

Tips for Grading

- 1. Have a set of guidelines** for turning in assignments, regrades, and grades in general. Work with your teaching team to create these guidelines. They should be included in the syllabus. Remind students of these guidelines often. Sample guidelines include:
 - a. All regrades must be turned into the instructor within one week.
 - b. All regrades must have a written explanation of grading error.
 - c. Late homework not accepted (or accepted with a 20% penalty up to one week after the deadline).
- 2. Use a rubric** (see EXAMPLE 1 and 2):
 - a. For smaller assignments or individual problems, you can create simpler rubrics as follows:
 - i. Define in writing the point values associated with each part of a problem or project.
 - ii. Before grading, briefly skim through a portion of problems or essays. This gives an idea of average student performance, common mistakes and misconceptions, and how to handle partial credit.
 - iii. Revise the rubric if needed before you start grading.
 - b. For large assignments, rubrics also describe the skills and knowledge that students need to demonstrate to receive a certain score and should be given to the student along with the instructions for an assignment. This helps students understand more clearly the expectations for the assignment before they do it.
 - c. You can also create general rubrics (e.g. for grading problems, lab reports, teamwork) that specify general strategies or components that you want to train students to utilize (e.g. when solving any problem, writing any lab report, or working in teams). EXAMPLE 2 shows a general rubric for solving problems in physics. These rubrics can then be applied to any specific assignment, making the feedback simpler and more efficient.
- 3. Be consistent and fair.** When possible, grade without looking at names of students.
- 4. Grade one problem on each paper until all papers have been completed.** It can help to practice grading with your rubric on the first several papers before grading all papers. What you do for one student, you must do for all students, so be careful when dealing with extra points or late homework submission, etc.
- 5. Provide effective written feedback** to students. This will save you time as it will reduce the number of students asking: “Why did I lose points on this problem?” It will provide a tool for the students to learn from their mistakes. Do not devote unlimited time to this. A detailed rubric can accomplish some of this work. Talk to previous graders of the course for a time estimate for grading. Effective feedback is:
 - a. **Detailed/specific** - “good job” and “not quite right” do not tell the student where to focus future effort, or what to change vs. what to keep doing
 - b. **Timely** - the closer to the completion of the assignment, the better
 - c. **Balanced** - highlighting just mistakes can discourage further effort, whereas a balance of things done well and suggestions for improvement promotes student growth
- 6. Try not to take students’ response to poor grades personally.** Grading issues can cause students a significant amount of anxiety. They may express anger or despair over their grade. If you have a method for grading and regrading, stick to it and try to remain impartial. When in doubt or if you feel uncomfortable with an interaction pertaining to grading, involve the teaching team on all judgment calls, or issues where you are uncertain of the University’s accepted protocol. It is best to keep the teaching team aware of any and all grade issues that arise between you and a student.
- 7. Note that grading on a curve (norm-referenced grading) is not recommended** as it promotes student competition and a negative classroom climate. More specifically, curving grades can have the following negative consequences:
 - a. Make it difficult for students to gauge their performance during the semester and develop strategies for remediation (because final grades are dependent upon how all others perform in total and not just on that individual student’s skills and abilities).
 - b. Dampen motivation and cooperation in a classroom since students compete for the higher relative grade.
 - c. Contribute to “impostor syndrome” (self-doubt and a sense of intellectual fraudulence that override any external proof of their competence) and cause students to question whether they should persist in their major. If students know they did poorly on an exam that was too difficult, but “pass” because of the curve, they may feel they don’t deserve the grade and constantly worry that someone will find out that they are not as smart as their grade indicates.

Rubrics

A rubric is a scoring key that indicates the criteria for scoring and the amount of points to be assigned for each criterion. A simple rubric can be created to help grade problems like the one shown in EXAMPLE 1 below.

EXAMPLE 1: WIND ENERGY PROBLEM (8 points)

Given the following information, is it possible for one wind turbine (diameter=15m) to produce 60kW of electric power? Explain.

Wind energy per unit mass of air = $36.1 \frac{J}{kg}$

Mass flow rate through a wind turbine = $1802.5 \frac{kg}{s}$

SOLUTION WITH RUBRIC:

$$P_{wind} = E * \dot{m}$$

$$P_{wind} = \left(1802.5 \frac{kg}{s}\right) \left(36.1 \frac{J}{kg}\right)$$

$$P_{wind} = 65.1 kW$$

$$\eta = \frac{\text{Total power to be generated}}{P_{wind}}$$

$$\eta = \frac{60 kW}{65.1 kW} = 92.2\%$$

1 point for correct equation

1 point for correct substitution

1 point for the correct P_{wind} value

1 point for the correct units

1 point for correct efficiency equation

1 point for correct efficiency value

The Betz limit (theoretical limit) for wind turbine efficiency is 59.3%. Hence, a single wind turbine will not be sufficient to produce 60 kW of power.

Moreover, practical utility scale wind turbines achieve at most 75% of the Betz limit increasing the number of turbines needed even more.

2 points for correct reasoning

Even the minimal rubric in EXAMPLE 1 helps:

- communicate expectations for an assignment and illustrate assessment priorities
- grade with transparency, more consistency, and increased objectivity

More detailed rubrics that explicitly describe performance expectations (e.g. EXAMPLE 2 below) can also help to:

- clarify the standards for a quality performance,
- provide focused feedback on works in progress, and
- align the assignment and assessment with the learning objectives.

EXAMPLE 2: GENERAL PHYSICS PROBLEM-SOLVING RUBRIC¹

	5 points	4 points	3 points	2 points	1 point
Strategic Approach (S)	Approach chosen is clearly shown, clearly written & all elements are valid.	Valid approach with minor errors that don't disrupt understanding.	Valid approach with multiple errors that impede understanding.	Invalid approach that demonstrates little understanding of the problem.	Little or no understanding of how to approach the problem.
Physics Concepts (P)	Appropriate concepts fully understood, clearly stated & employed correctly.	Appropriate concepts that are mostly understood, but employed with errors.	Appropriate concepts identified, but not employed or understood.	At least one concept identified but unable to demonstrate understanding.	Little or no understanding of physics concepts.
Mathematical Concepts (M)	Correct starting equations. All mathematical steps are clearly shown and they flow easily toward the correct answer.	Correct starting equations. And either: all math steps clearly shown but minor errors yield wrong answer. OR: correct answer but the math steps are unclear.	Correct starting equations. The mathematical steps are hard to follow and errors begin to impede application.	Can identify at least one equation, but unable to apply them.	Incorrect equations; demonstrates little or no understanding of mathematical concepts involved.
Answer (A)	100% correct answer (analytically, numerically & conceptually)	Correct answer analytically, but not numerically	Incorrect answer, but on the right path.	Unable to reach a correct answer on this path.	No answer.

Finally, if provided ahead of time, a good rubric can help the learner prioritize tasks, develop understanding and skill and make dependable judgments about the quality of their own work.

You can create rubrics in Canvas, or using other online tools.²

¹Downloaded on 7/17/18 from: <http://appeal.physics.tamu.edu/images/Physics%20Homework%20Rubric.pdf>

² community.canvaslms.com/docs/DOC-12861-4152724129, rubistar.4teachers.org or rubric-maker.com/