

Hi everyone,

Thanks for the feedback this Friday. There was information in many directions:

Many people indicated satisfaction with a direction they have chosen to study.

I have had requests for examples. To this, I refer you to worked examples in your text and HW problems at the end of the chapters, the sheet of past problems posted on our website, and many online opportunities including Khan Academy worked examples. If you need more examples, please ask me and I'll do my best to teach you how to find some.

There was strong support for the opportunity to retake parts of MT2.

You have asked that grades on PolyLearn are updated. I'll attempt to do this Tuesday.

Several people requested that I correct MT2 grades for the fact that the exam was "too" long and/or "too" hard. I have a few responses to this. You will have many exams at Cal Poly that many people will do poorly on or not be able to finish. It may seem that there is something wrong with the exam, because the alternative interpretation is that there is something wrong with the students. However, instructors usually have neither perspective. Please ask some upper division-engineering students if they have had exams with a class average less than 50%. This doesn't mean that most of the students failed. The instructor may feel, "good, there were some hard questions, but students showed some understanding. This exam challenged them." The instructor knows the exam is difficult and has no problem with the fact that the average is low. A low average doesn't mean that the final grades will be low because it is the instructor, not the average that determines the final letter grade. It would be good for the student to also have no problem with this. So, I find that there is nothing about the MT 2 exam score that needs to be "corrected". You are graded in this class neither competitively, nor on an absolute scale. I provide your grade, and I know that this exam was harder, so the grade is already corrected. I recognize that most freshmen have a long history of watching grades. I also understand that students who are concerned about their grades perform worse than students who are not concerned about their grades. The logic is that we can really only think about one thing at a time. If you're thinking about your grade, and especially if you have anxiety, it compromises the attention you might give whatever it is you are doing or studying at the time. The conclusion for the study supporting this (Deci, E., Koestner, R., & Ryan, R.; 2001; Extrinsic Rewards and Intrinsic Motivation in Education: Reconsidered Once Again. Review of Educational Research) is provided below. You are welcome to do what you like with this information, but my advice is to recognize the anxiety and attention on grades as the "problem" rather than the grade itself. I accept that making this change is difficult.

In any case, despite the grades being pretty good, in the class as a whole, there were enough questions not done correctly to motivate providing a means to try again. Students who want to try again will have 15 minutes on each question during class time as indicated on the webpage week 9 timeline:

Monday, Nov. 17, question #1

Tuesday, Nov. 18, question #3

Wednesday, Nov. 19, question #4

Thurs/Fri, Nov. 20/21, question #5

You will submit your quizzes with your original test. I will correct your retake question and subtract 20% from it because it is a retake. If this grade is higher than your original effort, I will substitute the new grade into your midterm grade. We will separate the classroom into a “retaking section” and a “working on classwork section.” As soon as you hand in your retake question, you move to the other section of the room and do classwork. It is interesting to me that our flipped classroom model allows us to do this without compromising content, because there’s not much lecturing done in class. I caution those retaking a question that they must allow extra time for physics in order to both study for the question and stay current in the new material!

While grades were lower on MT2, than MT1, they were still much better than years’ past. The class average was  $34 \pm 7.2$  for the 10 AM class and  $29 \pm 7.9$  for the 1 PM class. The uncertainty of these averages is called the “standard deviation of the mean”, which is equal to the standard deviation divided by the square root of the number of people in the sample (about 50 for each class). So, the uncertainty for these averages is about 1 point, meaning that the 5-point difference between the two classes is very significant.

We will have a quiz next Wednesday Nov. 12 on gravity, the inverse square law, and potential energy diagrams, consistent with Week 8 timeline.

“I really like the way you teach the class because the way I think about physics has positively changed. Thinking about the concepts first has helped me in this class and applications in other classes. Encouraging group work has really helped me too.”

**From the paper I referenced above:**

Summary and Conclusions

To summarize, results of the meta-analysis make clear that the undermining of intrinsic motivation by tangible rewards is indeed a significant issue. Whereas verbal rewards tended to enhance intrinsic motivation (although not for children and not when the rewards were given controllingly) and neither unexpected tangible rewards nor task-noncontingent tangible rewards affected intrinsic motivation, expected tangible rewards did significantly and substantially undermine intrinsic motivation, and this effect was quite robust. Furthermore, the undermining was especially strong for children. Tangible rewards-both material rewards, such as pizza parties for reading books, and symbolic rewards, such as good student awards-are widely advocated by many educators and are used in many classrooms, yet the evidence suggests that these rewards tend to undermine intrinsic motivation for the rewarded activity. Because the undermining of intrinsic motivation by tangible rewards was especially strong for school-aged children, and because studies have linked intrinsic motivation to high-quality learning and adjustment (e.g., Benware & Deci, 1984; Ryan & Grolnick, 1986), the findings from this meta-analysis are of particular import for primary and secondary school educators.

Specifically, the results indicate that, rather than focusing on rewards for motivating students' learning, it is important to focus more on how to facilitate intrinsic motivation, for example, by beginning from the students' perspective to develop more interesting learning activities, to provide more choice, and to ensure that tasks are optimally challenging (e.g., Cordova & Lepper, 1996; Deci, Schwartz, et al., 1981; Harter, 1974; Reeve, Bolt, & Cai, 1999; Ryan & Grolnick, 1986; Zuckerman, Porac, Lathin, Smith, & Deci, 1978). In these ways, we will be more able to facilitate the type of motivation that has been found to promote creative task engagement (Arnabile, 1982), cognitive flexibility (McGraw & McCullers, 1979), and conceptual understanding of learning activities (Benware & Deci, 1984; Grolnick & Ryan, 1987).

