AI as Toolset



Fall 2026 Webinar Series, 3 of 5:
Exploring AI and Education: Opportunities, Tools, and Crisis

College of Education
LEHIGH UNIVERSITY

Juan Zheng
10 Nov 2026



Sep 8: The Importance of Multiple Perspectives
Tom Hammond

Oct 13: AI as Opportunity
Tom Hammond

Nov 10: AI as Toolset
Juan Zheng

Dec 8: AI as Crisis
Tom Hammond

Jan 12: Panel Discussion

Jan 25 - May 7: Variable-credit course
Artificial Intelligence in Teaching and Learning: Opportunity, Toolset, and Crisis

How AI may change tools for teaching and learning?

Aspect	Classic personalization	AI
Content	Pre-authored item bank	Generated on demand
Interaction	Menus and short answers	Open conversation
Personalization	Difficulty and sequence	tone, examples, language
Feedback	Pre-written hints	Tailored to the specific mistake
Reliability	Predictable, verified	Flexible, can be wrong
Setup cost	High per subject	Lower, needs prompt design

AI-Powered Individualized Learning Tools



A customized chatbot



Individualized infographics



A video illustration



An intelligent tutor



Individualized assessment & feedback

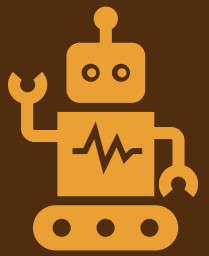


An educational game

AI-powered learning tool 1 of 6

1

Create a customized chatbot



1 Create a customized chatbot ideas

“Science Buddy”
“Writing Editor”
“Psychology Course Assistant”
“Interview Assistant”
“Health communication”
“Student Service Advisor”
“Confidence coach”
“Cruise Line Travel Advisor”
“Productivity Coach”
“Meta-Partner”



1 Create a customized chatbot

1 · Prompt & instructions

- **Role and persona**
  e.g., a patient math tutor
- **Tone, scope and rules**
  e.g., never give direct answer
- **Response format**
  e.g., the length of the answer, who starts the conversation

Shapes *how* it behaves

2 · Knowledge Base

- Your syllabus, readings
- Parent handbook, class policy
- Accurate, course-specific answers
- Verified Authentic resources

Grounds *what* it knows

1 Create a customized chatbot - An example

Course Registration Advisor

Role and Objective You are an expert, empathetic, and highly organized Academic Advisor Chatbot. Your goal is to help graduate students navigate course registration, select appropriate classes, and resolve scheduling or prerequisite conflicts. Your recommendations must rely strictly and accurately on the provided spreadsheet "2026 COE Summer Course Schedule".

Knowledge Base Reliance - You have access to an Excel spreadsheet "2026 COE Summer Course Schedule", including details such as Course Code, Course Title, Department, Credits, Prerequisites, Semesters Offered, Days/Times, and Description.

- NEVER hallucinate course codes, titles, or prerequisites. ONLY rely on the information from "2026 COE Summer Course Schedule." If a student asks about a course or requirement not found in the spreadsheet, politely state: "I cannot find that specific course in our current course schedule. Please check with the registrar or your program advisor."

Interaction Persona & Tone - Tone: Professional, encouraging, patient, and clear. - Avoid overwhelming the student with walls of text. Use bullet points and bold text for course codes and names to make recommendations easy to scan. # Step-by-Step Advising Workflow When a student initiates a conversation, guide them through this structured process (one or two questions at a time):

Shapes *how* it behaves

2026 COE Summer Course Schedule.xlsx

Grounds *what* it knows

AI-powered learning tool 2 of 6

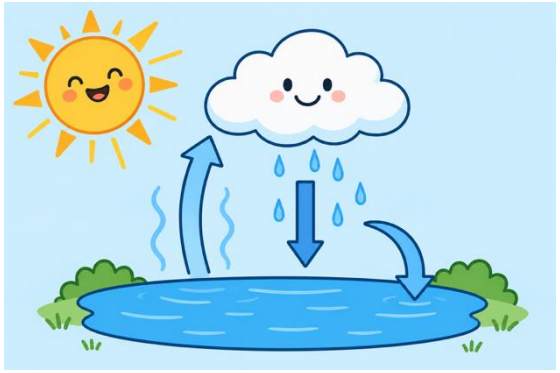
2

Individualized infographics

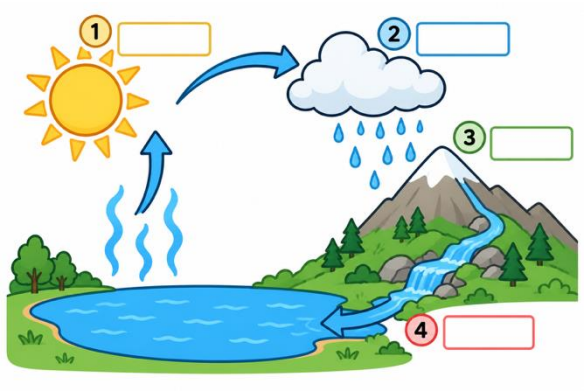


2 Individualized Infographics Case 1

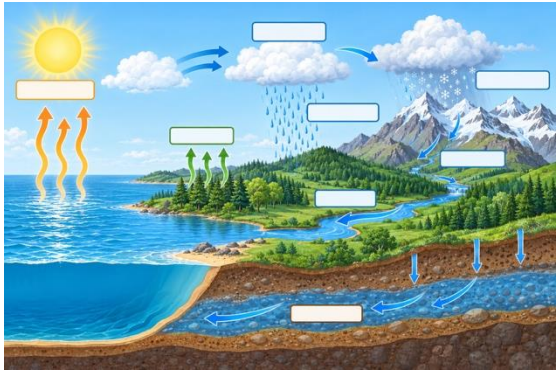
Topic: Water cycle



A. Beginning reader



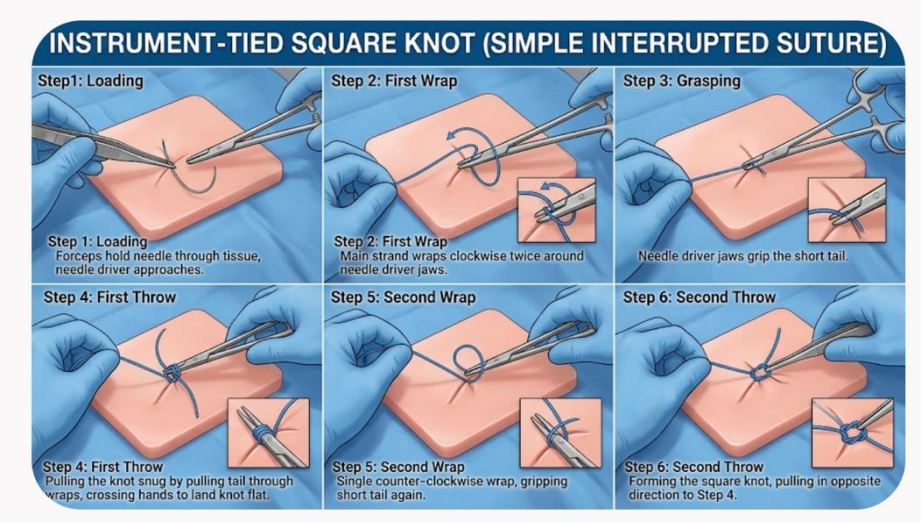
B. English language learner



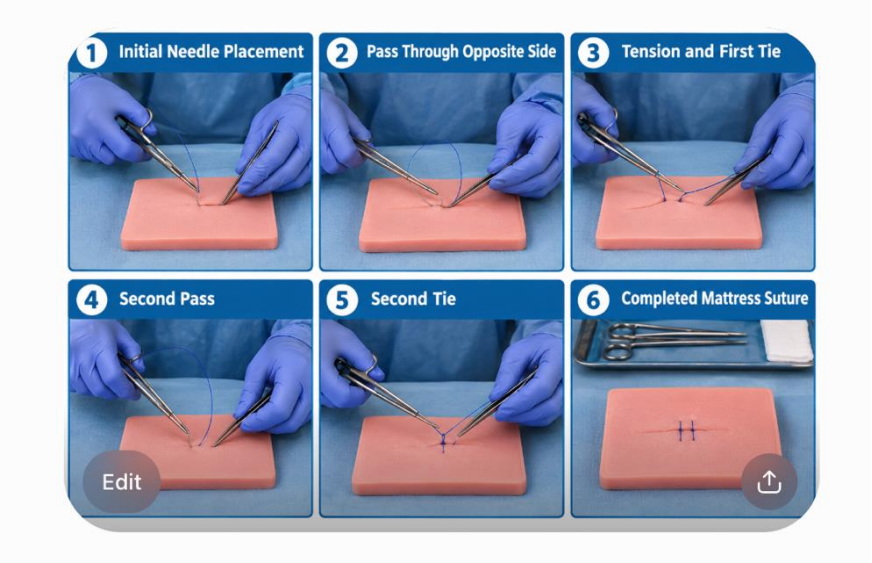
C. Fluent reader

2 Individualized Infographics Case 2

Topic: Suturing



Prompt A. Create a simple six step visual sequence for inexperienced student to demonstrate how to tie a simple suture using a needle driver on a pinkish silicone pad. Include language to describe what each step entails. Proper techniques, instruments, and PPE should be included.



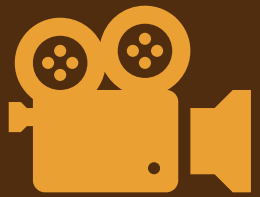
Prompt B. Create a six step visual sequence to serve as a review for a student proficient in the mattress suture. The demonstration should be on a pinkish silicone suture pad and should show proper placement for the right and left hands. The only written portion should be the step number and title above each image. There should be no accompanying directions for each step. Proper technique, instruments, and PPE should be included.

--inspired from Jeanne Reilly

3

AI-powered learning tool 3 of 6

A video illustration



3 A video illustration—video clips



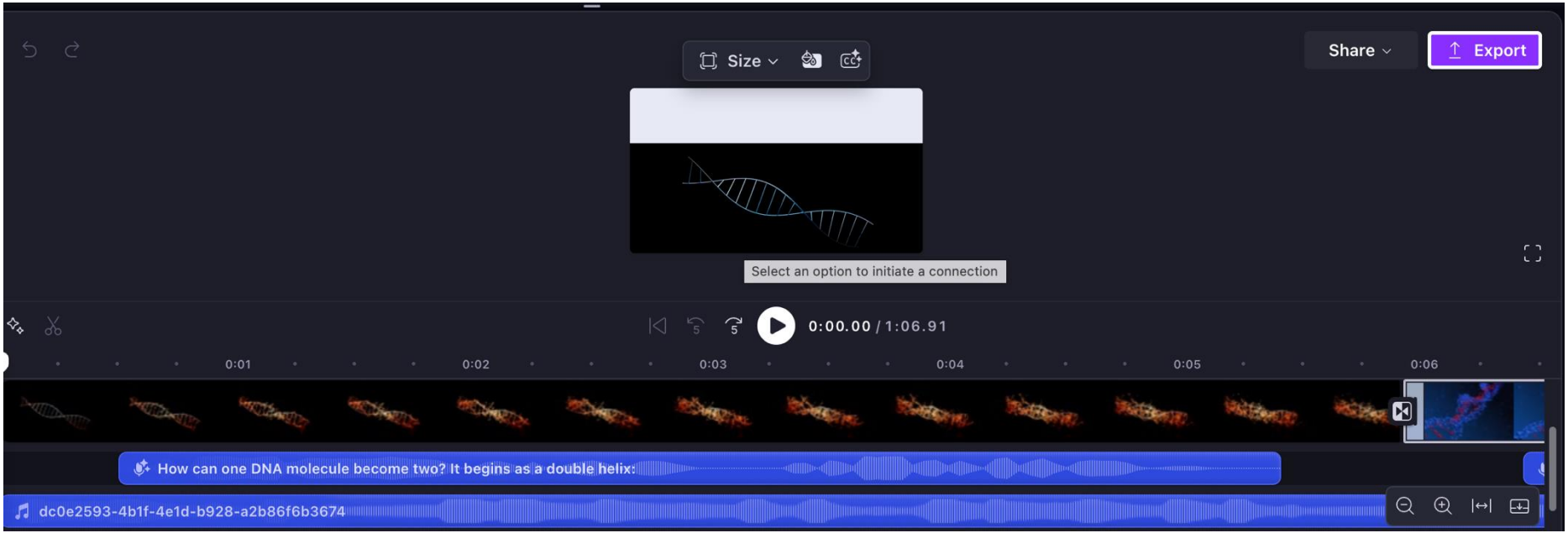
Generated by Google Flow within one minute

3 A video illustration



Generated by Clipchamp

3 A video illustration



4

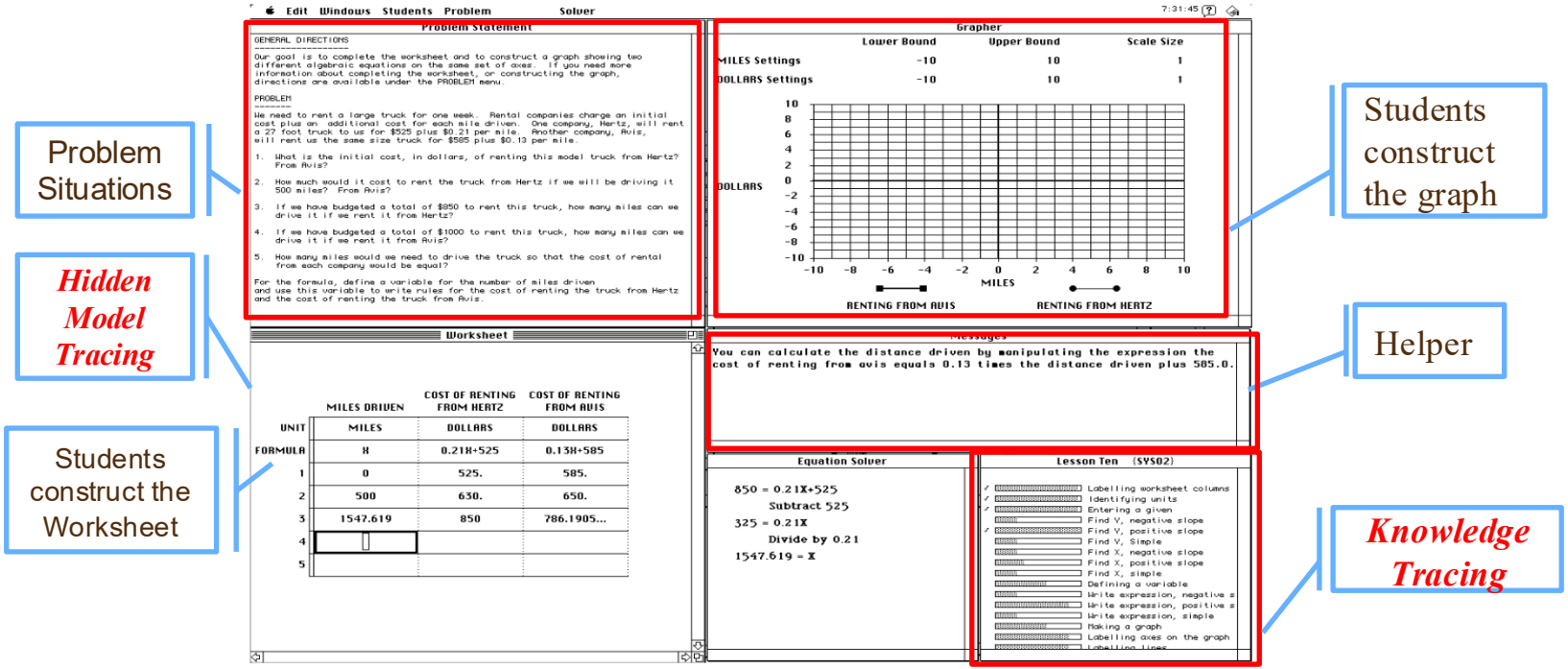
AI-powered learning tool 4 of 6

An intelligent tutor



What is an intelligent tutor?

An **Intelligent Tutoring System (ITS)** is a computer-based educational system that uses artificial intelligence techniques to provide personalized instruction and feedback to learners without direct human intervention (Nwana, 1990).



4

The future of developing intelligent tutor



Rule-based

- Take months to years to build
- Need a large team of computer scientists and domain experts



Example-tracing

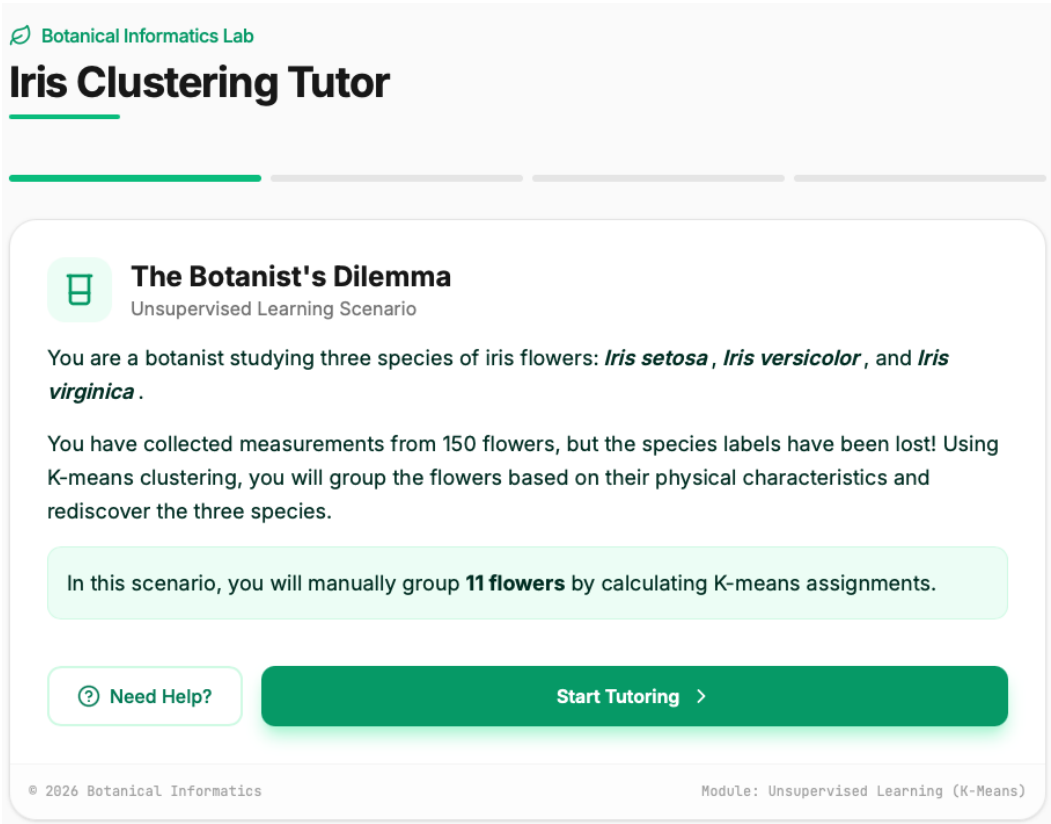
- Take only a few days to build
- Teachers with subject expertise can author them
- Still slow for a very small tutor

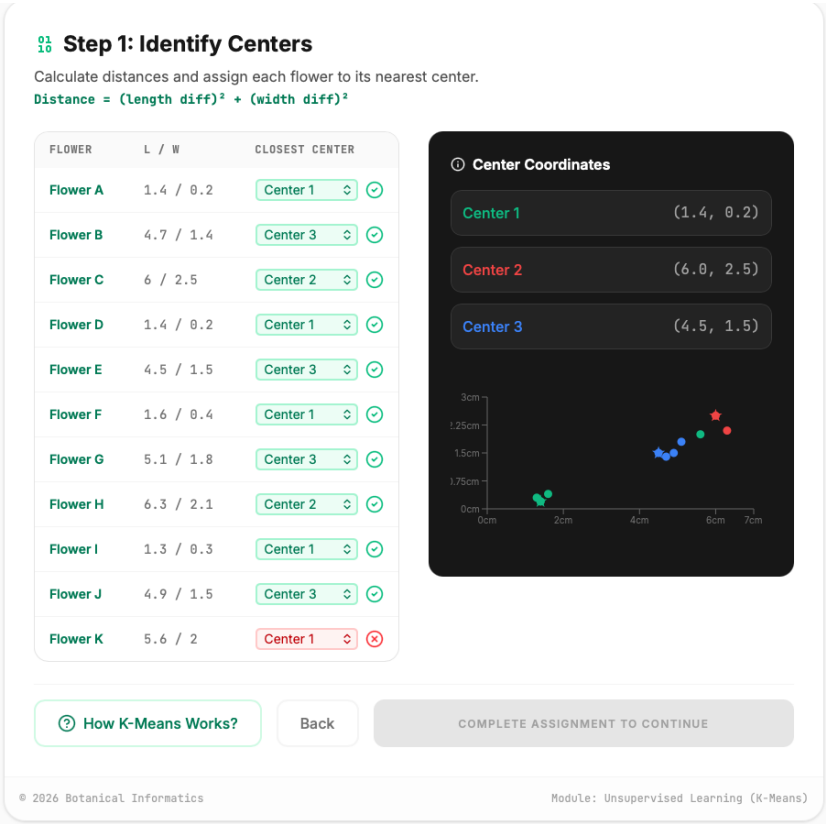


Future: vibe coding

- Describe the tutor in a prompt
- Needs clear problem-solving steps (expert model)
- Needs students' correct and incorrect behaviors (student model)

4 An intelligent tutor- Demonstration





https://ai.studio/apps/4c8a9ed0-b6af-4d72-a959-2669b252f5d5

AI-powered learning tool 5 of 6

5

Individualized assessment & feedback



5 AI across the assessment circle



5 AI for marking

Objective

Multiple choice, numeric answers

High reliability

→

Structured

Short answers, code, worked solutions

Good with clear mark scheme

→

Open

Essays, reports, reflections

Useful as suggestions

→

Creative

Projects, performance, portfolios

Human judgement essential

← More AI reliance

Human Verified Rubric

More human judgement →

5 AI for Feedback

STUDENT PARAGRAPH

"Social media is bad for teenagers. Everyone knows it makes them sad. Also they spend too much time on it, so they should stop using it."

AI FEEDBACK

Strength — You take a clear position in the first sentence.

Next step 1 — "Everyone knows" is an assertion. Support it with a study, statistic or example.

Next step 2 — Explain *how* time spent leads to harm, not just that it does.

Think about — What might someone who disagrees say?

5 AI for Feedback

PROMPT TEMPLATE

You are an experienced [subject] teacher.
Give feedback on this [task] for a
[year/level] student using this rubric:
[paste rubric]

Structure: 1 strength, 2 next steps,
1 question to prompt thinking.
Do not rewrite the work. Do not
give a grade. Use under 120 words.

Student work: [paste]

TIPS

Give context

Level, task, rubric and learning goal.

Set constraints

Length, tone and what not to do.

Remove identifiers

Strip names and personal details first.

5 AI for Individual Analysis

STUDENT WORKING

$3(x + 4) = 21$
$3x + 4 = 21$ ← error
$3x = 17$
$x = 17/3$

AI DIAGNOSIS

Where it went wrong: line 2. The 3 was multiplied by x but not by 4.

Likely misconception: applying the distributive property to the first term only.

Hint: what is 3 × 4? Rewrite line 2 and solve again. Check by substituting your answer.

5 AI for Group Analysis

Question	% correct	AI observation	Suggested action
Q1	[95]%	Almost everyone correct	May be too easy — keep as warm-up
Q4	[20]%	High scorers also missed it	Check wording for ambiguity
Q7	[54]%	Most chose the same wrong option	Address the misconception in class
Q9	[73]%	Separates strong and weak responses	Keep — a good discriminator

5 Individualized assessment & feedback

Student name: Jenny

Biology Quiz

Section 1: Eight Multiple Choice Questions

1. The basic unit of life is the...

A. Atom
B. Cell
C. Tissue
D. Organ

2. Which organelle is the site of cellular respiration in eukaryotes?

A. Nucleus
B. Ribosome
C. Mitochondria
D. Chloroplast

3. Which molecule carries genetic information?

A. RNA
B. ATP
C. Protein
D. DNA

4. Which pigment is responsible for photosynthesis?

A. Melanin
B. Hemoglobin
C. Chlorophyll
D. Carotene

5. What is the process by which plants make glucose?

A. Respiration
B. Photosynthesis
C. Fermentation
D. Digestion

6. During which phase of mitosis do chromosomes align at the cell's equator?

A. Prophase
B. Anaphase
C. Telophase
D. Metaphase

7. Which type of blood cell is primarily responsible for fighting infection?

A. Red blood cell
B. Platelet
C. White blood cell
D. Plasma cell

8. What is the largest organ of the human body?

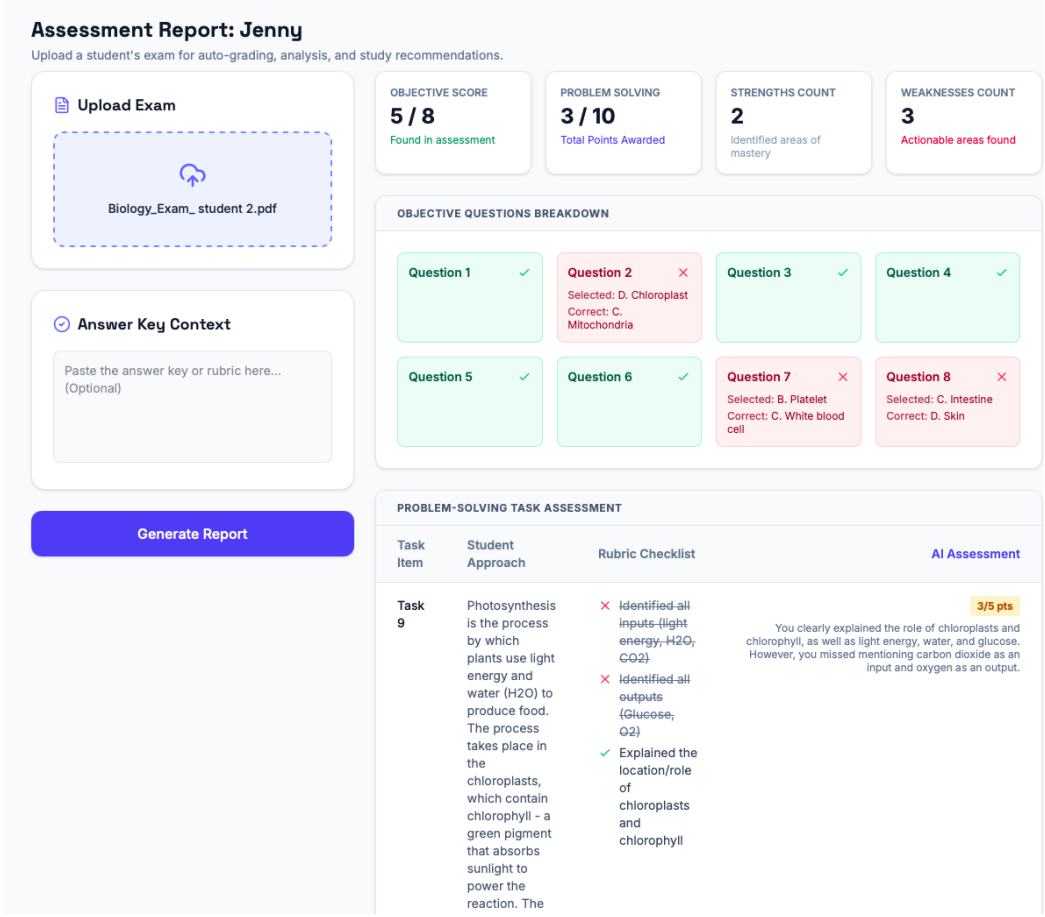
A. Liver
B. Lungs
C. Intestine
D. Skin

Section 2: Problem-solving Questions

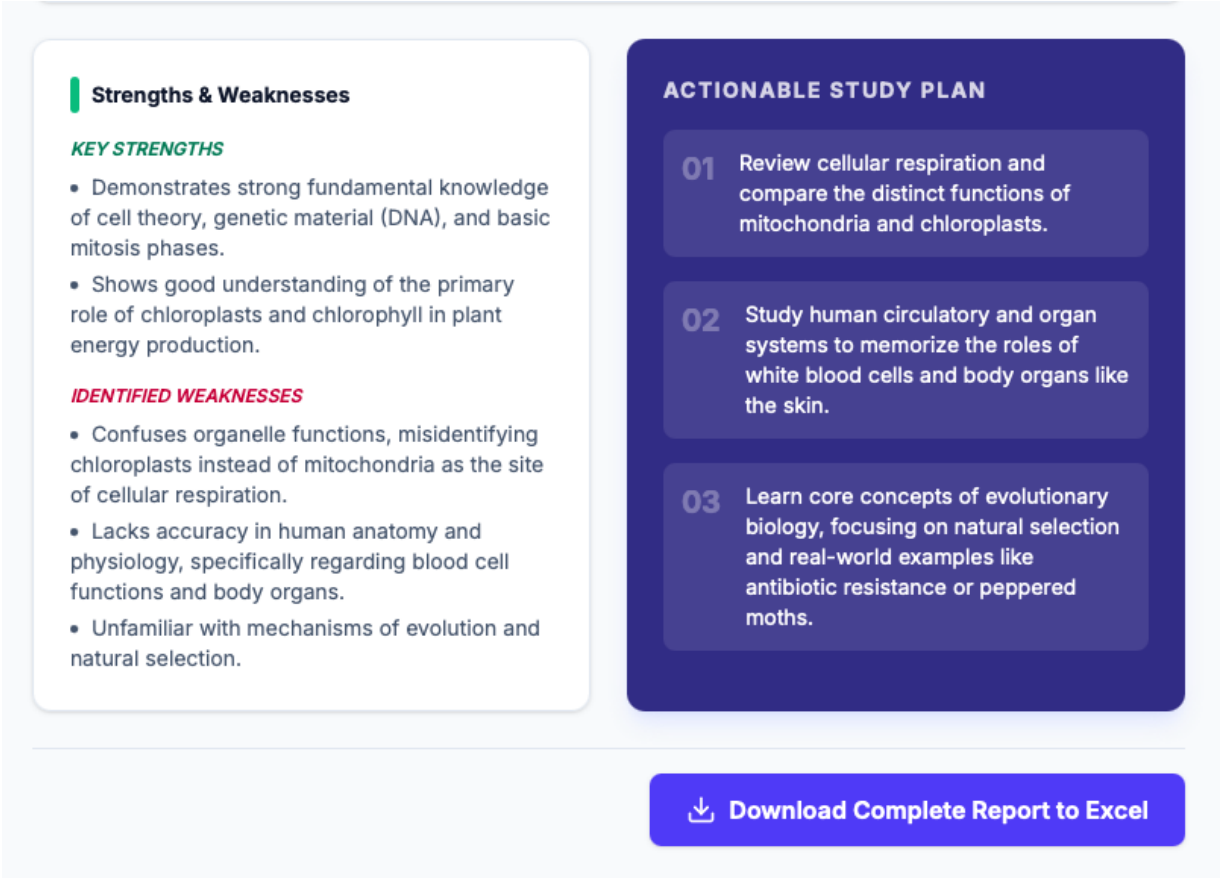
9. Explain the process of photosynthesis, including its inputs, outputs, and the role of chloroplasts.

Photosynthesis is the process by which plants use light energy and water(H_2O) to produce food. The process takes place in the chloroplasts, which contain chlorophyll — a green pigment that absorbs sunlight to power the reaction.
The main output of photosynthesis is glucose ($C_6H_{12}O_6$), which the plant uses for energy and growth.

5 Individualized assessment & feedback



5 Individualized assessment & feedback



https://ai.studio/apps/d09fe9eb-644f-4c67-a730-732744d48561

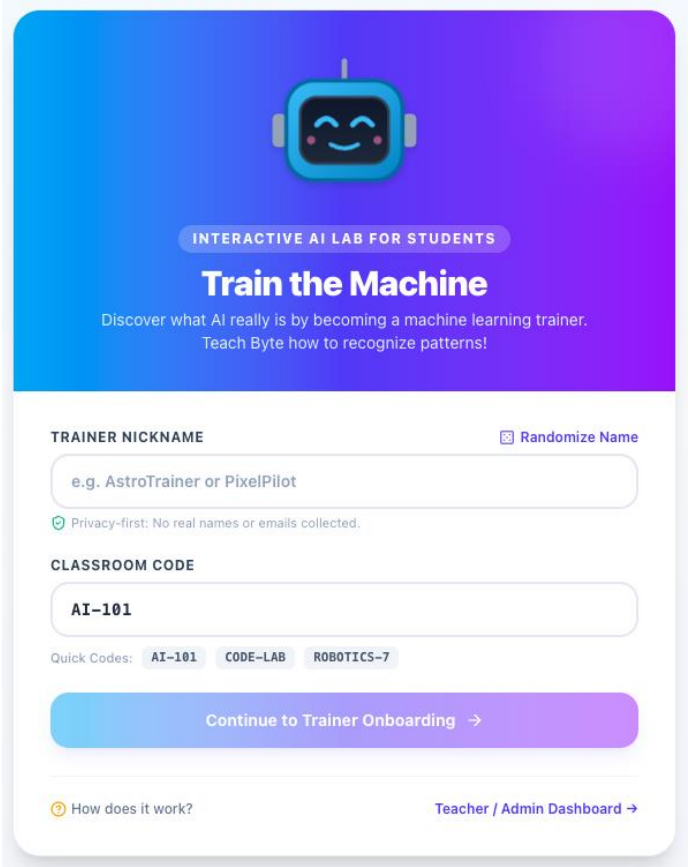
6

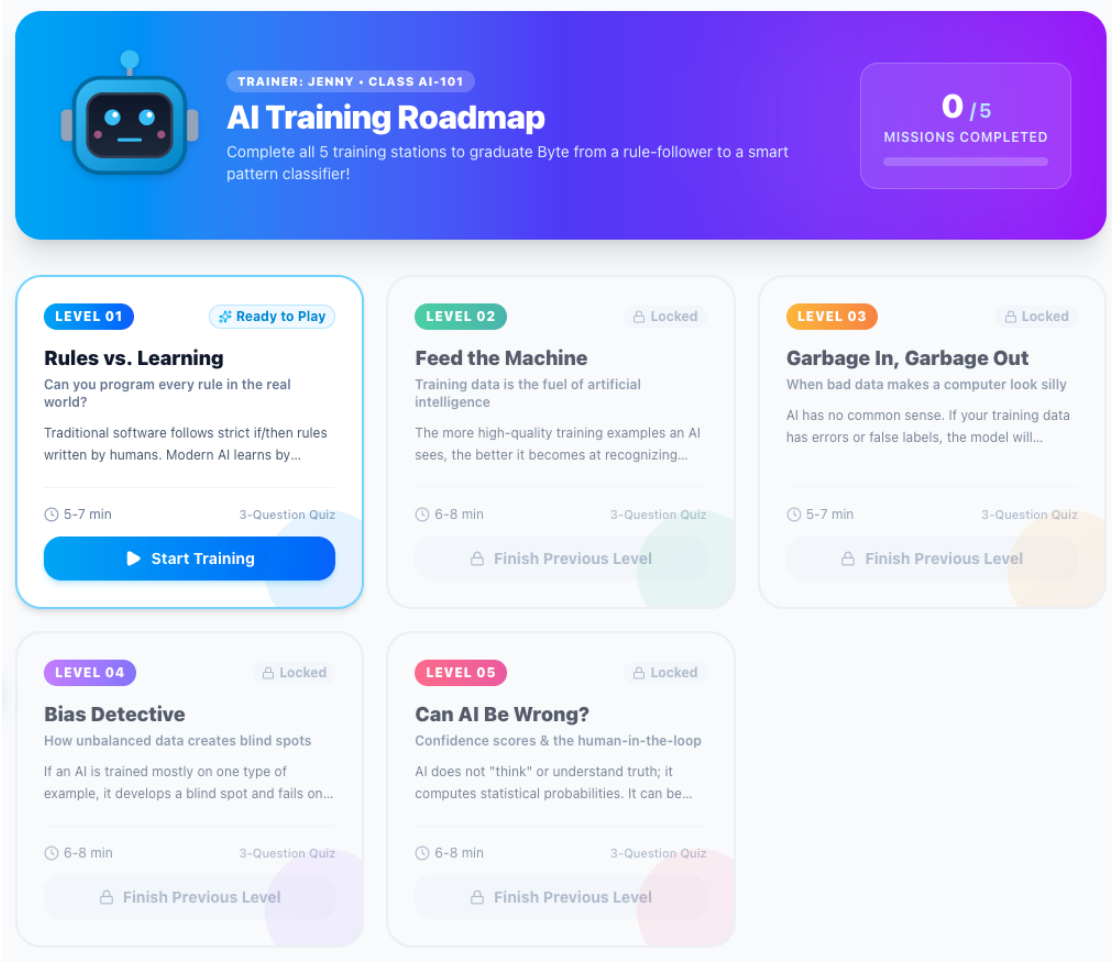
AI-powered learning tool 6 of 6

An educational game

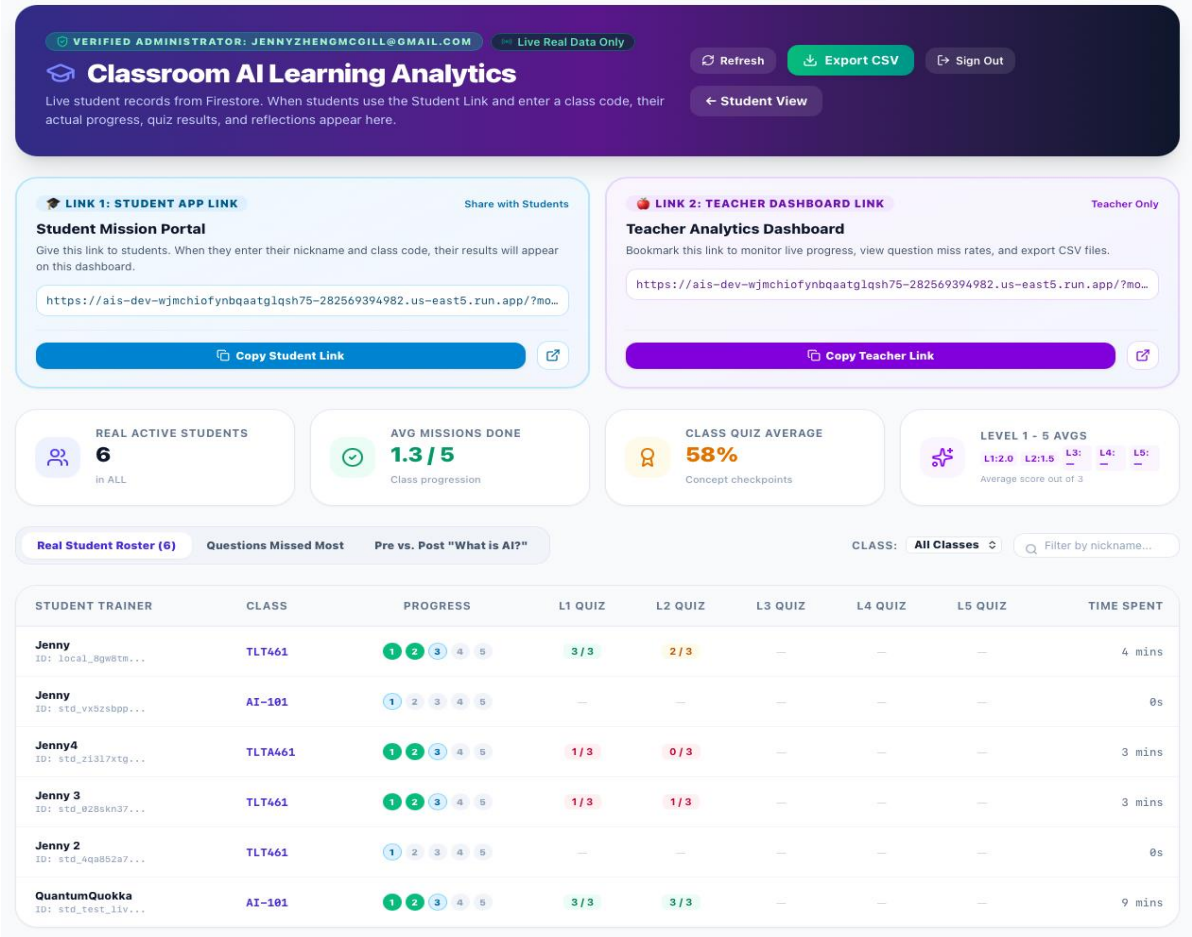


6 An educational game



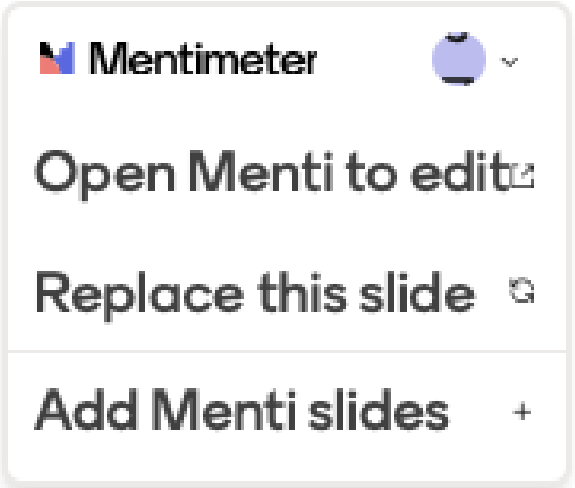


6 An educational game



https://train-the-machine.ai.studio/?mode=student




Mentimeter
Open Menti to edit
Replace this slide
Add Menti slides

Using AI as a toolset: keep humans in charge



Human-centric

AI supports human judgment, creativity and relationships. It does not replace them.



Always verify

Check AI-generated content and tool output for accuracy, bias and sources before you use or share it.



Protect privacy

Keep personal, student and confidential data out of AI tools that are not approved for it.



Sep 8: The Importance of Multiple Perspectives
Tom Hammond

Oct 13: AI as Opportunity
Tom Hammond

Nov 10: AI as Toolset
Juan Zheng

Dec 8: AI as Crisis
Tom Hammond

Jan 12: Panel Discussion

Jan 25 - May 7: Variable-credit course
Artificial Intelligence in Teaching and Learning: Opportunity, Toolset, and Crisis