

Three-Part Assignment: AI, Learning, and Finding Reliable Sources

Purpose

Artificial intelligence tools can be useful in academic and professional settings, and you are likely to encounter them throughout your education and future career. However, AI tools also have important limitations. In this assignment, you will explore both how AI can hinder learning and how it can mislead users when locating or suggesting references, and reflect on what that means for your own work as a student and researcher. Note that AI has other positives and negatives beyond the scope of this assignment; this is merely a starting point.

This assignment is not about avoiding AI entirely. Instead, it is about learning to use it critically and responsibly.

Part 1: AI and Learning (Reflection)

Answer the following questions in complete sentences (approximately 150–250 words total). **Please number your responses!**

1. Describe a situation in which using AI to complete an academic task could reduce your learning, even if the final answer looks correct.
 - What skill would you miss practicing?
 - How could that affect you later in advanced classes, research, or a job?
2. Describe a situation where AI *could* be helpful without replacing your thinking.
 - What would you still need to do yourself to learn effectively?

Part 2: AI and References (Exploration)

Ask an AI tool a question that would reasonably require references. Feel free to use your own, but examples include:

- “Find academic sources on spontaneous magnetization reversal.”
- “What research exists on undergraduate physics research experiences?”
- “Give references for making a good sample for physics study.”
- “Give references for what it means for a sample to be high quality.”

Then respond briefly to the following prompts (approximately 200–250 words total):

1. Include the references or sources suggested by the AI tool (copied as-is). You do not need to verify them or format them correctly.
2. What kinds of sources did the AI suggest? (For example: textbooks, review articles, popular websites, journal papers, or specific citations.)
3. What potential problems did you notice or anticipate? Which of the following issues seemed most relevant for your prompt, and why? (See examples on next page.)

Consider that AI tools:

- often favor well-known, English-language, or easily accessible sources,
 - may over-represent certain journals, institutions, or viewpoints,
 - can suggest outdated, incomplete, or even non-existent (“hallucinated”) references,
 - usually lack awareness of why a source is credible, contested, or appropriate for a specific context.
4. How could relying only on AI-generated references be risky in research work?
 5. If you had enough time to search better, what would be a better way to find references. How might AI help you if you were struggling to find what you want with this method?

A Note on Sources and Certainty

AI tools are not the only sources that can be incomplete or incorrect. Even peer-reviewed scientific papers sometimes contain mistakes, overlooked assumptions, or conclusions that later turn out to be wrong. Peer review improves quality, but it is not a guarantee of correctness. Science advances because humans question results, test ideas repeatedly, and revise understanding over time. This assignment is not about finding “perfect” sources, but about learning to evaluate information—whether it comes from AI, a textbook, or a published paper. (Note: AI might be an interesting way to explore potential paper errors, yet it still would not be perfect and would likely give many false positives requiring evaluation.)

Part 3: What This Means for You (Short Post Reflection)

Answer the following in 5–7 sentences:

1. When you need sources for a research or class project, what role (if any) should AI play?
2. What steps would *you* still need to take to make sure your references are appropriate, accurate, and useful?

Expectations and Grading

This assignment is graded on thoughtfulness and engagement, not on having the “right” opinion. You are not expected to be an expert in research or citation practices. You may use AI as part of this assignment, but your grade depends on your ability to evaluate and reflect, not on the quality of the AI’s output.

Why this Assignment Matters

In research and professional settings, tools that generate answers or sources can be powerful—but they cannot judge importance, context, or correctness the way humans can. Developing the habit of questioning, checking, and thinking through information is an essential skill for scientists and problem-solvers.

Physics Career Exploration Assignment

Purpose: Choosing a career path in physics (or related fields) is a process that takes time, exploration, and reflection. You are **not expected to have everything figured out yet**—in fact, most people don't at this stage. In this assignment, you will explore one possible career path based on your current interests (even if you're unsure). The goal is not to make a final decision, but to start thinking intentionally about how your time in college can help you move toward different possibilities. At the end of the year, you will revisit this assignment and share what you've learned with your classmates. By that point, many of you will have explored different paths, and together you will build a broader understanding of the many careers available to physics majors. This means your work now is not only for your own benefit, but also contributes to a shared pool of ideas that others can learn from.

Instructions

1. Choose **one career** you might be interested in pursuing. It is completely okay if you are unsure—you will make your best guess based on what you currently know. (Many students initially consider becoming a professor, and this is absolutely a valid career path. However, you are strongly encouraged to explore a wide range of options so that, as a class, we can learn about the many directions a physics degree can lead. If you do choose “professor,” you should be specific about the type (for example: research-focused university professor, teaching-focused college professor, or community college instructor) and explore what distinguishes that path from others.)
2. Answer the questions below thoughtfully and completely. **Please letter your responses!**
3. Support your answers with specific details where possible (examples, research, course names, experiences, etc.). Quality matters more than length—be thoughtful and specific.

Optional: Using AI to Get Started

If you are unsure what career to explore, AI tools can be helpful for brainstorming ideas. For example, you might try prompting an AI tool with:

- Activities you enjoy (e.g., teaching, building things, solving puzzles, working with computers)
- Subjects you find interesting (e.g., astronomy, energy, materials, medical applications)
- Skills you want to develop

You could ask something like: “I’m a first-year physics student interested in [X, Y, Z]. What are some possible career paths I might explore?” From there, you can choose one career that seems interesting and use it for this assignment.

Important Reminder: AI is best used as a starting point—not a final product. Your assignment should reflect your own thinking, interests, and reflection, not generic responses.

Section 1: Choosing a Career

- A. What career are you exploring, and how confident are you in this choice (1–5)? Explain.
- B. What interests you about this career, and what other options did you consider?

Section 2: Understanding the Career

- C. What do people in this career actually do (typical work, problems they solve, industries)?
- D. What are the most appealing aspects of this career? What are some challenges or drawbacks?

Section 3: Education and Skills

- E. What education and key skills (technical and non-technical) are needed?
- F. What experiences (internships, research, etc.) would help prepare you?

Section 4: Planning Your Time in College

- G. What should you focus on during college (courses, experiences, skills)?
- H. What is one specific thing you should start doing **this year**?
- I. What is at least one longer-term goal (by junior year)?

Section 5: Personal Fit

- J. Why might this career be a good fit for you?
- K. What concerns or gaps do you see in your preparation or interests?

Section 6: Reflection

- L. What surprised you most about this career?
- M. What is one reason you might reconsider this path?

Section 7: Looking Ahead

- N. What questions do you still have about this career?
- O. What will you do this year to test whether this career is a good fit for you?

Optional Enrichment (Optional, but encouraged): Choose 1 of the following:

- P. Find a real job posting in this field. What qualifications are required?
- Q. Identify a real person working in this career (faculty member, alumnus, or online profile). What path did they take? What warnings do they have?

End-of-Year Follow-Up (Preview)

At the end of the semester, you will revisit this assignment and give a presentation in which you **advise your classmates** about this career path. Your goal is to explain what the career involves and what a physics student should do to prepare for it. Think of your presentation as guidance for someone who might be considering this path in the future. What should they know? What should they do early? What should they watch out for?

Guided “Learning How *You* Learn” Reflection

Purpose: This assignment is designed to help you build skills used by successful students and researchers: planning, staying focused, monitoring progress, and reflecting on what works for you. The goal is not to study “perfectly,” but to better understand how you actually work so you can improve over time. You will complete one focused study session of your choosing and reflect on it.

What kind of work can I use this for?

You may use this assignment to work on any real academic task, such as studying for an upcoming exam or quiz, working on a problem set or writing assignment, reading or reviewing material for a class, or preparing for a research task. Choose something meaningful to you right now.

Constraints (please follow these)

- Complete one individual (not group) study session only for this reflection. You are of course welcome to study your topic more, but I want you to reflect on only this study session.
- Session length: 2–4 hours
- Work should be for a course you are currently taking
- This is an individual reflection, not group work
- While not required, handwritten responses are encouraged

Part A: Plan (before you start)

Answer briefly (~5 minutes):

1. What course and specific task will you work on?
2. What is your **concrete goal** for this session?
(Example: “Finish problems 1–5” or “Understand Gauss’s Law,” not “study physics.”)
3. How long do you *expect* this task to take?
4. What part of the material do you expect to be easiest? What part expected hardest?
5. Name 1-3 things you will do to reduce distractions or interruptions.

Part B: Time Log (during the session)

Keep a simple record of what actually happens.

You do **not** need to track every minute—just note changes.

Example format:

- 2:00–2:45 — Problem solving
- 2:45–3:00 — Break / phone / interruption
- 3:00–3:50 — Worked, stuck on one problem
- 3:50–4:00 — Reviewed notes, wrapped up

Be honest. This is for learning, not judgment.

Part C: Reflection (after you finish)

Answer each prompt briefly but thoughtfully.

1. **Goal:** Did you reach the goal you set? Why or why not?
2. **Time:** How did the actual time compare to what you expected?
3. **Focus:** What interfered most with your focus? How well did you manage it?
4. **Strategy:** What approach or strategy worked best? What didn't work as well?
5. **Understanding:** What material now feels solid? What is still confusing?
6. **Next time:** What is/are 1-3 specific things you would do differently when working on a similar task?

Grading

This assignment is graded on completion and thoughtfulness, not on performance or results.

You will receive full credit if:

- All parts are completed
- Responses are honest and reflective
- The work shows genuine effort

There are no “right” outcomes—struggle and incomplete goals are common and expected. If you find this assignment helpful, I recommend you try repeating it (not all questions still effective).