Science Discipline Specific Exploration 1: Lesson Planning

This exploration draws on prior Co-Lab frameworks, particularly AI for Lesson Design and AI for Personalization & Differentiation with a special focus on Science courses. We will consider several ways to leverage AI to enhance teaching and learning for our courses. These are probably a simple way to think about using AI in our discipline, but it's a good starting point.

Tips for our Science DSE:

A. Stick to frontier models for the best outputs (i.e., ChatGPT, Claude, Gemini and Copilot). You are encouraged to experiment with multiple models to compare the experience!
B. Don't forget the Co-Lab SECRET SAUCE: Make sure you **ask lots of follow ups. Challenge and probe the outputs you get with further back-and-forth.** This iteration is what will lead to the best possible ideas and help you get the most out of the exploration.
C. Don't limit yourself to one course, level, or topic as you explore the four frameworks below. Test out ways to experiment AI use cases for any number of topics and levels you may teach.
D. You don't have to move through exploration frameworks in order and you do not have to complete them all.

Questions to consider as you explore

- ➔ Co-Lab's guiding question: ***"How will this use of AI enhance teaching and learning?"***
  - ◆ What did the AI do especially well v. not so well for you?
  - ◆ What tradeoffs are you making as a teacher when you use AI this way? (e.g., skill development for teachers and students, time-saved v. pedagogical value added)
- ➔ **What do you most want to share out with others in our upcoming collaboration call?** Did you have any "aha moments?" What surprised you? What disappointed you? What would you change next time? What was most immediately useful to you?

Suggested time: 45-60 minutes
If you finish early…

- Take these prompts to another AI model and compare outputs
- Design more resources or activities
- Try designing something for a colleague's course (or a new faculty member)

Upon Completion:

- Reflect - how will this impact student learning, if at all? What am I challenged by? Excited by?
- Design your own prompt - is there something else Science teachers should know how to do lesson-design-wise?
- Start planning what you would like to share in our post-exploration "collaboration." Remember that the essential question for our Collaboration call will be "*To what extent will this use of AI enhance teaching and learning*?"

Science Lesson Planning Exploration

Lesson Design Tool	Prompt
5E/7E extension	You are a seasoned science educator with expertise in the 5E/7E instructional model. Your task is to create a comprehensive lesson plan on [INSERT SCIENCE TOPIC] using this model. The lesson should be designed for [INSERT GRADE LEVEL] and include the following phases: 1. Elicit: An activity to draw out students' misconceptions about the topic. 2. Engage: An activity or question that captures students' attention and connects to their prior knowledge. 3. Explore: Hands-on or interactive activities where students investigate and experiment. 4. Explain: Opportunities for students to discuss and articulate their understanding, with teacher guidance. 5. Elaborate: Activities that extend students' understanding to new situations or more complex applications. 6. Extend/Expand: Additional activities that deepen or broaden learning. 7. Evaluate: Strategies to assess student learning and understanding throughout the lesson. Include the following in your lesson plan: - Clear learning objectives. - A list of materials and resources. - Concise but detailed activity descriptions with timing given [75 minute class blocks] and guiding questions for each phase. - Assessment strategies that align with the learning objectives. Present the plan in a structured format with clear headings for each phase.
How did you follow up on this prompt? **Use the dropdown below to rate the above activity, from 1 (low) to 5 (high) for usefulness in your class prep:** 3 - I'm not sure yet. Will probably be looking more at this. **Include brief notes below to further explain your rating above:**	
Demo	You are an expert science educator specializing in the use of hands on demonstrations for any scientific topic at any age level. Your task is to create

	an engaging but brief demonstration of [Insert science topic] for [Insert grade level]. This demo should be be concisely explained, with all needed materials listed. Please also include learning objectives, possible student misconceptions and how to address them, suggestions for where to take the lesson next, and a closing activity (ex. Reflection, exit ticket) that ensures students understood what they saw.
How did you follow up on this prompt? **Use the dropdown below to rate the above activity, from 1 (low) to 5 (high) for usefulness in your class prep:** 3 - I'm not sure yet. Will probably be looking more at this. **Include brief notes below to further explain your rating above:**	
POGIL - Process Oriented Guided Inquiry Learning If you're unfamiliar with POGIL and/or don't have POGILs of your own, here are two examples you could download and attach to the prompt**:** **Example One** **Example Two**	You are an expert science educator specializing in Process Oriented Guided Inquiry Learning (POGIL). Your task is to help a teacher create a detailed worksheet and answer key for a POGIL you make on [INSERT TOPIC HERE] for [INSERT GRADE LEVEL HERE]. Attached is an example of what the output should look like. If you cannot generate images yourself, write in bracketed text a description of the image or you are asking students to analyze, providing advice about where the teacher could find such an image. The POGIL should take about 25 minutes for students to complete and ask questions that encourage collaboration and guide their inquiry. Start with basic interpretation questions, followed by application and analysis questions.
How did you follow up on this prompt? **Use the dropdown below to rate the above activity, from 1 (low) to 5 (high) for usefulness in your class prep:** 3 - I'm not sure yet. Will probably be looking more at this. **Include brief notes below to further explain your rating above:**	
Lab - Inquiry expansion	You are an expert science educator skilled in transforming traditional "cookbook" labs into inquiry-based experiences. Your task is to modify a standard lab on [INSERT SCIENCE TOPIC] for [INSERT GRADE LEVEL] to include age-appropriate opportunities for student-driven inquiry. Revise the lab by: 1. Identifying aspects where students can develop their own questions. 2. Suggesting ways to let students, at an appropriate level of independence, design parts of the procedure (e.g., variables, data collection methods).

	3. Including prompts that encourage students to analyze results and connect findings to broader concepts. 4. Providing strategies for assessing student-generated questions and investigations. Ensure that your modifications align with students' developmental levels, offering more structured guidance for younger students and increasing autonomy for older students. Format your response with clear headings and specific examples of inquiry-based modifications.
Use the dropdown below to rate the above activity, from 1 (low) to 5 (high) for usefulness in your class prep: 3 - I'm not sure yet. Will probably be looking more at this. **Include brief notes below to further explain your rating above:**	