

Practical AI for STEM Teaching

See AI turn teaching ideas into lesson plans, personalized assignments, quizzes, and feedback. Learn to guide its work, check the results, and revise them for your students.

WHAT YOU WILL SEE

The presenter will demonstrate each workflow using a running STEM example, such as forces and motion. Your questions and suggestions can help shape the revisions.

0-5

5 MIN

Welcome and teaching goals

Connect the teacher survey priorities to the examples and introduce the STEM topic.

5-15

10 MIN

Getting started with AI

Open a chat, inspect the available model choices, make a clear request, and improve the first answer with a follow-up.

15-28

13 MIN

Lesson planning

Develop a lesson around a clear learning goal, with realistic timing, materials, and checks for understanding. Review and refine the plan.

28-43

15 MIN

Personalized assignments + quizzes

Adapt the same learning goal for different support needs. Draft a short quiz with an answer key, then check accuracy and alignment.

43-55

12 MIN

Giving feedback

Use fictional student responses and clear criteria to draft specific feedback. Check whether it identifies the error and gives a useful next step.

55-60

5 MIN

Questions and next steps

Discuss remaining questions and choose one teaching task to try after the seminar.

A REUSABLE STARTING POINT

State the **goal**, **students**, **constraints**, and **desired output**. Then inspect and revise.

Free AI. Real choices.

Compare **model access**, **usage allowances**, and **sign-up effort** before choosing your free educator account.

01 / COMPARE THE OFFERS

Full sources and links on page 3

GitHub Education Copilot Pro

1,500

AI credits / month

Choose models from multiple companies. Pro includes Claude Sonnet 5.5 and GPT-5.6 Terra. Credits are spent by model and token use. The top-tier exclusions are listed on page 3.

SETUP GitHub account, school email, affiliation documents, and approval. [1-3]

Claude for Teachers

1 year

free after verification

Expected from Pro-level access: Haiku 5.5, Sonnet 5.5, and Opus 5.5. The teacher-specific model roster is not published. Rolling 5-hour and weekly limits; numeric allowance unpublished.

SETUP Individual U.S. K-12 verification. Enroll by June 30, 2027. [4,9]

ChatGPT for Teachers

June 2028

free through this date

The teacher plan page lists **GPT-5.1 Instant, Auto, and Reasoning-Mini**. No numeric allowance is published. Check your model menu for current access.

SETUP Self-service verification using a U.S. K-12 school or district email. [5]

Gemini for Education

25

Pro prompts / 4 hours

Pro, Thinking, and Fast. Release notes map Pro to Gemini 3.1 Pro; the education page does not guarantee a revision. Also up to 300 Thinking prompts/day and 32,000-token context. Argon is not included.

SETUP School Google account; institution must provide and enable access. [6,10]

Microsoft Copilot Chat

Included

with eligible school accounts

OpenAI GPT-5 family; GPT-5.2 is named in release notes. The current free-account revision is not guaranteed. Choose Auto, Quick response, or Think deeper. No fixed credit balance.

SETUP Eligible school Microsoft 365 login; may already be enabled. [7,11]

Start here: GitHub offers explicit model choice and a stated credit allowance. An existing school Microsoft or Google login may offer the quickest access.

Make the free access count.

GITHUB COPILOT PRO

$$\begin{array}{rcl}
 \mathbf{1,000} & + & \mathbf{500} & = & \mathbf{1,500} \\
 \text{BASE CREDITS} & & \text{FLEX CREDITS} & & \text{CREDITS / MONTH}
 \end{array}$$

1 credit = \$0.01 at GitHub's model-token rates. Credits reset on the first of each month (UTC), do not roll over, and the 500-credit flex portion can change. [1,8]

MODEL ACCESS HAS TIERS

Included examples

Claude Sonnet 5.5
GPT-5.6 Terra

Require a higher Copilot tier

Claude Opus 5.5
GPT-6 Sol and GPT-6 Astra

The free teacher benefit is **Pro**. GitHub's overall model catalog includes options outside Pro; availability also depends on the interface you use. [2]

WHY CREDITS ARE NOT MESSAGE COUNTS

A sample Sonnet 5.5 exchange with 2,000 uncached input tokens and 1,000 output tokens costs about **1.4 credits** before other context, caching, or tool activity. Longer chats can cost more. This is an illustration, not a guaranteed message count. [8]

03 / GET CONNECTED

1 Check your school account first.

Look for Copilot Chat in Microsoft 365 or Gemini in your school Google account. Your institution controls availability.

2 Want GitHub's model picker?

Apply to GitHub Education with your school email and proof of affiliation. After approval, activate Copilot Pro and open github.com/copilot.

3 Want a direct teacher account?

Verify with [Claude for Teachers](#) or [ChatGPT for Teachers](#). Their limits are not stated in GitHub-style credits.

04 / SAVE THESE LINKS

[1] [GitHub credits and resets](#)

[2] [GitHub models by plan](#)

[3] [GitHub Education sign-up](#)

[4] [Claude teacher plan details](#)

[5] [ChatGPT teacher plan details](#)

[6] [Gemini education limits](#)

[7] [Microsoft Copilot Chat details](#)

[8] [GitHub model-token prices](#)

[9] [Claude model range by plan](#)

[10] [Gemini model release notes](#)

[11] [Microsoft model release notes](#)

Keep in mind: Limits, eligibility, and model menus change. Compare the options actually shown in your account. Published limits do not establish which offer gives the most total use.

How the models compare.

Two kinds of evidence: **benchmark performance** and **human preferences**. Compare scores within each column. Higher is better; none of these scores is a percentage of teaching quality.

A / ARTIFICIAL ANALYSIS

Intelligence Index v4.3.2

Ten evaluations of reasoning, knowledge, coding, and completing tasks.

MODEL	REASONING SETTING	INDEX
Claude Opus 5.5	High	54
Claude Sonnet 5.5	xHigh	52
GPT-5.6 Terra	High	34
Gemini 3.1 Pro Preview	As evaluated	30
GPT-5.2	xHigh	30*
GPT-5.1	High	25*

* **Estimated by Artificial Analysis**, with independent evaluation forthcoming. Claude entries use default fallback. These are index points, not percentages. Click a row for its source.

B / ARENA HUMAN PREFERENCES

Which responses do people prefer?

Snapshot: October 22, 2026. Math means preference on math prompts, not accuracy.

MODEL / SETTING	OVERALL	MATH	INSTRUCTION FOLLOWING
Claude Opus 5.5 / High	1509 +/-7	1512 +/-25	1521 +/-11
Gemini 3.1 Pro Preview	1487 +/-3	1489 +/-8	1480 +/-4
Claude Sonnet 5.5 / xHigh	1478 +/-7	1501 +/-27	1485 +/-11
GPT-5.2 Chat / 20260210	1476 +/-4	1454 +/-13	1457 +/-6
GPT-5.6 Terra / xHigh	1467 +/-4	1483 +/-13	1464 +/-6
GPT-5.1 / High	1456 +/-4	1458 +/-12	1450 +/-6
GPT-5.2 / High	1437 +/-4	1456 +/-11	1427 +/-6

+/- values are Arena's displayed uncertainty intervals. Overlapping intervals make small rank differences uncertain. GPT-5.2 Chat and GPT-5.2 High are separate tested entries.

THE SETTING MATTERS

On the same Artificial Analysis index, Sonnet 5.5 scores **47 at High vs 52 at xHigh**; Opus 5.5 scores **54 at High vs 58 at Max**. A free educator account may not expose the tested setting.

Work well with AI.

The tutor develops these **20 ideas and skills**. Each knowledge component is one idea to understand or one skill to practice; the sections below group them for easy reference.

Understand how AI works

01 Generating is different from finding

AI writes from learned patterns; it can also classify material or retrieve information with tools. Generating an answer does not verify it.

02 Data, design, and computing power

Training examples, model design and learning algorithms, and computing power jointly enable AI. Greater capability does not guarantee correctness.

03 Confidence can accompany errors

Fluent, confident explanations can be wrong. Check important claims against evidence; certainty in the wording is insufficient.

04 Conversation space has limits

AI can use only so much context at once. In long chats and documents, check that key instructions and material still guide its work.

05 Repeated requests can differ

Repeated requests can produce different answers. Use variety for exploration; different wording does not mean better accuracy.

Shape the collaboration

11 Specify the method when it matters

Specify required sources, steps, or analytical methods. Inspect the work; an explanation alone does not establish that the method was followed.

12 Give AI a conversational role

Ask AI to explore, help decide, challenge an argument, or offer support. Specify the useful level of detail and tone.

13 Show examples when useful

Use correct examples when instructions alone do not show the desired pattern. Cover relevant variation; examples are not needed every time.

14 Ask for help writing the request

Explain the goal and difficulty, then ask AI to help formulate the request. Check that its proposed wording preserves your intent.

15 Build and check a plan

Provide goals, constraints, resources, and time. Request steps, milestones, and dependencies; check feasibility and missing work.

Choose and direct the work

06 Choose AI for the actual task

Test systems on your teaching tasks, capabilities, and access needs. Success on one task does not establish the best choice for every task.

07 Choose how to collaborate

Choose defined task execution, joint development, or independent action on your behalf. Match human involvement to how settled the outcome is.

08 Define a successful result

State the goal, students, purpose, scope, format, and constraints. Explain what makes the lesson, assignment, or quiz usable.

09 Check what AI can access

Check available documents and tools as well as learned knowledge. Supplied material can be current; better wording cannot grant missing access.

10 Provide relevant background

Supply relevant background, including student or user knowledge when it changes the answer. Longer prompts are useful only when details matter.

Evaluate, improve, and reuse

16 Evaluate the finished output

Check accuracy, coherence, audience fit, requirements, and practical usefulness. Use evidence to decide what to keep, revise, or discard.

17 Notice failures along the way

Inspect visible work for faulty reasoning, lost constraints, repetition, or rejected material returning. Identify the specific departure.

18 Give specific corrective feedback

Name the defect, why it matters, and the correction needed: "This tests recall; revise it to test applying the concept."

19 Describe AI contributions accurately

Tell relevant people what AI actually contributed, with timing and detail appropriate to the setting and audience.

20 Keep reusable prompts adaptable

Save instructions and examples with fields for changing details. Fill them for each task, check the new result, and update the template.

REFERENCES | TEACHER-FACING SUMMARIES ADAPTED FROM:

[1] MoFaCTS. (2026, October 23). [SPARC AI Fluency: current KCs, misconceptions, and path](#). Lesson source package.

[2] Dakan, R., Feller, J., & Anthropic. (2025). [AI Fluency: Framework & Foundations](#) [Online course]. [Framework and resources](#). CC BY-NC-SA 4.0.

Two ways to plan a lesson.

Both prompts below are reproduced verbatim. Choose the approach that suits how you want to begin.

1 / Provide the details up front

Replace the bracketed fields, then paste the complete prompt into your AI chat.

You are an expert [GRADE AND SUBJECT] teacher, proficient in creating engaging, well-developed and effective lesson plans for your students. Your task is to come up with [NUMBER] ideas for lesson plans in our unit on [UNIT TOPIC]. The lesson plans should be [NUMBER] minutes each and should [BUILD ON EACH OTHER / STAND ALONE]. The lessons should focus on: [SPECIFIC UNIT TOPICS]. Each lesson should be engaging and appropriate for [GRADE LEVEL] students.

Each lesson should be aligned to [STANDARDS] and should include: learning objectives; a list of key vocabulary; a lesson outline that includes direct instruction, an engaging activity, and a closure with a synthesis/summary of student learning; and an assessment of learning.

Source: AI for Education. [Create a Lesson Plan with an AI Chatbot](#). "Lesson Plan Idea Prompt." Reproduced unchanged; the publisher permits use and sharing.

2 / Let AI ask you questions

Paste this prompt unchanged, then answer the questions as they appear.

You are a friendly and helpful instructional coach helping teachers plan a lesson.

First introduce yourself and ask the teacher what topic they want to teach and the grade level of their students. Wait for the teacher to respond. Do not move on until the teacher responds.

Next ask the teacher if students have existing knowledge about the topic or if this is an entirely new topic.

If students have existing knowledge about the topic ask the teacher to briefly explain what they think students know about it. Wait for the teacher to respond. Do not respond for the teacher.

Then ask the teacher what their learning goal is for the lesson; that is what would they like students to understand or be able to do after the lesson. Wait for a response.

Given all of this information, create a customized lesson plan that includes a variety of teaching techniques and modalities including direct instruction, checking for understanding (including gathering evidence of understanding from a wide sampling of students), discussion, an engaging in-class activity, and an assignment. Explain why you are specifically choosing each.

Ask the teacher if they would like to change anything or if they are aware of any misconceptions about the topic that students might encounter. Wait for a response.

If the teacher wants to change anything or if they list any misconceptions, work with the teacher to change the lesson and tackle misconceptions.

Then ask the teacher if they would like any advice about how to make sure the learning goal is achieved. Wait for a response.

If the teacher is happy with the lesson, tell the teacher they can come back to this prompt and touch base with you again and let you know how the lesson went.

Source: Ethan Mollick & Lilach Mollick. "Plan a lesson," in OpenAI's [Getting started with ChatGPT as an educator](#). Reproduced unchanged. Prompt licensing: [CC BY 4.0](#).

Build a useful quiz.

Two approaches: supply teaching materials or let the assistant ask about your class.

1 / University of Michigan: source-based quizzes

Exact opening excerpt: “Develop {number of items} recall and comprehension multiple choice questions from the following lecture script: {insert text}.”

The complete template combines your teaching text and learning goals with rules for constructing answer choices, feedback on each option, and a specified output structure. Michigan compared five prompt versions while developing this approach.

[Open the complete Michigan template](#)

Source: Hedieh Najafi, University of Michigan Center for Academic Innovation (2026).

2 / Ethan and Lilach Mollick: interactive Quiz Creator

Paste the complete prompt below; answer the questions before it drafts the quiz.

You are a helpful teaching assistant and an expert in assessment. You create diagnostic quizzes that comprise of multiple choice and open ended questions that test student knowledge. You only ask 2 questions at a time and keep your part of the conversation brief. First introduce yourself to the teacher and ask them what topic they teach and the learning level of their students (high school, college, or graduate school). Number the questions. Wait for the teacher to respond.

Do not move on until the teacher responds. Do not ask any other questions until the teacher responds. Do not mention topics or documents until the teacher responds to the first two questions. Only once you have the answers to the first two questions then go ahead and ask the teacher what specifically (in 2 or 3 points) students should understand about this specific topic and what sticking points or difficulties students might have. This will help you construct the test. Wait for the teacher to respond.

Then go ahead and create a quiz with 5 multiple choice questions and 2 open ended questions. The questions should be arranged from easiest to most difficult. Questions should test for rote knowledge and ask students to apply their knowledge. Do not focus on sticking points only. Every incorrect choice in the multiple choice questions should be plausible. Do not use an “all of the above” option in any of the questions and do not use negative framing.

When applicable, open ended questions should prompt students to apply their knowledge and explain concepts in their own words and should include a metacognitive element eg explain why you think this? What assumptions are you making? Make the test nicely formatted for the students. Also give the teacher an answer key. Explain your reasoning for each question and let that teacher know that this is a draft and that you are happy to work with them to refine the questions.

You also can explain that your job is to help them assess student knowledge and that you view a test as both useful for assessment and as a learning event, to help student see the gap in their knowledge and give them an opportunity to recall what they know (retrieval practice).

Source: Ethan Mollick & Lilach Mollick. "Quiz Creator," [Prompts for Instructors](#). Reproduced verbatim; [CC BY 4.0](#).

Adapt the same learning goal.

Both AI for Education prompts are reproduced verbatim. Replace the bracketed fields for your class.

3 / Create Scaffolds and Extensions

You are an expert in Universal Design for Learning and differentiated instruction. Your task is to build flexible scaffolds and extensions into my [GRADE LEVEL and CONTENT AREA] lesson on [TOPIC] so that all students can access rigorous content and deepen their learning based on their readiness.

In the core lesson students [DESCRIBE THE MAIN ACTIVITY OR TASK] with these learning objectives (same for all students): [LIST 2-3 SPECIFIC OBJECTIVES]. Potential barriers in this lesson are: [IDENTIFY 2-3 BARRIERS].

Design scaffolds and extensions that allow students to work on the same rigorous task with appropriate support or challenge:

Scaffolds (2-3 options):

Create supports that remove specific barriers without lowering cognitive demand. Scaffolds should be:

- Available to any student who needs them (not labeled for specific groups)
- Gradually releasable as students build skills
- Focused on access, not doing the thinking for students

Extensions (2-3 options):

Create opportunities for deeper or broader thinking that increase complexity without just adding more work.

Extensions should:

- Elevate the cognitive demand or application
- Be authentic challenges, not just "extra" or "bonus"
- Connect to the same core objectives

For each scaffold and extension, provide:

- What it is and how students use it
- What barrier it addresses or how it deepens learning
- How to present it as a flexible option (not a fixed assignment)

Source: AI for Education. [Create Scaffolds and Extensions](#). Reproduced verbatim; formatting only changed.

4 / Revise Lessons with Student Interests

You are an expert in Universal Design for Learning and culturally responsive teaching. Your task is to redesign my [GRADE LEVEL and CONTENT AREA] lesson on [TOPIC] by creating engagement strategies that connect to my students' authentic interests while maintaining academic rigor.

My students are interested in: [LIST 3-5 STUDENT INTERESTS]. The lesson currently [BRIEFLY DESCRIBE CURRENT APPROACH] with the following learning objectives [INSERT 2-3 SPECIFIC LEARNING OBJECTIVES].

Generate [NUMBER] engagement strategies that:

- Connect authentically to at least one student interest (not just surface-level references)
- Maintain rigor by requiring the same depth of thinking and content mastery
- Are immediately practical to implement in a typical classroom setting
- Provide entry points for students with different levels of background knowledge

For each strategy, include:

- How it will hook student interest
- The activity structure (step-by-step)
- How students demonstrate mastery of the learning objectives
- Materials and estimate time

Source: AI for Education. [Revise Lessons with Student Interests](#). Reproduced verbatim; formatting only changed. The publisher permits use and sharing of its prompts.

Examine student thinking.

Use these resources to identify misconceptions in written responses and give specific feedback on paragraphs, essays, and lab reports.

1 / Identify recurring misconceptions

UNIVERSITY OF FLORIDA | RESPONSE-ANALYSIS PROMPT

Exact excerpt from the source prompt:

“Identify misconceptions that reflect gaps in conceptual understanding. Describe what the misconception is and how frequently it appears.”

Provide: the assignment topic, learning objectives, and anonymous student responses. The prompt asks what you want examined before beginning its analysis.

It reports: recurring mistakes, evidence of understanding, frequency patterns, and uncertainties. Its stated purpose is to describe patterns; it does not assign grades or recommend instructional responses.

[Open the complete Florida prompt](#)

Source: University of Florida, UFIT Center for Instructional Technology and Training.

2 / Respond to student writing

WRITTEN FEEDBACK | TWO PROMPTS ON PAGE 10

Feedback against your criteria: supply the assignment, learning objectives, rubric, and student work. The first prompt asks for evidence, strengths, areas for development, and uncertain judgments.

Feedback on a lab-report introduction: the second prompt asks AI to respond using the assignment guidelines and to avoid supplying replacement text. It comes from a study of feedback on scientific writing.

Examine the comments: look for factual or conceptual errors, missing reasoning, and feedback that refers to the actual student response. Check whether the AI has accurately understood the student’s explanation.

Sources: [Risepoint Faculty Center](#); [Rankins et al. \(2026\)](#), [scientific-writing feedback study](#). Full references and verbatim prompts appear on page 10.

The Florida quotation is an exact excerpt. Page 10 provides two published prompts for written feedback, with references and selectable text.

Respond to student writing.

Use your assignment criteria to examine students' ideas, reasoning, and writing. The prompts below are reproduced verbatim and request written feedback.

1 / Connect feedback to your criteria

For a paragraph, essay, lab report, or written explanation: replace the bracketed fields and attach your instructions, criteria, and the student's work.

I have attached the following assessment details: [assessment instructions], [rubric].

The assessment measures the following learning objective(s): [insert objective(s)].

Act as an assistant for drafting student feedback. Review the attached [anonymized student submission].

For each rubric criterion, identify relevant evidence, one strength, and one area for development. Do not assign a score or infer anything not stated in the submission. Flag uncertain judgments for instructor review. If an attachment is missing or unreadable, ask for it before proceeding.

Source: Risepoint Faculty Center. (2026, September 15). [AI-assisted feedback](#). "Use rubrics to ground AI outputs." Published practice template; this exact prompt is not presented as experimentally validated.

2 / Review a science-writing introduction

Paste a sample lab-report introduction and upload its assignment guidelines, then use this prompt. The wording addresses the AI from the writer's perspective.

provide feedback on my introduction using the uploaded guidelines as the basis for all feedback. Do not suggest any new text to add.

Source: Rankins, D. R., Tran, E. N., La, V. T., Huang, D. M., & Barry, R. M. (2026). [A rubric to assess generative AI-based feedback on student writing assignments](#). Journal of Microbiology & Biology Education. doi:10.1128/jmbe.00350-25. Exact "no rewrite" prompt quoted in the article.

What to look for: Does the comment identify a specific idea or passage? Does it correctly describe the student's reasoning? Does it explain a misconception or omission without replacing the student's writing?