students and provide some examples like:

- Swelly
- Kuki
- IBM Watson

Define the voice assistants to the students to the students with some examples like:

- Amazon Alexa
- Siri
- Google Voice Assistant
- ELSA Speak

Make the students understand about AI enhanced Photo Editor like:

- Adobe Lightroom
- Luminar-4 AI

Share the information about Navigational apps to the students like:

- Google Maps
- Wave

Explain the main rideshare apps to the students like:

- Uber
- OLA

Share the information of some social media apps which are:

- Facebook
- Snapchat

Extension

Ask the students some oral questions based on this chapter.

Q. Define the following:

a. Swelly
b. Kuki
c. IBM Watson
d. Amazon Alexa
e. Siri
f. Google Voice Assistant
g. ELSA Speak
h. Adobe Lightroom
i. Luminar-4 AI
j. Google Maps

k. Wave
l. Uber
m. OLA
n. Facebook
o. Snapchat

Evaluation

Encourage the students to walk-through the chapter and ask them to play the game given on page 43 on their own under the name **AI Game**.

After explaining the chapter, let the students do the exercises given on Page 44 and 45 in the main course book as **AI Quiz** and **Exercise**. Tell them to solve the critical and computational skill developing exercises as **AI in Life** and **AI Deep Thinking** given on Page 46.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on Page 46 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

Suggested Activity

Ask the students to search about some more examples of chatbots and other AI apps.

4. Types of Robots

Teaching Objectives

Students will learn about

- ☞ Categories of Robots
- ☞ Robots Vs Humans-Advantages and Disadvantages

Teaching Plan

Number of Periods	
Theory	Practical
2	1

Before starting the chapter, ask the students to read the comic given in page number 49 to understand the recap of the topic.

Define the meaning of robots and categories of robots with proper examples:

- Industrial Robots
- Service Robots
- Military Robots
- Robots in Medicine
- Toy Robots
- Collaborative Robots or Cobots
- Security Robots
- Robots in the Agriculture Industry
- Robots in Space and Research
- Humanoid

Explain the advantages and disadvantages between Robots Vs Humans to the students:

Parameters	Humans	Robots/Humanoids
Diligence	Humans tend to get tired of working for long hours and get bored too.	They can work round the clock any task diligently without getting bored.
Speed and accuracy	Humans lack in speed and accuracy in performing certain tasks.	Robot can perform with greater degree of accuracy and much higher speed.
Job	Humans will always have a threat of unemployment on unskilled areas where Robots are deployed and perform better.	Robots can't replace humans in skilled areas and constantly changing work environment.
Workability	Humans are most adaptive, creative and smartest in all domains except extreme environment and places that are life challenging.	Robots with AI perform all the task with higher precision that they are trained with. They can work in extreme and dangerous environment with ease.
Communication	Jobs requiring certain level of communication are unlikely to be automated. Professions like healthcare, education, psychology etc.	Robots have limited communication skills and they are good at only trained domains.

Extension

Ask the students some oral questions based on this chapter.

Q. Define the following:

a. Industrial Robots
b. Collaborative Robots or Cobots
c. Service Robots
d. Security Robots
e. Military Robots
f. Robots in the Agriculture Industry
g. Robots in Medicine
h. Robots in Space and Research
i. Toy Robots
j. Humanoid

Q. Write advantages of Robots Vs Human.

Q. Write disadvantages of Robots Vs Human.

Evaluation

After explaining the chapter, let the students do the exercises given on Page 60 and 61 in the main course book as **AI Quiz** and **Exercise**. Tell them to solve the critical and computational skill developing exercises as **AI in Life** and **AI Deep Thinking** given on Page 61.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on Page 61 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

Suggested Activity

Ask the students to search about different types of robots other than taught in this chapter.

5. Myths and Facts of AI

Teaching Objectives

Students will learn about

- ☞ Influence of AI based Movies on Mankind
- ☞ Myths Vs Facts of AI
- ☞ Different Technologies Related to AI

Teaching Plan

Number of Periods	
Theory	Practical
2	0

Before starting the chapter, ask the students to read the comic given in page number 62 to understand the recap of the topic.

Explain the influence of AI based movies on mankind to the students:

These are the common statements people often make after watching such movies:

"Artificial intelligence will automate everything and put people out of work."

"AI is a science-fiction technology."

"Robots will take over the world."

Share the Myths Vs Facts of AI to the students like:

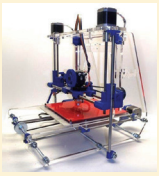
- Myth #1 along with the Fact
- Myth #2 along with the Fact
- Myth #3 along with the Fact
- Myth #4 along with the Fact
- Myth #5 along with the Fact
- Myth #6 along with the Fact

Define the different technologies related to AI to the students in detail:

- VR
- MR
- IoT
- AR
- XR
- 3D Printing

Share the comparison of these different technologies in detail to the students:

Parameter	Technology	Hardware	Software	Real World Applications	Related Image
VR	User leaves the real world and enters into fully digital environment.	A computer, Tracking device, Input device, Sensory devices.	3D computer graphics, tracking technology, sound processing technology, etc.	Military, Sport, mental health, education and fashion, etc.	
AR	Virtual objects are superimposed onto the real word.	Smart phone devices with camera, microphone, etc.	Software capable of projecting computer-generated objects into real world.	Retail shops, repair and maintenance, business logistics, tourism industries, etc.	
MR	Virtual objects are placed in the real world.	A computer, mixed reality headset like HoloLens and supportive hardware.	Windows mixed reality needs Windows 10.	Design, entertainment, military training, remote working.	
IoT	Physical objects are connected and share data through internet.	Dedicated hardware devices that can connect physical world with the interface.	IoT Device Management Software.	Smart house, smart barcode readers, Connected healthcare systems, IoT connected factories etc.	

Parameter	Technology	Hardware	Software	Real World Applications	Related Image
3D Printing	It creates a physical object from a digital design.	A computer with 3D graphics card and a 3D printer.	Software that provides seamless integration between its platform and 3D printer.	making jewellery, dolls, toys, art articles, consumable art like 3D chocolates, etc.	
XR	These devices are created to enhance our senses.	headgear, remotes and capable systems	3D computer graphics, tracking technology, sound processing technology etc.	mental health, education and fashion etc.	

Ask the students to solve the task given on page number 71 as **AI Reboot**.

Make sure to ask the students to scan and watch the video given on page 67. Encourage the students to make presentation on the topic learned and discuss in class.

Extension

Ask the students some oral questions based on this chapter.

Q. Define all the myths along with the facts.

Q. Define the following:

a. VR
b. AR
c. MR
d. XR
e. IoT
f. 3D Printing

Evaluation

After explaining the chapter, let the students do the exercises given on Page 71 and 72 in the main course book as **AI Quiz** and **Exercise**. Tell them to solve the critical and computational skill developing exercises as **AI in Life** and **AI Deep Thinking** given on Page 73.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on Page 73 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity.

Suggested Activity

Ask the students to search about some examples of XR, AR and VR..