Education & Learning / Tutoring

Analyze student mistakes to identify the underlying misunderstanding — root cause analysis for targeted intervention.
Difficulty: Advanced
Model: GPT-4 / Claude / Gemini
Use Case: Mistake Analysis, Targeted Teaching
Updated: June 2026
Why This Prompt Exists
Correcting a student’s answer without understanding why they got it wrong misses the root cause. The same error repeats. Most tutors correct answers, not misunderstandings.

You get:

- same mistakes repeated across problems (root cause not addressed)
- tutors correcting answers instead of misunderstandings
- students who can’t identify their own errors
- inefficient tutoring (fixing symptoms, not causes)
- frustration when errors persist

But errors reveal underlying issues:

- factual error: missing or incorrect information
- procedural error: wrong sequence of steps
- conceptual error: misunderstanding of core idea

- application error: can’t transfer to new context
- careless error: attention or precision issue
- reasoning error: logical flaw in thinking

Without diagnosis, correction is superficial.
This prompt analyzes student mistakes to find root causes.

The Prompt

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Assume the role of a diagnostic tutor who analyzes student errors.

Your task is to identify the root cause of a student's mistake.

Generate:

1. ERROR CONTEXT
   - Problem: [question or task]
   - Student's answer: [their response]
   - Correct answer: [expected response]
   - Student's work (if available): [their steps or reasoning]

2. ERROR CLASSIFICATION

| Error Type | Description | Present? |
|------------|-------------|----------|
| Factual | Missing or incorrect information | Yes/No |
| Procedural | Wrong sequence of steps | Yes/No |
| Conceptual | Misunderstood core idea | Yes/No |
| Application | Can't transfer to new context | Yes/No |
| Careless | Attention or precision issue | Yes/No |
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| Reasoning | Logical flaw in thinking | Yes/No |

3. ROOT CAUSE ANALYSIS

- Primary error type: [the main category]
- Specific misunderstanding: [detailed description]
- Evidence from student work: [what indicates this cause]
- What student does correctly: [strengths to build on]

4. GAP ANALYSIS

What Student Knows	What Student Needs	Gap
[knowledge/skill]	[missing knowledge/skill]	[description]

5. DIAGNOSTIC QUESTIONS (to confirm hypothesis)

- Question 1: [test for specific misunderstanding]
- Question 2: [probe deeper]
- Question 3: [verify correction]

6. TARGETED INTERVENTION

- Concept to reteach: [what they misunderstood]
- Teaching approach: [analogy, example, demonstration]
- Practice problem: [similar problem to test fix]

7. COMMON ERROR PATTERNS BY SUBJECT

Subject	Common Error	Root Cause	Fix
Math	Order of operations	Procedural	Step checklist
Writing	Run-on sentences	Conceptual	Sentence boundaries lesson
Science	Correlation vs. causation	Conceptual	Explicit contrast
Language	Verb tense shifting	Procedural	Tense tracking practice

INPUTS:

Problem/question:
[PASTE THE PROBLEM]

Student's answer:
[PASTE THEIR RESPONSE]

Correct answer:
[PASTE THE CORRECT ANSWER]

Student's work (optional):
[PASTE THEIR STEPS OR REASONING]

Subject area:
[E.G., "Algebra", "Essay Writing", "Chemistry", "Spanish"]

RULES:
- Distinguish between careless errors (attention) and conceptual

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errors (understanding)
- Look for patterns across multiple problems (one error may be
anomaly)
- Ask diagnostic questions to confirm hypothesized cause
- Build on what student does correctly (don't just correct errors)
- Reteach the concept, not just the problem
- Test with a similar problem after intervention
- Document error patterns for future reference
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How To Use It

- Distinguish between careless errors (attention) and conceptual errors (understanding) — they need different interventions.
- Look for patterns across multiple problems — one error may be an anomaly, repeated errors reveal root causes.
- Ask diagnostic questions to confirm hypothesized cause — test your hypothesis before reteaching.
- Build on what the student does correctly — don’t just correct errors; reinforce strengths.
- Reteach the concept, not just the problem — address the underlying misunderstanding.
- Test with a similar problem after intervention — verify that the error is fixed.
- Document error patterns for future reference — build a record of common misconceptions.

Example Input

Problem/question: “Simplify: 3 + 4 × 2”
Student’s answer: “14”
Correct answer: “11”
Student’s work: “3 + 4 = 7, then 7 × 2 = 14”

Subject area: “Algebra (Order of Operations)”
Why It Works
Most tutors correct answers without diagnosing errors — fixing symptoms, not causes. The same mistake repeats.
This framework improves outcomes by forcing: error classification, root cause analysis, gap identification, diagnostic questioning, targeted intervention, and pattern recognition.
Failure modes this prevents: Same mistakes repeated, correcting answers not misunderstandings, students unable to self-diagnose, inefficient tutoring.
This improves on: Answer-focused correction. Error diagnosis addresses root causes.
Related to: TU-01 (Socratic Questions) for guided correction; SG-04 (Misconception Detector) for common errors.

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