

A new comprehensive final exam

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My objectives for an ideal final exam:

- **Clearly evaluates a student's mastery of the set class goals.**
- **Requires review of all the material, *beginning to end*.**
- **Leads to further insights about the subjects covered.**
- **Makes connections between and shows the interdependence of the various topics.**
- **Isn't stressful for students (*or me*).**

A new kind of final exam

During the term:

- **Instructor formulates (20) complex questions covering all course topics.**
- **Questions are numbered 1-20 so that the topics form a natural sequence for the course.**

7-10 days before the scheduled exam:

- **Provide students with the 20 questions – i.e., give them the final exam!**
- **Each student will present the answer to one of these questions – but they don't know which one. They should prepare answers for all 20 questions.**
- **Students may collaborate as they prepare.**
- **Each student can bring notes, limited to 3 sheets of paper, front and back, to the scheduled final exam. These notes are handed in.**

At the exam:

- **Each student picks a unique number from a hat. This is the question that that student will answer.**
- **Students are given 15 minutes to prepare a presentation in answer to their assigned question. They may use their notes to prepare.**
- **Presentations are called in order, 1 – 20.**
- **Each student has 5 minutes to present their answer and 2 minutes to answer questions.**
- **Students in the audience must write comments, questions, or observations for each of their peers' presentations. These notes are handed in.**

- **Grades are given as follows:**
 - **50% for thoroughness, accuracy, clarity and completeness of the answer to their assigned question**
 - **50% for the detail, quality, and relevance of their notes on other students' presentations.**

Lessons learned:

- **Explain the format of the final at the beginning of term. Don't surprise them with it.**
- **Provide practice!**
 - **Assign homework questions that model the type of questions on the final.**
 - **Randomly choose student to present an answer to the HW during the next class. WARN THEM first.**
- **Include additional assessments during the semester – mid-terms, essays, etc.**

Lessons learned:

- **Make sure grading is well-balanced between their talks and their peer assessments.**
- **Take breaks at reasonable intervals.**
- **Refreshments help.**

This final exam achieves:

- A review of all the material.
- “Good” questions require connections to be made, problems to be solved.
- Practice in presenting coherent, well-formulated answers.
- The final becomes a concise summary of the entire course as questions are answered.
- Allays student fears: “What should I study? What is important?”

A sample question:

You live in a moon colony. You can see the earth in your “sky.”

- **Describe a typical lunar day.**
- **What kind of eclipses would you see while living in this colony?**

For the future:

A repository of “good” questions which necessitate thinking across topics and present simple astronomical puzzles that require application of learned material.