



The AI Lab — Teacher's Guide

A simple, ready-to-read explanation of **every activity** in the AI Lab — what it teaches, what students do on screen, exactly what to say, the key words, questions to ask, and the common mistake to clear up.

How every activity works (the same everywhere):

- Open the page, read the **title** and the short **instruction line** under it.
- The big **playground** is hands-on — students click, type, drag sliders, or press buttons and watch what happens.
- A blue "🤖 In a real AI..." box connects the play to the real idea.
- Every page ends with a **scored quiz (Practice 🎯)** whose questions come straight from that chapter's exercises in the handbook.
- It all runs in a browser — **online** at the links below, or **offline** from the downloaded ZIP (no internet needed).

Suggested 1-period flow: 2 min you demo on the board → 8–10 min students play → 5 min the quiz → 3 min discuss the "Ask the class" questions.



Which activity for which chapter

Use this to match a playground to the lesson you're teaching.

Class 6 chapter	Activities to use
Ch 1 — Introduction to AI & Everyday Examples	What is AI? · AI Around Us · Supervised (Classification) · Unsupervised (Clustering) · Reinforcement Learning
Ch 2 — Basic Data Concepts	Basic Data Concepts
Ch 3 — Pattern Recognition & Decision Making	Patterns & Decisions
Ch 4 — Ethics & Digital Responsibility	Ethics & Digital Safety
Class 7 chapter	Activities to use
Ch 1 — AI Domains & Applications	Computer Vision · Tokenization · Cleaning words · Word numbers · Guess the next word · Classification · Regression · Clustering · Datasets

Ch 2 — AI in Industries	AI Around Us
Ch 3 — Data Visualisation & Analysis	Data Visualisation
Ch 4 — Ethics & AI Bias Awareness	Bias & Fairness · Ethics & Responsible AI

Class 8 chapter	Activities to use
Ch 1 — AI Project Lifecycle	AI Project Lifecycle · Datasets · Training vs Answering
Ch 2 — Deeper Dive into AI Applications	AI Around Us · Computer Vision · Classification (no-code idea)
Ch 3 — Data & Fairness in AI	Bias & Fairness · Classification
Ch 4 — Ethics & Responsible AI	Ethics & Responsible AI

The activities at a glance

★ Class 6 · What is AI? 🤖

★ Class 6 · Basic Data Concepts 📁

★ Class 6 · Patterns & Decisions 🔄

★ Class 6 · Ethics & Digital Safety 🛡️

1. Tokenization 🔪

2. Cleaning words 🧹

3. Word numbers (embeddings) 📊

4. Guess the next word 🧠

5. Computer Vision 👁️

6. Training vs Answering 🤖

7. Classification (Supervised) 📁

8. Regression 📈

9. Clustering (Unsupervised) ✂️

10. Reinforcement Learning 🎮

11. Datasets & the split 📁

12. Data Visualisation 📊

13. Bias & Fairness ⚖️

14. AI Project Lifecycle 🔄

15. AI Around Us 🌐

16. Ethics & Responsible AI 🛡️




Class 6 · What is AI? — intelligence, history & the Turing Test

Class 6 · Ch 1

Big idea

What intelligence means, the **story of AI**, and how to tell real **AI** from plain automation.

What students do Four games: **1) Which kind of intelligence?** (👉 Interpersonal / 🌱 Naturalistic / 🧠 Intrapersonal) · **2) The story of AI** — press ► **Next milestone** through automatons → the Turing Test → 1956 birth → AI Winter → modern AI · **3) The Turing Test** — tap 🧑 **Human** or 🤖 **Machine** for each reply · **4) Automation or AI?** — tap ⚙️ **Automation** or 🤖 **AI**.

 **Say this:** *AI = computing + intelligence. People are clever in different ways. The dream of thinking machines is old — from water-clock automatons, to Alan Turing asking "Can machines think?", to 1956 when the field got its name. But a machine is only AI if it learns from data; if it just follows fixed rules, it's automation.*

Key words

intelligence · Turing Test · automation · machine learning (supervised, unsupervised, reinforcement).



Ask the class: Who introduced the Turing Test? · In which year was AI "born"? · Is a microwave AI or automation?



Watch out: Not every smart-looking machine is AI — automation follows fixed rules and never learns.



Class 6 · Basic Data Concepts — types, tables & charts

Class 6 · Ch 2

Big idea

Data comes in **five types**, and we make sense of it with **tables, bar charts and pictograms**.

What students do Playground 1 — **Sort the data**: drop each item into **Numerical** / **Text** / **Image** / **Video** / **Sound**. Playground 2 — **Bar chart**: a lemonade-sales chart with $-/+$ buttons; the best-seller is highlighted. Playground 3 — **Pictogram builder**: trees planted per class, with a switchable key = 5 / = 10.

Say this: *Data is just raw facts. It can be numbers, text, images, video or sound. Once we organise it and draw it, patterns pop out — a bar chart compares amounts, and a pictogram counts using a picture plus a key, like = 5 trees.*

Key words

data types · table · bar chart · pictogram · key.

Ask the class: Is CCTV footage video or image data? · Which lemonade sold the most? · In the pictogram, what does one stand for?

Watch out: A pictogram needs a key (= 5) — without it you can't tell the real numbers.



Class 6 · Patterns & Decisions — spot it, predict it, decide

Class 6 · Ch 3

Big idea

Spot **patterns** to predict what comes next, make **observations** from data, then make a good **decision**.

What students do Playground 1 — **Continue the pattern**: pick the next shape, number or colour. Playground 2 — **What do you observe?**: read a small bar chart and answer. Playground 3 — **Decide from what you observe**: choose the sensible action for each everyday situation.

Say this: *A pattern is something that repeats, so it lets us predict what comes next. With data we first make an observation (what do we see?), then draw a conclusion, then make a decision. Finding patterns in data is exactly what machine learning does too.*

Key words

pattern · predict · observation · conclusion · decision.

Ask the class: What comes next: 2, 4, 6, 8...? · Which day had the highest attendance? · You scored low marks — what's the smart decision?

Watch out: A conclusion must come from the data you actually see — not from a guess.



Class 6 · Ethics & Digital Safety — stay safe online

Class 6 · Ch 4

Big idea

Use the internet safely — spot online **tricks**, build **strong passwords**, and mind your **digital footprint**.

What students do Game 1 — **Spot the threat**: label each situation 🎧 **Phishing** / 📧 **Spam** / 🖱️ **Hacking** / 📄 **Plagiarism** / ✅ **Safe**. Game 2 — **Build a strong password**: type a password and watch a live meter check length, capital, small letter, number and symbol. **Game 3 — Active or passive footprint?**: tap 🖐️ **Active** (you did it on purpose) or 🤖 **Passive** (happened without you realising).

💡 **Say this:** *The internet is useful but you must be careful. Phishing tries to trick you into giving up passwords; copying others' work is plagiarism. Make passwords long, with capitals, numbers and symbols — and never share them. And remember: everything you do online leaves a footprint, sometimes without you even realising.*

Key words

phishing · spam · hacking · plagiarism · strong password · digital footprint (active / passive).



Ask the class: An email says "win a phone, share your password" — what do you do? · What makes a password strong? · Is a website quietly storing cookies an active or passive footprint?



Watch out: "You won a free prize — click here!" is almost always a trick. Never share passwords, and check before you click.




1. Tokenization

Class 7 · Ch 1 (NLP)

Big idea


Computers can't read words directly. They first chop text into small pieces called **tokens** and give each a number.


What students do Type any sentence (or tap a "try these" like **ChatGPT is amazing 🤖** or **2 cats + 3 dogs = 5 pets**), then choose how to chop it: **By words**, **By word-pieces (subword)**, or **By letters**. Coloured token chips appear, each with an ID number and a total count.

 **Say this:** *Before a computer can understand a sentence, it cuts it into pieces — like a row of word-cards. Each piece is a "token" and gets its own number, because computers only ever work with numbers.*

Key words

token = a piece of text · **token ID** = its number · **subword** = a chunk smaller than a whole word.

 **Ask the class:** How many tokens are in "I love AI"? · Why might a long word like "unbelievable" get split into pieces? · Do emojis and punctuation get their own tokens?

 **Watch out:** A token is *not* always a whole word — long or rare words get split into smaller pieces.



2. Cleaning words

Class 7 · Ch 1

Class 8 · Ch 1 (data cleaning)

Big idea

We tidy text before an AI uses it — make it lowercase, drop tiny **stop-words**, and cut words down to their **root**.

What students do Pick a phrase (e.g. **studies & runs**, **leaves & happier**) or type their own, then switch steps on/off: **a→a lowercase**, **remove stop-words**, **stemming**, **lemmatization**. Compare *Original* vs *After cleaning*.

Say this: *Computers waste effort on tiny words like "the" and "is", and they get confused that run, runs and running look different. Cleaning removes the clutter and turns words back to their root so the computer sees the real meaning.*

Key words

stop-words = very common words (the, is, a) · **stemming** = chop to a rough root (studies → studi) · **lemmatization** = proper dictionary root (studies → study).

Ask the class: What is the root of "running"? · Why remove the word "the"? · What's the difference between stemming and lemmatization?

Watch out: Stemming can give a non-word (studi); lemmatization gives a real dictionary word (study).

12
34

3. Word numbers (embeddings)

Class 7 · Ch 1 (NLP)

Big idea

Words are turned into **lists of numbers** so that words with similar meaning sit close together on a "meaning map".

What students do Click any word on the meaning map to light up its nearest neighbours. Try "meaning maths": **king→queen (make it female)** and **dog→puppy (make it a baby)** — the same "direction" is applied to other words.

Say this: *AI turns each word into numbers — like coordinates on a map. Words that mean similar things land near each other. Amazingly, directions have meaning too: the step from "king" to "queen" is the same kind of step as "man" to "woman".*

Key words

embedding = a word turned into numbers · **neighbour** = a nearby, similar word · **vector** = the list of numbers (an arrow/direction).

Ask the class: Which words sit near "happy"? · What does "king – man + woman" give? · Why is storing meaning as numbers useful?

Watch out: The numbers aren't random — distance on the map = similarity in meaning.



4. Guess the next word


Class 7 · Ch 1

Class 8 (how LLMs work)

Big idea


A language model writes by repeatedly guessing the **most likely next word** — a probability game.


What students do Pick a starter (**The...** , **I...** , **Once...** , **My...** , **The dog...**). The model shows several next-word guesses with probability bars; click one to add it and get fresh guesses. A sentence grows word by word.

 **Say this:** *A language model doesn't plan the whole sentence. It just keeps asking "what word probably comes next?" Each option has a percentage. Pick words and watch a sentence build — that's exactly what ChatGPT does, only very fast.*

Key words

prediction · **probability** = how likely · **next-token**.

 **Ask the class:** After "The dog...", what is the top guess? · Why are there several options, not just one? · Is the highest-probability word always the "correct" one?

 **Watch out:** It predicts what's *likely*, not what's *true* — so it can write silly or wrong sentences.






6. How an LLM learns vs answers (Training vs Inference)

Class 8 · Ch 1 (model training)

Big idea


Two different jobs: **Training** = slowly learning from lots of text by adjusting millions of "knobs"; **Inference** = using what it learned to answer, one token at a time.


What students do **Train one step** /  **Auto-train** and watch "how often it's right now" climb and the "knobs (weights)" change. Then pick a prompt (**The sun rises in the...**) and **Generate next token** → /  **Finish it** to watch it answer.

 **Say this:** *Learning and answering are different. While TRAINING, the model reads tons of text and tweaks tiny knobs until its guesses improve — slow, and done once. While ANSWERING (inference), it just uses those fixed knobs to produce words quickly.*

Key words

training · **weights/knobs** · **accuracy** · **inference** = answering.

 **Ask the class:** In which phase do the knobs change? · Why does accuracy go up during training? · Is answering fast or slow compared to training?

 **Watch out:** The model is *not* learning while it answers you — the learning happened earlier, during training.

Vision — how computers see




5. Computer Vision


Class 7 · Ch 1 (the Eyes)

Class 8 · Ch 2 (image AI)

Big idea

A computer sees a picture as a **grid of numbers**, and finds shapes by sliding a small **filter** that detects edges.

What students do Draw on the pixel grid (click squares) or pick a shape (7, A, H, ♥, +, 😊, line). Tap  **show numbers** to see it as 0s and 1s. Choose ↓ **vertical edges** or ↔ **horizontal edges**, then ► **Slide the filter** and watch the edges light up.

 **Say this:** *A photo is just a grid of numbers — bright spots are high, dark spots are low. The first thing an image AI does is slide a tiny window across the picture to find edges, where light meets dark. Stack many of these and it can recognise objects and faces.*

Key words

pixel = one dot of the grid · **filter (kernel)** = a small edge-finder · **feature** = something it finds, like an edge.



Ask the class: What number is a "lit" pixel? · What does the vertical-edge filter light up? · How does finding edges help the computer recognise a "7"?



Watch out: The computer doesn't really "see" a 7 — it only sees numbers and patterns of edges.

The ways machines learn



7. Classification — Supervised Learning

Class 7 · Ch 1

Class 8 · Ch 3

Big idea

Learn from **labelled** examples, draw a **boundary**, then sort new things. It needs a teacher (the labels).

What students do Pick a problem (🍏 **Healthy or junk?**, 🐱 **Cat or dog?**, 🌱 **Will it grow?**, 📧 **Spam or real?**, 📖 **Pass or fail?**). See the labelled dots and the boundary the computer learned. 🎁 **Drop a mystery one** or click anywhere to test a new point; **clear tests** to reset.

💡 **Say this:** *In supervised learning, a teacher first labels lots of examples — healthy/junk, spam/real. The computer finds a line, a boundary, that best splits the two groups. For anything new, it just checks which side of the line it falls on.*

Key words

label · supervised learning · boundary · feature (the two axes).

🧑 **Ask the class:** Who provides the labels? · How does it decide a brand-new point? · Name another classification job (hint: a spam filter).

⚠️ **Watch out:** Supervised learning needs labels / a teacher — that's the opposite of clustering.



8. Regression — predicting a number

Class 7 · Ch 1

Big idea

Classification's partner — but it predicts a **number** (not a category) by fitting a trend line.

What students do Pick an example (📖 **Study hours → exam marks** or 🏠 **House size → price**). ✎ **Move the line to fit the dots** (or tap ✨ **Best fit**). Then 🧙 **predict a NEW number** — choose an input and read the line's prediction.

💡 **Say this:** *Regression predicts a number. We draw the line that best follows the dots. Then for a new input — say 6 hours of study — we read the line to predict the marks. Classification asks "which group?"; regression asks "how much?"*

Key words

regression · trend line / line of best fit · predict.

👤 **Ask the class:** If you study more hours, does the predicted mark go up or down? · What mark does the line predict at 5 hours? · Is "price" a category or a number?

⚠️ **Watch out:** Regression gives a *number*; classification gives a *category*. Don't mix them up.



9. Clustering — Unsupervised Learning

Class 7 · Ch 1

Class 8 (unsupervised)

Big idea

No labels at all — the computer finds the groups by itself, putting nearby points together (k-means).

What students do Pick a real example (🛒 **Shoppers**, 🍎 **Fruits**, 🎵 **Songs**) or 🎲 **Random dots**. Choose **2 or 3 groups**. Press ▶ **One step** or ⏮ **Find groups** to watch the centres move and settle; ↺ **Reset** or 🎲 **New dots** to try again.

💡 **Say this:** *Sometimes nobody labels the data — we just have a pile of dots. Clustering lets the computer discover the groups on its own: it drops a few "centres", sends each dot to its nearest centre, moves the centres to the middle, and repeats until they stop moving. No teacher needed.*

Key words

clustering · unsupervised learning · centre (centroid) · k = number of groups.

👤 **Ask the class:** Does clustering use labels? · How does it decide which dots belong together? · What's the biggest difference from classification?

⚠️ **Watch out:** Unsupervised learning has no labels / no teacher — the exact opposite of classification.



10. Reinforcement Learning

Class 8 (third way to learn)

Big idea

A robot learns by **trial and error**, collecting **rewards** (good) and **penalties** (bad) — like training a pet with treats.

What students do Pick a world (**Open field**, **Lava river**, **Wall maze**). Press **Train 1 try** or **Auto-train (100 tries)**, then **Watch it play**; **Forget everything** to start over. Watch the arrows (its best move per square) and the reward bars climb.

Say this: *No labelled answers here. The robot tries moves; reaching the gives a big reward, falling in the lava gives a penalty. Over many tries it remembers what paid off. After training, watch it walk straight to the treasure — it learned the path entirely by itself.*

Key words

reward · penalty · trial and error · policy = the arrows showing the best move per square.







Ask the class: How does the robot learn the path? · Why does it move almost randomly at first? · What everyday thing is this most like? (training a pet)


Watch out: The three ways AI learns are **supervised, unsupervised**, and **reinforcement** — this is the third one.

11. Datasets — the food an AI learns from Class 7 · Ch 1


Class 8 · Ch 1 (data collection)


Big idea A **dataset** is the data we teach an AI with. We split it into **training / validation / test**, and data comes in different **types**.

What students do **Playground 1 — Split the dataset:** choose **60/20/20**, **70/15/15** or **80/10/10** and watch 100 items colour into the three groups. **Playground 2 — Sort the data:** pick an item and drop it in the right bucket —  **Numerical**,  **Text**,  **Multimedia**,  **Time-series**,  **Spatial**;  **Play again**.

 **Say this:** *An AI learns from a dataset. We split it up: most for TRAINING (learning), some for VALIDATION (checking while it learns), and some kept secret for the TEST — the final exam on data it has never seen. Data also comes in types: numbers, text, images/audio, time-series, and maps.*

Key words **dataset · training / validation / test split · data types · structured vs unstructured.**

 **Ask the class:** Why must we keep the test data secret? · What percent did you give to training? · Is a song "numerical" or "multimedia"?

 **Watch out:** Never test on data the model already trained on — it's like letting a student see the exam answers first.



12. Data Visualisation

Class 7 · Ch 3

Big idea

Turning numbers into **pictures (charts)** helps us spot patterns fast — and data is only trustworthy when it is **valid** (accurate AND precise).

What students do **Playground 1 — Your report card:** change subject marks with $-/+$ and switch **Bar** / **Line** / **Pie**; the highest and lowest are highlighted. **Playground 2 — Spot the VALID data:** pick the dartboard that is accurate *and* precise; **Reveal all labels.** **Playground 3 — Sort the data:** **Structured** vs **Unstructured.**

Say this: *The same numbers can become a bar chart (to compare), a line graph (to show change over time), or a pie chart (to show parts of a whole). Pictures help our brain see patterns quickly. And data is only trustworthy when it's valid — both accurate (close to the truth) and precise (consistent and exact).*

Key words

bar / line / pie chart · pattern · trend · precision · accuracy · valid data.

Ask the class: Which chart best shows change over time? · Which dartboard shows valid data? · Is a table of marks structured or unstructured?

Watch out: A pie chart shows parts of a whole, *not* change over time. And "precise" is not the same as "accurate".



13. Bias & Fairness

Class 7 · Ch 4

Class 8 · Ch 3

Big idea

AI learns only from the data we give it — so **unbalanced or unfair data makes an unfair AI**.

What students do **Demo 1 — Balance the training data:** change how many 🍌 vs 🍌 examples there are, press 🗑️ **Test the AI**, and watch its guesses skew toward whichever it saw more of; ⚖️ **Snap to 50/50** to fix it. **Demo 2 — Name that bias:** read a short story and pick the type of bias (data, historical, measurement, algorithmic, human); **Next story** →.

💡 **Say this:** *Machines don't invent bias — they copy it from the data. If we show mostly cricket bats, the AI guesses "bat" for almost everything. Balance the examples and it becomes fair again. That's why we use diverse, balanced data and keep checking the AI.*

Key words

bias · balanced data · data / historical / measurement / algorithmic / human bias · fairness.

🧑 **Ask the class:** Where does AI bias actually come from? · What happened when the data was 90% bats? · How can we make the AI fairer?

⚠️ **Watch out:** "Garbage in, garbage out" — unfair data gives an unfair AI, even when the maths is perfect.



14. AI Project Lifecycle

Class 8 · Ch 1

Big idea

Building an AI is a **6-stage journey**; and real AI (which learns/adapts) is different from **automation** (fixed rules).

What students do **Playground 1 — the journey**: press ► **Next stage** through the 6 stages (Define problem → Data collection & prep → Model development & training → Evaluation & refinement → Deployment → Monitoring & maintenance); ↺ **Restart**. **Playground 2 — spot the difference**: tap ⚙️ **Automation** or 🤖 **AI** for each scenario. **Playground 3 — a tiny model**: set attendance, study hours, marks and participation (Yes/No), then test **Student 4 / Student 5** to predict Above/Below 75%.

💡 **Say this:** *Real AI projects follow steps: first define the problem, gather and clean data, build and train the model, test and improve it, deploy it, then keep monitoring it. And remember — a fixed-rule machine like a timed car wash is just automation; it's only AI if it learns and adapts.*

Key words lifecycle · the 6 stages · automation vs AI · accuracy · refinement · deployment · monitoring.

🧑 **Ask the class:** What is the very first stage? · Is a traffic light that changes every 30 seconds AI or automation? · Why must we keep monitoring after deployment?

⚠️ **Watch out:** Not every machine is AI — automation follows fixed rules and never learns from data.



15. AI Around Us (Applications)

Class 7 · Ch 2

Class 8 · Ch 2

Big idea

Where AI helps in real life — **healthcare, environment, transport, education, agriculture, smart homes.**

What students do Explore AI around us: tap a sector to see real ways AI helps (with Indian examples). **Match the AI to its field:** choose the correct field for each application. ⚙️

Automation or 🤖 AI?: decide which one each scenario is; ↺ **Play again.**

💡 **Say this:** *AI is already all around us — spotting diseases in X-rays, watching for plastic in the oceans, timing traffic lights, giving instant quiz feedback, advising farmers, and running smart homes. Explore each area, then test yourself by matching real examples to the right field.*

Key words

domain / field · application · healthcare / environment / transport / education / agriculture AI.



Ask the class: Name one way AI helps farmers. · Which field is "analysing MRI scans"?
· Is soil-moisture-based irrigation AI or automation?



Watch out: AI usually *assists* experts, it doesn't fully replace them — e.g. AI helped steady the surgeon's hands; it did not do the surgery alone.



16. Ethics & Responsible AI

Class 8 · Ch 4

Class 7 · Ch 4 (digital citizenship)

Big idea

Using AI the right way — protect your **privacy**, spot **misinformation**, and keep **humans accountable**.

What students do **Game 1 — App permissions:** tap **Allow** or **Deny** for each request and learn what an app really needs. **Game 2 — Trust it or Check first:** tap **Trust it** or **Check first** on each message and learn the verify checklist. **Game 3 — Who is accountable:** decide who is responsible when an AI makes a decision (Human-in-the-Loop). **Play again.**

Say this: *Powerful AI needs rules. Protect your privacy — only allow an app the permissions it truly needs, and never share OTPs or passwords. Don't believe everything online — check the source before you share. And remember: a human must always stay responsible for important AI decisions.*

Key words **ethics · privacy · permissions · misinformation · accountability · Human-in-the-Loop.**

Ask the class: Should a torch app get access to your contacts? · What should you do before forwarding a shocking message? · Who is responsible if an AI makes a mistake?

Watch out: "The computer decided" is never an excuse — the people and organisations who build and use AI stay responsible.

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Online: nlp-lab.pages.dev/class6 · [/class7](https://nlp-lab.pages.dev/class7/) · [/class8](https://nlp-lab.pages.dev/class8/) · Offline: download the ZIP from the home page and double-click **index.html**.