IMPLEMENTING THE SIX-STEP FRAMEWORK

A practical one-page guide for instructors

EVIDENCE FROM THE STUDY Both groups received the same short introduction to the framework. The key experimental difference was repeated written use during homework. The structure-journal group averaged 76.2 versus 61.6 on the final exam - about a 24% relative difference ($d \approx 0.65$, $p < 0.05$).

GETTING STARTED: ASSIGNMENT WORKFLOW

You do not need to convert the whole homework set.

1 Select a few problems

Study: four conceptually demanding problems per homework set.
To start: one or two structured problems per week may be enough.

2 Students write by hand

Use the student's own notebook; no fill-in template is required.

3 Collect periodically

In person or as scanned handwritten PDFs, collected by the instructor or TA.

4 Model it and provide the guide

Refer to the six steps in your own worked examples and provide the one-page student guide at the start of the course.

MAKE IT WORK IN PRACTICE

- Give brief, prompt feedback on reasoning, assumptions, and reflection.
- Discuss recurring reasoning errors in lecture or recitation and show how to revise a solution.
- Protect symbolic reasoning: keep symbols before numerical substitution.
- Be consistent: repeated practice matters more than the number of assigned problems.

GRADING: REASONING, NOT CORRECTNESS

Keep solution correctness separate; your existing homework system can continue to grade numerical answers.

1 PT	1 PT	1 PT
Completeness	**Clarity of reasoning**	**Self-assessment of errors and assumptions**

In the study, the rubric score was applied as a coefficient on the homework grade:

- Full and consistent use = 1.0
- Partial use = reduced coefficient
- Journal omitted = 0.5

WORKLOAD REALITY

10 min → 5 min

per student, per submission • early semester → once students learn the format

Why it stays manageable

- Assess structure and reasoning rather than re-deriving every calculation.
- Use common errors as shared feedback in recitation or lecture.
- For the class studied, the additional grading remained within normal TA working hours.

STUDY VS. STARTING POINT The study used four selected problems per homework set; a smaller number is a practical starting recommendation, not the tested implementation.

We want students to reason through the physics — not just recognize a pattern or produce a number.

Based on: A. Godunov, "Problem Solving in Physics Classes: Navigating Fast and Slow Thinking," Am. J. Phys. 94, 607–613 (2026) • DOI: 10.1119/5.0269803