8

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

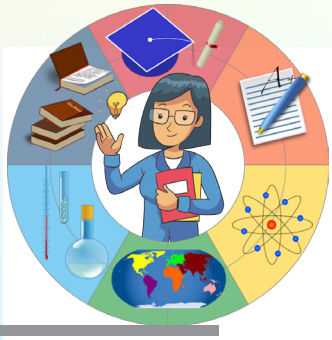
"If you cannot do great things, do small things in a great way."

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.

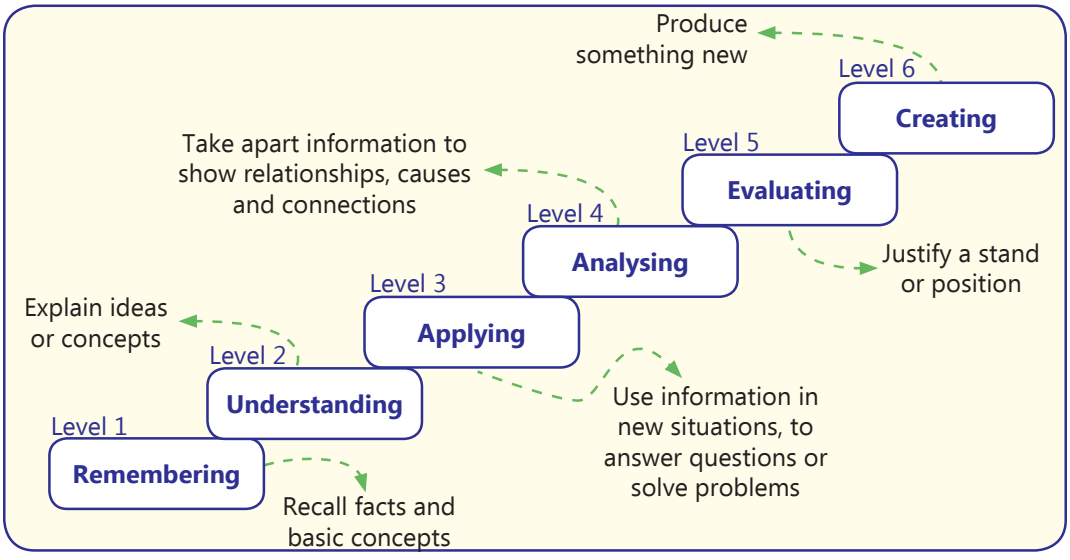
"Knowing yourself is the beginning of all wisdom."

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 8

LESSON PLAN

Artificial Intelligence

1. Excite

Teaching Objectives

Students will learn about

- Introducing AI
- Brief History of AI
- Tasks Performed by AI
- Terminologies Associated with Artificial Intelligence
- Why Artificial Intelligence Matters?
- Difference between Human Intelligence and AI
- Types of Artificial Intelligence
- Various Practices Involved in Artificial Intelligence
- Domains of AI
- Human-Machine Interaction (HMI)

Teaching Plan

Number of Periods	
Theory	Practical
2	1

Before starting the chapter, ask the students to read the conversation given in page number 11 to understand the recap of the topic.

Start the chapter by giving an introduction of AI to the students with the help of using real time examples. Also, give some famous phrases about AI like Larry Page.

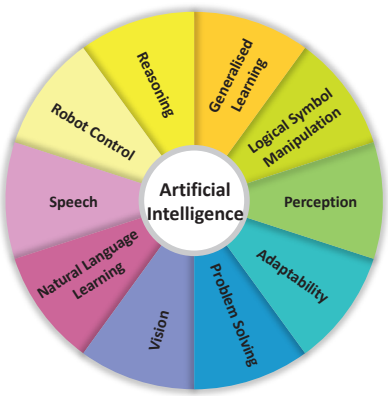
Explain the brief history of AI to the students along with the milestone and year:

S.No.	Year	Milestone
1.	1950	Alan Turing submitted a paper about the possibility of creating a machine that would think.
2.	1956	John McCarthy finally gave the name "Artificial Intelligence". A research was founded in Dartmouth college.
3.	1966	First Chatbot ELIZA was created.

S.No.	Year	Milestone
4.	1967	WABOT project was undertaken in Japan.
5.	1972	The world's first full-scale intelligent humanoid robot WABOT-1 was completed.
6.	1980	Form of AI program "Expert System" was adapted.
7.	1989	Deep Thought and HiTech defeated chess masters. It led to the development of Deep Blue.
8.	1997	Deep Blue defeated then reigning world chess champion, Garry Kasparov.
9.	2002	Roomba, the robotic vacuum was developed.
10.	2011	IBM Watson, a question-answer computer system won a quiz show.
11.	2012	Google Now, a search application for Android and iOS was launched.
12.	2014	Eugene Goostman, a Chatbot won the Turing Test again convincing 33% of the judges.
13.	2015	Voice Controlled Intelligent Speakers—Amazon Echo, was available in the market.
14.	2016	The first social humanoid Robot Sophia made her first public appearance.

Define the tasks performed by AI to the students along with some examples for the following:

- Generalised Learning
- Reasoning
- Problem Solving
- Adaptability
- Perception
- Computer Vision
- Speech
- Natural Language Understanding
- Logical Symbol Manipulators
- Robot Control



Share the terms which are associated with AI in brief detail with the students:

- Intelligence
- Learning
- Understanding
- Chatbots

- Internet of Things (IoT)
- Big Data
- Programming Language
- Data Mining
- Machine Learning

Explain to the students why AI matters in our lives and how it affects our lives.

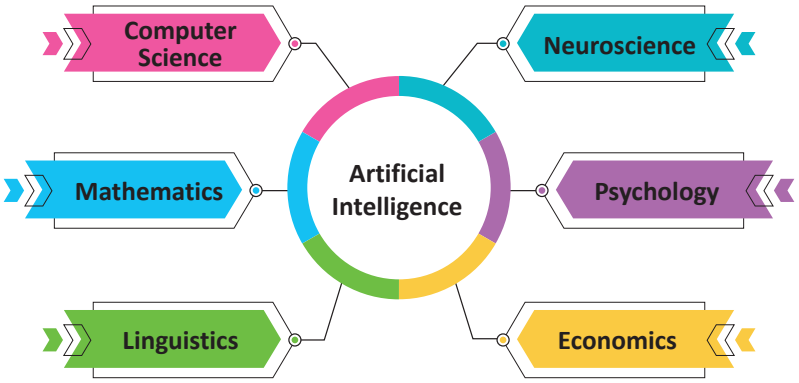
Tell the students about the difference between Human Intelligence and Artificial Intelligence in detail using the below table:

Parameter	Human Intelligence	Artificial Intelligence
Nature	Human intelligence adjusts with new environment using different cognitive skills.	AI aims to build machines that can mimic human behaviour.
Brain	Human brain is analogous.	AI based machines are digital.
Functioning	Humans use brain's memory, ability to think and computational power.	AI based machines depend on the huge data bank and specific instructions are fed into the system.
Tasks	Human beings perform various tasks using past experience, using trial and error methods and the learning continues throughout their life.	AI machines perform various tasks by learning through data and continuous training.Myriad Pro
Change in the environment	Human insight takes less time to adapt to the changed environment.	AI machines take much more time to adjust to the changed environment.
Speed	Human beings take more time to process huge data manually.	AI based machine's processing speed is much faster than that of human beings.

Define the types of AI to the students along with examples for better understanding:

- Artificial Narrow Intelligence
- Artificial General Intelligence
- Artificial Super Intelligence

Share the information about the various practices involved in AI with the students.



Explain the Domains of AI in detail to the students with proper explanation and examples:

- Data
- NLP (also explain different types of NLP)
- Computer Vision (also explain the tasks performed by CV)

Share the detailed information about Human-Machine Interaction and the tools related to it with the students.

Ask the student to solve the exercise given on page number 14 and 19 as **AI Reboot**.

Ask the students to solve the task given on page number 17, 18 and 21 as **AI Task**.

Extension

Ask the students some oral questions based on this chapter.

Q. What is AI?

Q. What is the difference between Human and Artificial Intelligence?

Q. Define tasks performed by AI.

Q. Define the following:

a. Generalised Learning
b. Reasoning
c. Problem Solving
d. Adaptability
e. Perception
f. Computer Vision
g. Speech
h. Natural Language Understanding
i. Logical Symbol Manipulators
j. Robot Control

Q. Why Artificial Intelligence matters?

Q. What is AI?

Q. What is Narrow AI?

Q. What is General AI?

Q. What is Super AI?

Q. What is Narrow AI?

Q. What is Big Data?

Q. What is NLP?

Q. What is Computer Vision?

Q. What is HMI?

Evaluation

Encourage the students to walk-through the chapter and ask them to play the game given on page 22, 23, 24, 25 and 26 on their own under the name **AI Game** after learning about the rules and basics.

After explaining the chapter, let the students do the exercises given on Page 27, 28 and 29 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 29 and 30. Ask the students to think and answer the exercise as **AI Ready 1** given on page number 31.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on Page 30 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 history of AI and some early robots.

2. Relate

Teaching Objectives

Students will learn about

- ☞ Most Common Fields which use AI
- ☞ AI in Apps
- ☞ Concept of Smart Living

Teaching Plan

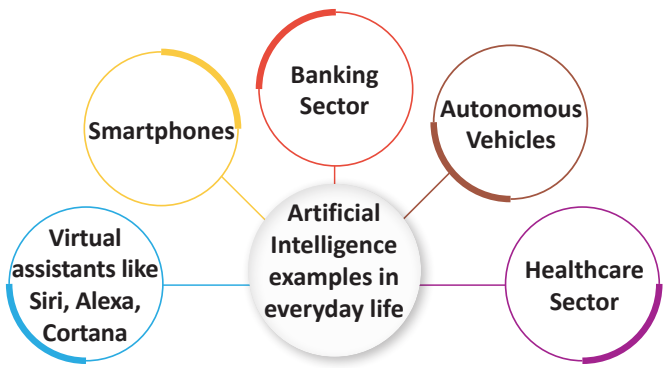
Number of Periods	
Theory	Practical
2	1

Before starting the chapter, ask the students to read the conversation given in page number 32 to understand the recap of the topic.

Start the chapter by relating AI to the students with the help of using real time examples.

Explain the most common fields to students which use AI with examples like:

- Smartphone Industry
- Social Media Platforms
- Banking and Financial Sector
- E-Commerce
- Autonomous Vehicles
- Security and Surveillance
- Navigation
- Autonomous Drones
- Healthcare
- Education



Introduce to the students about how AI is used in Apps:

- Siri
- Alexa
- Reas
- Cortana
- Google Assistant
- ELSA Speak
- Socratic
- Fyle
- Youper
- OLA/Uber

Define the concept of Smart Living to the students with the detailed topics like:

- Smart Homes along with the benefits of a smart home and the devices which are used in a smart home.
- Smart Cities along with the objectives, benefits and challenges of establishing smart cities with proper examples.

Ask the student to solve the exercise given on page number 34, 38 and 48 as **AI Reboot**.

Ask the students to solve the task given on page number 41 and 42 as **AI Task**.

Make sure to ask the students to scan and watch the video given on page 40, 46 and 48. Encourage the students to make presentation on the topic learned and discuss in class.

Encourage the students to complete the Ice Breaker Activity given on page number 49 for learning by doing.

Extension

Ask the students some oral questions based on this chapter.

Q. Define AI in these:
   a. Smartphone Industry
   b. Social Media Platforms
   c. Banking and Financial Sector
   d. E-Commerce
   e. Autonomous Vehicles
   f. Security and Surveillance
   g. Navigation
   h. Autonomous Drones
   i. Healthcare
   j. Education

Q. What are the benefits of a smart home?

Q. What is the objective of a smart city?

Q. What are the benefits of a smart city?

Q. What are the challenges of establishing a smart city?

Q. Define the following apps:
   a. Siri
   b. Alexa
   c. Cortana

d. Google Assistant
e. ELSA Speak
f. Socratic
g. Fyle
h. Youper
i. OLA/Uber

Evaluation

Encourage the students to walk-through the chapter and ask them to play the game given on page 50, 51, 52 and 53 on their own under the name **AI Game** after learning about the rules and basics.

After explaining the chapter, let the students do the exercises given on Page 54, 55 and 56 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 56.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on Page 56, 57, 58 and 59 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity. Ask the students to think and answer the exercise as **AI Ready 2** given on page number 60.

Suggested Activity

Ask the students to search about more apps where AI is used.

3. Purpose

Teaching Objectives

Students will learn about

☞ Sustainable Development Goals

Teaching Plan

Number of Periods	
Theory	Practical
2	1

Before starting the chapter, ask the students to read the conversation given in page number 63 to understand the recap of the topic.

Start the chapter by giving an introduction of SDGs to the students with the help of using real time examples.

Tell the students about Sustainable Development Goals and answer these queries regarding it:

1. What are SDGs?
2. How they are introduced?
3. Why they are introduced?
4. Who introduced SDGs?

Briefly explain all the SDGs in detail along with their motives and purpose:

Ask the student to solve the exercise given on page number 69 as **AI Reboot**.

Ask the students to solve the task given on page number 69 as **AI Task**.

Extension

Ask the students some oral questions based on this chapter.

Q. What are SDGs?

Q. How they are introduced?

Q. Why they are introduced?

Q. Who introduced SDGs?

Q. Define the following:

a. Goal 1 b. Goal 2 c. Goal 3

d. Goal 4 e. Goal 5 f. Goal 6

g. Goal 7 h. Goal 8 i. Goal 9

j. Goal 10 k. Goal 11 l. Goal 12

m. Goal 13 n. Goal 14 o. Goal 15

p. Goal 16

Evaluation

After explaining the chapter, let the students do the exercises given on Page 70 and 71 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 71.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on Page 71, 72 and 73 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity. Ask the students to think and answer the exercise as **AI Ready 3** given on page number 74.

Suggested Activity

Ask the students to research more about SDGs and ask them to create a poster on SDGs.

4. Possibilities

Teaching Objectives

Students will learn about

- ☞ Preferred Skills to get a Job in AI Field
- ☞ Career Opportunities in AI
- ☞ Organisations Providing AI Jobs

Teaching Plan

Number of Periods	
Theory	Practical
2	1

Before starting the chapter, ask the students to read the conversation given in page number 75 to understand the recap of the topic.

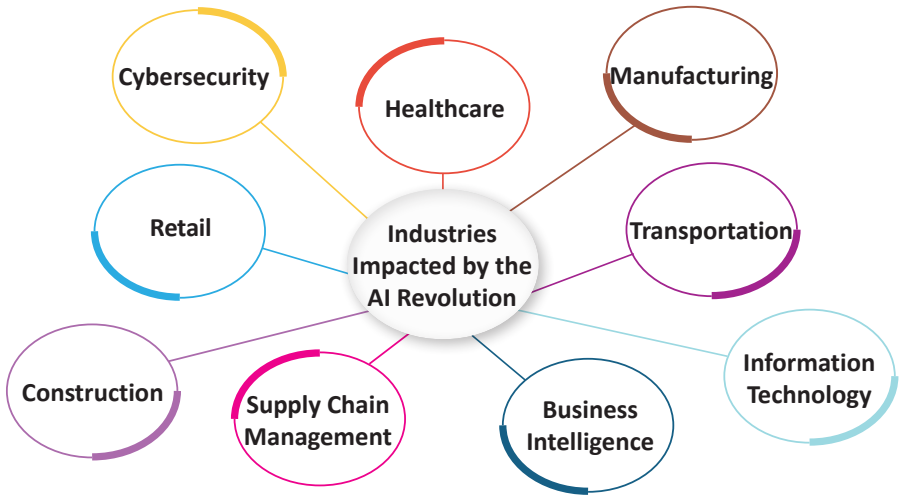
Start the chapter by giving an introduction of skills related with AI to the students with the help of using real time examples.

Explain the students about the preferred skills to get a job in AI field which are:

a. **Soft Skills**
   - Data Literacy Skills
   - Collaboration Skills
   - Critical Thinking Skills
   - Leadership Skills
   - Adaptability Skills

b. **Technical Skills**
   - Programming Languages
   - Machine Learning Algorithms
   - Artificial Neural Networks
   - Mathematics and Algorithm
   - Signal Processing Techniques

Tell the students about the career opportunities in AI in detail which are:



Share the skills required with the students along with some of the jobs in the field of AI which are:

- Machine Learning Engineer
- Computer Vision Engineer
- Aerospace Engineer
- Robotics Engineer
- Data Scientist

Define some of the organisations providing AI jobs to the students along with case study of AI start-ups in India and their purpose at different levels which are:

- Niramai Health Analytix
- Discover.ai
- Doxper
- Expertrons
- Haptik.ai
- Niki.ai
- Avaamo

Ask the student to solve the exercise given on page number 81 and 82 as **AI Reboot**.

Ask the students to solve the task given on page number 83 as **AI Task**.

Extension

Ask the students some oral questions based on this chapter.

Q. What are soft skills?

Q. What are technical skills?

Q. Define the following jobs:

a. Machine Learning Engineer
b. Robotics Engineer
c. Computer Vision Engineer
d. Data Scientist
e. Aerospace Engineer

Q. Define the purpose of these start-ups:

a. Niramai Health Analytix
b. Haptik.ai
c. Discover.ai
d. Niki.ai
e. Doxper
f. Avaamo
g. Expertrons

Evaluation

After explaining the chapter, let the students do the exercises given on Page 84 and 85 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 85 and 86.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on Page 86 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity. Ask the students to think and answer the exercise as **AI Ready 4** given on page number 87.

Suggested Activity

Ask the students to google about some more Indian start-ups which provide AI jobs.

5. AI Ethics

Teaching Objectives

Students will learn about

- Understanding AI Ethics
- Ethical Issues with AI
- AI Bias
- Is AI a Boon or a Bane?
- Need of AI Ethics
- AI Ethics Progress
- AI Access
- Advantages and Disadvantages of 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 88 to understand the recap of the topic.

Start the chapter by making the students understand the concept of AI ethics with the help of using real time examples.

Explain the meaning of AI Ethics to the students and purpose of AI Ethics.

Define the need of AI Ethics to the students with examples.

Share the information to the students about the ethical issues with AI:

- Unemployment
- Inequality
- Gender Gap
- Humanity
- Accountability
- Unforeseen Circumstances
- Threat to Human Dignity

Demonstrate the AI Ethics Progress along with the major progress made in this area to the students.

Explain AI Bias to the students and also share the types of the same which are:

- Perceptive Biases
- Incomplete Data Biases
- People

Define some of the popular AI Bias examples to the students which are:

- Amazon Recruitment
- COMPAS
- Healthcare Risk Algorithm
- Facebook Ads

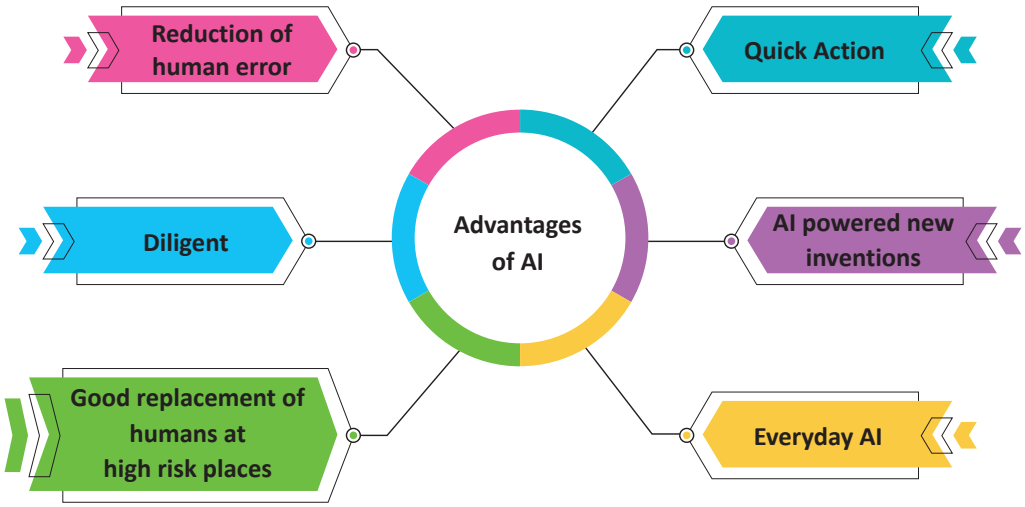
Also, tell the students how to prevent from biases with example.

Make the students understand the AI Access and how it can be acquired:

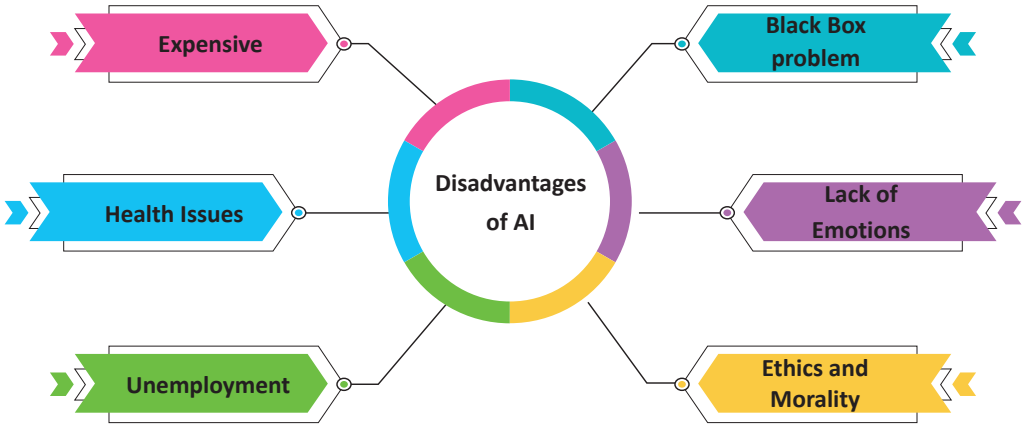
- Data Availability
- Abilities

Share with the students whether AI is a boon or a bane with proper examples.

Define the advantages of AI to the students:



Define the disadvantages of AI to the students:



Ask the student to solve the exercise given on page number 90, 94 and 98 as **AI Reboot**.

Ask the students to solve the task given on page number 99 as **AI Task**.

Make sure to ask the students to scan and watch the video given on page 93 and 99. 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 AI Bias?

Q. Define the following:

a. Unemployment
b. Inequality
c. Gender Gap
d. Humanity
e. Accountability
f. Unforeseen Circumstances
g. Threat to Human Dignity

Q. What are the types of AI Bias?

Q. What is AI Access? How can one acquire it?

Q. Write the advantages of AI.

Q. Write the disadvantages of AI.

Evaluation

After explaining the chapter, let the students do the exercises given on Page 100 and 101 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 101 and 102.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on Page 102 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment activity. Ask the students to think and answer the exercise as **AI Ready 4** given on page number 103.

Suggested Activity

Ask the students to make a presentation on advantages and disadvantages of AI.