STAC | Science & Technology Advancement Center

AI-Resilient Task Rubric

Designing science tasks that keep student reasoning central in an AI-rich classroom

Artificial intelligence is already widely accessible to students, which means traditional assignments that emphasize final answers or polished products are no longer reliable evidence of student understanding.

This rubric supports teachers in designing and reviewing science tasks that require students to think, evaluate, justify, revise, and defend ideas using evidence. It is grounded in the Science and Engineering Practices and aligned to STAC's core framing: AI should support learning without replacing the reasoning students need to do for themselves.

A strong AI-resilient task protects productive struggle, makes student thinking visible, and uses AI intentionally as imperfect input rather than as an authority or shortcut.

How to use this rubric

- Use it to evaluate an existing task for AI-resilience.
- Use it while planning a new task to make sure student reasoning remains central.
- Look for the preponderance of evidence across dimensions rather than treating the rubric as a checklist of isolated features.
- The strongest tasks are usually anchored in one or more Science and Engineering Practices and ask students to critique, compare, revise, explain, or defend ideas with evidence.

1. Task Goal: From Answer to Thinking

Guiding question: *Is the task primarily assessing a finished answer, or is it assessing how students reason their way toward understanding?*

Level	Descriptor
Emerging	Task success is defined mainly by a correct, complete, or polished final product. A student could complete the task by copying, paraphrasing, or lightly editing AI output.
Developing	The task includes some explanation or reflection, but most of the value still sits in the final answer or product. Student reasoning is present but secondary.
Strong	Task success is defined by the quality of student reasoning, critique, revision, and justification. The main evidence is how students make sense of the phenomenon, not how polished the final wording appears.

What strong evidence looks like in practice:

- Students explain how they arrived at a decision, not just what they decided.
- The task asks students to show what they noticed, questioned, revised, or defended.
- Scoring criteria privilege reasoning, evidence use, and revision over fluency or formatting.

2. Role of AI: Intentional, Limited, and Clear

Guiding question: *Is AI used in a deliberate way that supports the learning goal, or is it simply available to generate responses?*

Level	Descriptor
Emerging	AI is optional or loosely included. Directions do not clarify what AI may do, what it may not do, or why it is being used.
Developing	AI has a defined role, but that role may still blur the boundary between support and substitution. Expectations for student responsibility are only partly clear.
Strong	AI is used intentionally for a specific instructional purpose, such as generating imperfect input, surfacing alternatives, or prompting critique. Students remain responsible for the key scientific thinking.

What strong evidence looks like in practice:

- Directions explicitly state what AI is for in the task.
- The task names the thinking that must remain human.
- AI is positioned as a tool, source of input, or thinking partner, not as the answer source.

3. Protection of Productive Struggle

Guiding question: *Does the task preserve the cognitive work students need in order to build understanding?*

Level	Descriptor
Emerging	AI or other supports remove much of the reasoning, interpretation, or decision-making that students should be doing. The task feels efficient, but not intellectually demanding.
Developing	Students still do some thinking, but AI may reduce the challenge too early or too much. Productive struggle is present but uneven.
Strong	The task protects productive struggle by requiring students to wrestle with evidence, uncertainty, competing ideas, or incomplete explanations. AI does not remove the need for thinking; it sharpens it.

What strong evidence looks like in practice:

- Students must decide what to accept, revise, reject, or defend.
- The task includes ambiguity, an incomplete explanation, or a purposeful flaw that students must work through.
- Students still need to interpret the phenomenon, analyze data, or connect science ideas for themselves.

4. Visibility of Student Thinking

Guiding question: *What artifacts make student reasoning visible during the learning process?*

Level	Descriptor
Emerging	The only scored artifact is a single final product. Little or no evidence shows how the student thought through the task.
Developing	Some process evidence is collected, but it is limited, optional, or peripheral to the task.

Level	Descriptor
	Large parts of the reasoning remain invisible.
Strong	The task requires visible thinking artifacts such as annotations, comparison charts, revision notes, evidence trackers, oral defenses, or written explanations of changes and decisions.

What strong evidence looks like in practice:

- A teacher can see how a student responded to AI input or feedback.
- Students externalize reasoning through notes, markings, discussion, or structured reflection.
- The process artifact matters to the task, not just the final product.

5. Reasoning, Evidence, and SEP Alignment

Guiding question: *How strongly does the task require students to use evidence and engage in meaningful Science and Engineering Practices?*

Level	Descriptor
Emerging	Students can succeed with generic explanations, surface-level facts, or fluent restatements. SEP alignment is weak or nominal.
Developing	The task gestures toward evidence use or SEP work, but reasoning may remain vague, formulaic, or disconnected from the phenomenon or data.
Strong	Students must use evidence, science ideas, and SEP-based reasoning to critique, explain, model, argue, analyze, investigate, or communicate. The practice is central to what students actually do.

What strong evidence looks like in practice:

- The task clearly anchors student work in one or more SEPs.
- Students use evidence from data, observations, texts, or investigations to support decisions.
- Reasoning connects claims to evidence and to the scientific ideas that matter in the lesson.

6. Equity, Access, and Participation

Guiding question: *Can all students meaningfully engage in the reasoning demanded by the task?*

Level	Descriptor
Emerging	The task assumes all students have equal access to AI tools, strong reading and writing proficiency, and independent familiarity with how to use AI well.
Developing	Some supports are present, but access, language demands, or participation structures are only partially addressed.
Strong	The task includes intentional scaffolds and participation structures so all students can engage in the reasoning. Alternatives are available when AI access is limited, and success does not depend on personal technology or advanced prompt-writing skill.

What strong evidence looks like in practice:

- Students can participate through multiple forms of expression or collaboration.

- Supports such as sentence stems, teacher-provided AI outputs, shared-device plans, visual organizers, or discussion structures are built in.
- The task measures reasoning, not access to a particular tool.

Quick reflection questions for designers

- If AI completed this task perfectly, what evidence of student thinking would still remain?
- Where, exactly, must the student notice, interpret, decide, justify, or revise?
- What part of the task keeps the student from outsourcing the central reasoning?
- Which SEP is actually driving the work, and where does that show up in the task artifacts?

Guiding Principle

A task is AI-resilient when student reasoning is indispensable. If students can bypass sensemaking and still succeed, the task needs redesign