



CAMBRIDGE

# Transforming teaching practices with AI

## How AI can support development of future skills

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8-9 December 2025

# Housekeeping

Health and safety

Fire safety

Washrooms



# Agenda

- AI competencies for teachers & evaluation of AI tools
- How AI can assist teachers
- Use AI to support teaching, learning and assessment
- Summary

# AI competencies for teachers & evaluation of AI tools

# AI competencies for teachers – key principles

**1****Inclusive &  
human-centred**

Human & social  
values, inclusivity  
and human-  
centred impact

**2****Teachers'  
rights**

Protect teachers'  
rights and  
iteratively define  
teachers' roles

**3****Trustworthy &  
sustainable**

Trustworthy for  
educational  
purposes and  
environmentally  
friendly

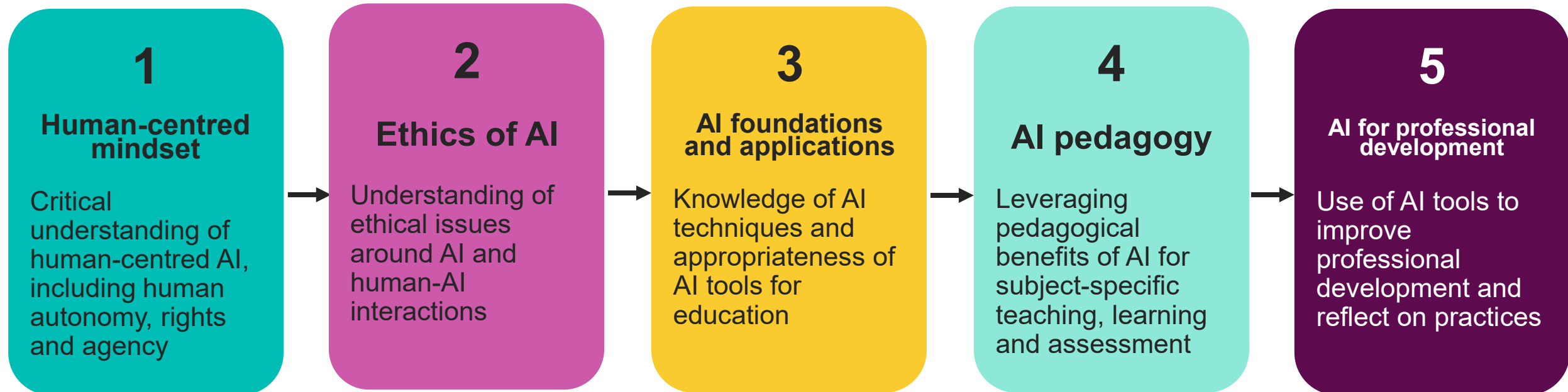
**4****Applicability &  
adaptability**

Applicability for all  
teachers &  
contexts and  
adaptability to  
digital evolution

**5****Lifelong  
learning**

Training & support  
and lifelong  
professional  
learning

# AI competencies for teachers – key competencies



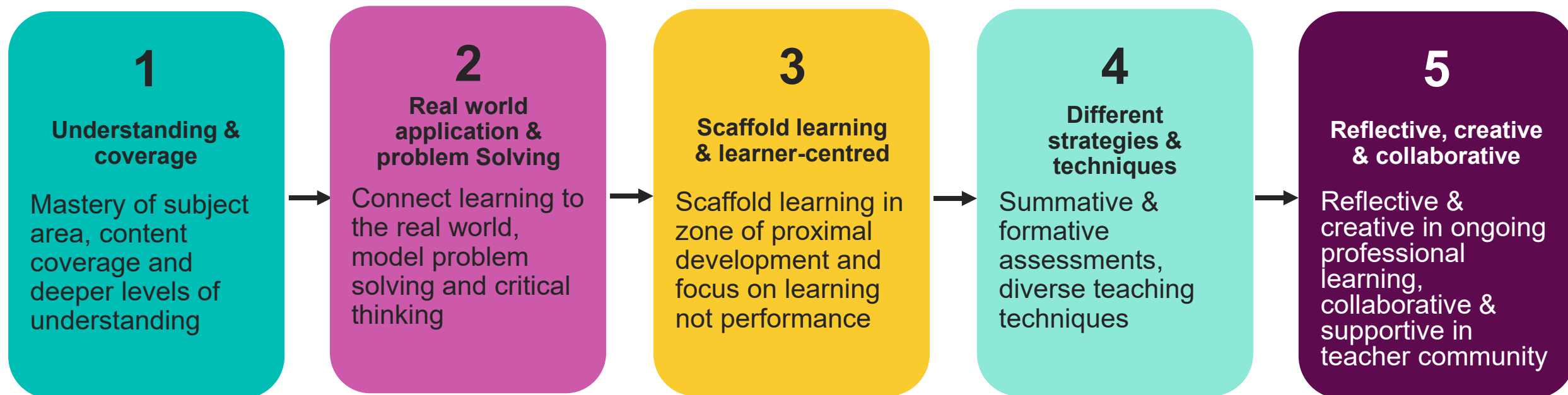
# Self-assessment

- Assessing where you are in terms of AI competencies
  - Human-centred mindset
  - Ethics of AI
  - AI foundations & application
  - AI Pedagogy
  - AI for professional development
- Are you **acquiring** new knowledge & skills, **deepening** your understanding, or **creating and leading** AI practices in education?



Ready  
for the  
world

# Cambridge approaches to teaching





## Discussion

- Reflecting on your own use of AI and evaluating AI tools are a good way to develop your AI competencies and pedagogical practices
- With the key principles in the competency framework and Cambridge approaches to teaching in mind, discuss in groups:
  - What key things do we need to consider when evaluating an AI tool?
  - What would be some of the specific criteria for a good AI tool?



**Ready** for  
the **world**

# Recap for discussion on how to evaluate AI tools

- Key principles:
  - Inclusive & human-centred
  - Protect teachers' rights
  - Trustworthy & sustainable
  - Applicability & adaptability
  - Support life-long learning
- Cambridge approaches to teaching:
  - Understanding & coverage
  - Real world application & problem solving
  - Scaffold learning & learner-centred
  - Different strategies & techniques
  - Reflective, creative & collaborative



# Framework for evaluation of AI tools

## Functionality

- What functionalities does this tool have?
- How useful are these functionalities for supporting teaching and learning?
- Are there any key functionalities missing?

## User experience

- How easy is it to navigate and use this tool?
- Does the interface look visually pleasing?
- What is the level of demand on the users' digital skills?

## Pedagogical alignment

- How well does this tool align with Cambridge teaching approaches?
- Does this tool help learners develop key competencies?
- Does this tool encourage critical and ethical use of AI?

## Accessibility & security

- How accessible is this tool for schools and learners in terms of costs and hardware/software requirements?
- Are there any accessibility features for learners with SEND?
- Can this tool ensure data security and confidentiality?

## Your own reflections

- What else do you think are important?
- What would be helpful for your specific subject(s) and grade(s)?
- Does the tool support your professional practices and development?

Underlying principles & values

Human-centred

Ethical & sustainable

Applicable & adaptable

Lifelong learning & development

Cambridge approaches to teaching

# How AI can assist teachers

# For learners to thrive we need effective learning outcomes...

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**For effective learning outcome teachers should:**

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**1. Set clear, specific learning goals**

Define what students should know, understand, and be able to do by the end of a lesson.

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**2. Continuously check for understanding**

Use formative assessments to gauge student learning in real-time and identify misconceptions.

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**3. Differentiate and personalise instruction**

Tailor content, process, and product to meet the varying needs, interests, and readiness levels of students.

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**4. Provide timely, actionable feedback**

Give specific feedback that guides students on how to improve, focusing on the task, not the person.

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**5. Create engaging and relevant learning experiences**

Design activities that connect to the real world and foster critical thinking, collaboration, and creativity.

Are we able to do all these?  
Answer is, not ALWAYS? Because...

Too much admin  
work.

Lots happening.

Why should we  
do this duty?

Could be  
excused this  
time?

Could we spread  
the activities  
please.

Why do we have  
to conduct too  
many tests?

Stress,  
overwhelmed,  
burnt out...

Homework,  
marking,  
feedback

# Not much time in the day!

Sun 15 Jun

\*\*\*  
edweek.org

EdW

## How Teachers Spend Their Time: A Breakdown



Patrick Jiner, a 7th grade math teacher at Lake Middle School in Denver, talks through a lesson earlier this month.  
— Rachel Woolf for Education Week

◀

🔖

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A new, [nationally representative survey](#) of teachers found that a typical teacher works a median of 54 hours per week. But just 46 percent of their time in the school building is spent teaching. The survey, which was administered by the EdWeek Research Center and commissioned by the Winston School of Education and Social Policy at Merrimack College, offers a closer look at how all those hours are spent.

EdW

## How Teachers Spend Their Time: A Breakdown

Here’s a breakdown of how much time (the median number of hours) teachers report spending on specific tasks throughout their workweeks, according to the survey:

- 5 hours grading and providing feedback of student work
- 5 hours planning or preparing
- 3 hours doing general administrative work
- 3 hours on non-teaching student interaction
- 2 hours collaborating/planning with colleagues
- 2 hours communicating with parents or guardians
- 2 hours doing other work activities
- 1 hour doing school committee work
- 1 hour doing professional-development activities
- 1 hour on non-curricular activities (such as sports, clubs, after-school events)

# Teaching and Learning International Survey (OECD, 2025)

- Nine in ten teachers are satisfied with their jobs, yet one in five report a lot of stress.
- A third of teachers now use AI for their work. Of those, one in five use it to assess or mark student work.
- The share of class time spent on discipline has increased in almost all OECD systems, from 13% in 2018 to 16% in 2024 on average.



# Are we ready for an AI assistant?

Scared

Threatened

Worried

Challenged

Excited



A word cloud of various emotions and attitudes. The words are arranged in a roughly circular shape, with some words being larger and more prominent than others. The colors of the words vary, including shades of blue, green, yellow, orange, and red. The words include: Intrigued, Open, Uncertain, Dynamic, Ambitious, Potential, Inspired, Concerned, Challenging, Exciting, Passionate, Diverse, Community, Innovative, Opportunity, Vital, Collaborative, Inclusive, Exciting, Determined, Positive, Hopeful, Optimistic, Challenging, Essential, Scared, Worried, Important, Potential, Community, Opportunity, Anxious, Nervous, Challenged, Collaborative, Vibrant, Changing, Accessible, Relevant.

# 6 areas that AI can assist teachers



## 1. Enhancing lesson planning with AI-powered tools



*Outcome:* teachers will integrate AI-driven lesson planning tools to optimise curriculum alignment and engagement.



## 2. Leveraging AI for personalised learning & adaptive teaching



*Outcome:* teachers will use AI-based platforms to offer tailored learning experiences for diverse student abilities.



## 3. AI-assisted simulations & virtual labs for concept mastery



*Outcome:* teachers will incorporate AI-driven simulations to enhance practical understanding of scientific phenomena.

# 6 areas that AI can assist teachers

## 4. Automated assessment & feedback for efficient student evaluation

*Outcome:* Teachers will implement AI-driven assessment tools to reduce grading workload and offer instant feedback.

## 5. AI-powered data analysis to identify learning trends

*Outcome:* Teachers will use AI analytics to track student performance trends and inform data-driven instruction.

## 6. Routine tasks and professional development

*Outcome:* Handling routine tasks like attendance, communication with parents, scheduling, documentation, and recommending new teaching strategies, resources, and research updates aligned with the teacher's subject and goals.

# Use AI to support teaching, learning and assessment

# Lesson planning

## Tools:

Chat GPT - Generate lesson plans, analogies, and explanations

Grok - Generate lesson plans, analogies, and explanations

Copilot - Generate lesson plans, analogies, and explanations

Curipod - Create interactive slide decks with AI

Eduaide.AI - Generate standards-aligned activities and scaffolds

Wakelet – Curates videos, links, pictures, tweets, Instagram posts

# Let us do it together – in 5 minutes

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**Task: To create a 45-minute lesson plan on Newton's Second law of motion - Cambridge IGCSE Physics 0625**

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**Suggest:**

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5 learning outcomes

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3 starter activities

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Recommend 3 demos

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3 simulations

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3 differentiated tasks

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5 check for understanding questions

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2 extension activities/questions for homework

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# Supporting the EAL learner

## 1. Differentiation and scaffolding of materials

AI can instantly adapt existing teaching materials to make them more accessible for EAL learners at different proficiency levels.

**Simplify texts:** paste a complex sentence into an AI tool and ask it to rewrite; for example 'rewrite newton's second law in simple terms with an illustration'

**Create sentence starters & frames:** generate sentence frames to support writing and speaking tasks.

**Develop visual aids:** ask AI to "suggest images or diagrams to explain a scientific concept" to support comprehension.

# Supporting the EAL learner



## 2. Vocabulary building and reinforcement



AI can help pre-teach and reinforce the key vocabulary needed to understand a lesson.



**Generate vocabulary lists:** Provide AI with a topic (e.g., "list the key terms used in Newton's 2<sup>nd</sup> Law") and ask it to "create a list of 10 essential vocabulary words with simple, student-friendly definitions."



**Create bilingual glossaries:** Ask the AI to translate the vocabulary list and definitions into a student's home language (e.g., "Now provide the translation for each word and definition").



**Make practice activities:** Prompt AI to "create a fill-in-the-blank worksheet using these 10 vocabulary words."



# Supporting the EAL learner – supporting grammar learning



## 3. Writing and Grammar Support



AI can act as a non-judgmental writing assistant, helping students build confidence and accuracy.



**Structured Writing Prompts:** Ask AI to "provide a step-by-step writing prompt for describing an animal" to break down a daunting task.

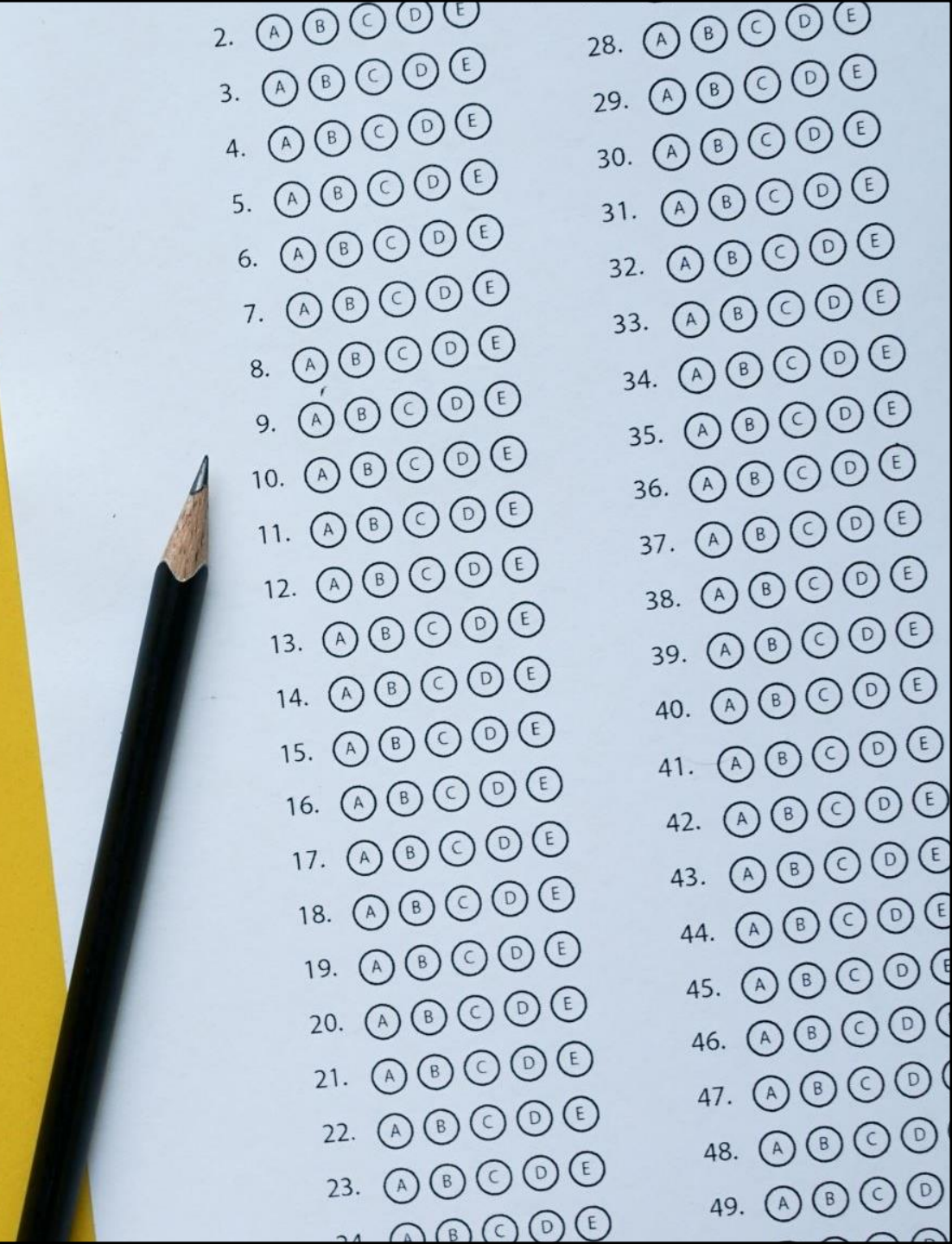


**Gentle grammar feedback:** students can input their own sentences and ask the AI to "check this for grammar and spelling mistakes and explain the corrections." This provides immediate, private feedback.



**Model texts:** generate examples of different text types (e.G., "Show me a short, simple book report") that students can use as a model for their own work.

# Post lesson - AI worksheet for extension and application



# Inquiry questions

Write 5 Inquiry  
questions on the ramp  
experiment.

# Here is what copilot gave me

- 1. How does changing the mass of an object affect the amount of force needed to move it?
- *Encourages students to explore Newton's Second Law by adjusting mass and observing the resulting motion.*
- 2. What happens to the motion of an object when balanced and unbalanced forces are applied?
- *Prompts investigation into the difference between static and dynamic equilibrium.*
- 3. How does friction influence the motion of an object on different surfaces?
- *Leads students to test various surface types and analyse how friction affects acceleration and stopping distance.*
- 4. Can you predict the motion of an object if you know the size and direction of the forces acting on it?
- *Challenges students to apply vector understanding and predict outcomes before testing in the sim.*
- 5. What patterns do you notice when you apply the same force to objects of different masses?
- *Encourages pattern recognition and deeper understanding of force-mass-acceleration relationships.*

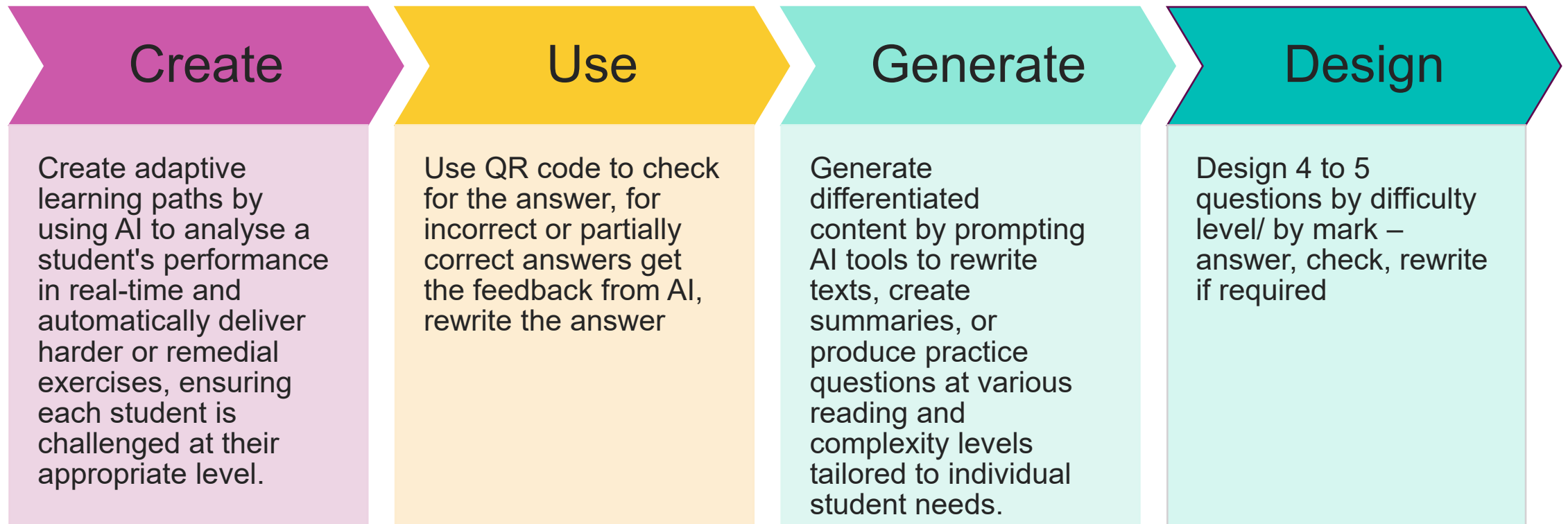


# Guided questions

- 5 Guided Questions:
- Observation: When you increased the force on the car (while keeping mass the same), what happened to its acceleration? Why?  
(Expected: Greater force = faster acceleration, since  $F = ma$ .)
- Prediction: If you doubled the force, what would happen to the car's acceleration? What if you tripled it?  
(Expected: Acceleration increases proportionally with force.)
- Analysis: When you added mass to the car but pushed with the same force, why did it accelerate more slowly?  
(Expected: More mass resists acceleration for the same force.)
- Real-World connection: How does Newton's Second Law explain why it's harder to push a full shopping cart than an empty one?  
(Expected: More mass requires more force for the same acceleration.)
- Critical thinking: If a rocket in space (no friction) fires its engines with constant force but burns fuel (losing mass), what happens to its acceleration over time?  
(Expected: Acceleration increases as mass decreases.)



# AI in personalised learning



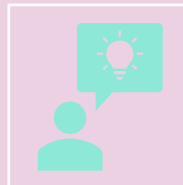
# AI in personalised learning



**Offer instant, individualised feedback** - AI can provide specific hints and explanations on student work, from math problems to short-answer questions, as they are working.



**Power interest-based learning** - AI can generate activities, assignments and self-check tests on areas of interest as well as concepts that require reviewing/revisiting.



**Support unique expression** - AI for brainstorming ideas, outline essays, or check their work, reducing cognitive load and helping them demonstrate their understanding in their preferred way.

# AI in grading and feedback – example: physics IA

## Summary Table

Criterion	Sub-Criterion	Mark
Research Design	Research Question	5/6
	Considerations	5/6
	Description of Methods	4/6
Data Analysis	Raw Data	4/6
	Uncertainty	4/6
	Data Processing	5/6
Conclusion	Conclusion	5/6
	Context	5/6
Evaluation	Limitations	5/6
	Suggestions	5/6



# AI in grading and feedback – example: physics EE

## Criterion E: Engagement (6 marks)

- **Process:** Reflections on pre-trials (e.g., removing sound as a variable, adjusting temperature range) show engagement.
- **Decision-Making:** Key choices (e.g., using a monocrystalline panel, controlling variables) are documented.
- **Personal Input:** The student’s interest (Climate Science Olympiad) and hypotheses demonstrate personal investment.

**Score: 5/6**

*Rationale:* Deeper reflection on unexpected results (e.g., plateau in light intensity experiment) could enhance engagement.

## Final Grade Calculation

Criterion	Marks
A	6
B	6
C	11
D	4
E	5
Total	32/34

# AI for assessment & feedback

## Automated grading

**Tool: Gradescope** (AI-assisted rubric grading)

- Upload student work, AI groups similar answers.

**Tool: Formative AI** (Instant feedback on quizzes).

## Example: gradescope grading

### Question:

*A 5 kg box is pushed across a frictionless surface with a constant force of 20 N. What is the acceleration of the box?*

### Solution:

Newton's Second Law states:

$$F = ma$$

Given:

- Force ( $F$ ) = 20 N
- Mass ( $m$ ) = 5 kg

Solving for acceleration ( $a$ ):

$$a = \frac{F}{m} = \frac{20 \text{ N}}{5 \text{ kg}} = 4 \text{ m/s}^2$$

## Gradescope Rubric Example

Points	Criteria	Feedback (if missed)
1 pt	Correctly writes Newton's Second Law ( $F = ma$ )	"Did not write the correct equation."
1 pt	Substitutes values correctly (20 N and 5 kg)	"Check your substitution."
1 pt	Solves for acceleration correctly ( $4 \text{ m/s}^2$ )	"Incorrect calculation."
1 pt	Includes proper units in the final answer	"Missing or incorrect units."

## Sample Student Responses & Grading

### Student A (Full Credit: 4/4)

*"Using  $F = ma$ , we have  $20 = 5a$ . Solving gives  $a = 4 \text{ m/s}^2$ ."*

- ✓ Correct equation (1 pt)
- ✓ Correct substitution (1 pt)
- ✓ Correct answer (1 pt)
- ✓ Correct units (1 pt)

### Student B (Partial Credit: 2/4)

*" $F = ma$ , so  $a = F/m = 20/5 = 4$ ."*

- ✓ Correct equation (1 pt)
- ✓ Correct substitution (1 pt)
- ✓ Correct answer (but missing units) (0.5 pt)
- ✗ Missing units (deduct 0.5 pt)

## Personalised feedback

**Tool: Turnitin Feedback Studio** (AI detects plagiarism + suggests improvements).

**Tool: ChatGPT** (Generate feedback drafts).

- *Example:* Paste a student response, prompt:
- "Provide constructive feedback on this explanation of Ohm's Law."

**Activity:** Teachers practice giving AI-generated feedback.

## After the lesson – reflection & follow up



### Why use AI?



AI helps analyse student performance, provide personalised feedback, and extend learning beyond the classroom.



It supports teachers in refining future lessons and addressing knowledge gaps.



It engages students with tailored revision resources for CAMBRIDGE assessments.

# AI for lesson – reflection & follow up



**Gather student feedback tool:** AI-powered survey analysis.



**Action:** use AI to analyse student feedback on the lesson to improve future delivery.



**Example prompt:** “summarize this feedback: 15 students found the simulation helpful, 5 struggled with formula, 10 wanted more real life applications.”



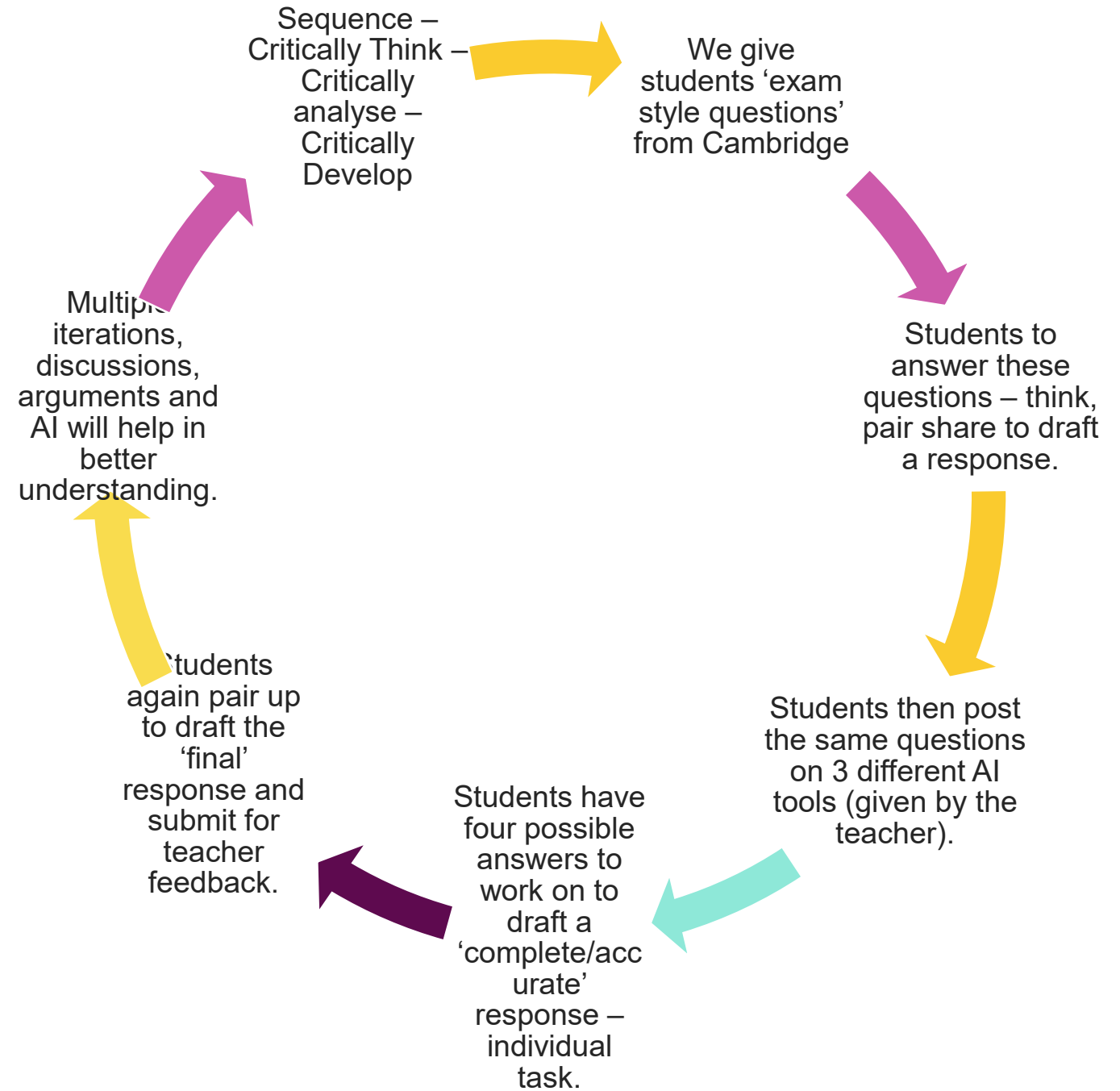
**Output:** AI suggests: “incorporate more formula practice and real-world examples (e.g., Skate park, motion down the ramp, link to momentum) in the next lesson.”



**Why:** enhances teaching effectiveness.



# AI assistant to challenge students at my school – do not copy, but critique



# Summary

# Summary – AI preparing learners to thrive

What teachers should do?	How AI can assist
<b>1. Set clear, specific learning goals</b> define what students should know, understand, and be able to do by the end of a lesson.	<b>AI can help by:</b> generating clear, student-friendly "I can" statements and breaking down broad standards into specific, manageable learning objectives.
<b>2. Continuously check for understanding</b> use formative assessments to gauge student learning in real-time and identify misconceptions.	<b>AI can help by:</b> creating quick quizzes, exit tickets, and polls. It can also analyse student responses to highlight common areas of confusion for the teacher.
<b>3. Differentiate and personalise instruction</b> tailor content, process, and product to meet the varying needs, interests, and readiness levels of students.	<b>AI can help by:</b> generating levelled reading passages, creating tiered assignments, suggesting alternative resources, and recommending intervention or enrichment activities.

# Summary – AI preparing learners to thrive

What teachers should do?	How AI can assist
<b>4. Provide timely, actionable feedback</b> give specific feedback that guides students on how to improve, focusing on the task, not the person.	<b>AI can help by:</b> offering instant, automated feedback on low-stakes tasks like multiple-choice questions, grammar, and fact-based answers. This frees up the teacher to provide deeper, more personalized feedback on complex skills like critical thinking and creativity.
<b>5. Create engaging and relevant learning experiences</b> design activities that connect to the real world and foster critical thinking, collaboration, and creativity.	<b>AI can help by:</b> brainstorming project-based learning ideas, generating realistic scenarios or case studies, and creating prompts for Socratic seminars or debates based on current topics.

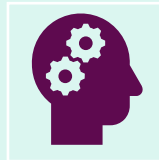
# Summary – AI preparing learners to thrive



**The crucial partnership:** Collaborative partnership between human and AI that **empowers teachers** and **improves the quality** of teaching, learning and assessment.



**The teacher's role:** The teacher remains the essential architect of learning—making professional judgments, building relationships, motivating students, and responding to complex social-emotional needs. They are the **facilitator, coach, and guide**.



**AI's role:** AI acts as a powerful **tool, assistant, strategist and co-planner** that handles time-consuming tasks (generating materials, grading basics, data analysis), allowing the teacher to focus their energy on the high-impact, human-centric aspects of teaching that technology cannot replicate.

# Summary – AI competencies & evaluation

Principles for AI in education	AI competencies for teachers	Evaluation of AI tools
<ul style="list-style-type: none"><li>• Inclusive &amp; human-centred</li><li>• Protect teachers' rights</li><li>• Trustworthy &amp; sustainable</li><li>• Applicability &amp; adaptability</li><li>• Support life-long learning</li></ul>	<ul style="list-style-type: none"><li>• Human-centred mindset</li><li>• Ethics of AI</li><li>• AI foundations &amp; application</li><li>• AI Pedagogy</li><li>• AI for professional development</li></ul>	<ul style="list-style-type: none"><li>• Functionality</li><li>• User experience</li><li>• Pedagogical alignment</li><li>• Accessibility &amp; security</li><li>• Ethical &amp; safe use</li><li>• Reflection on what works for your subjects, in your context</li></ul>



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# Any questions?

**Cambridge Schools Conference, December 2025**  
Future-ready: preparing learners to thrive

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# Thank you!

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Future-ready: preparing learners to thrive



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