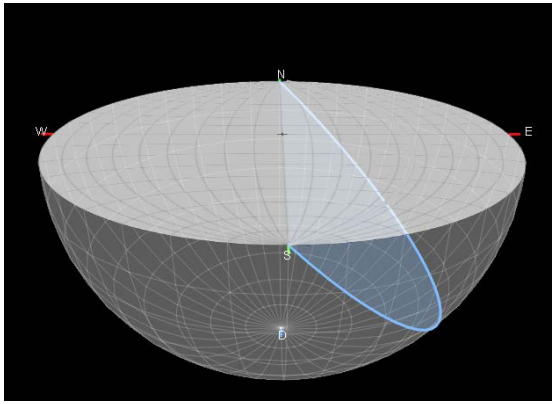
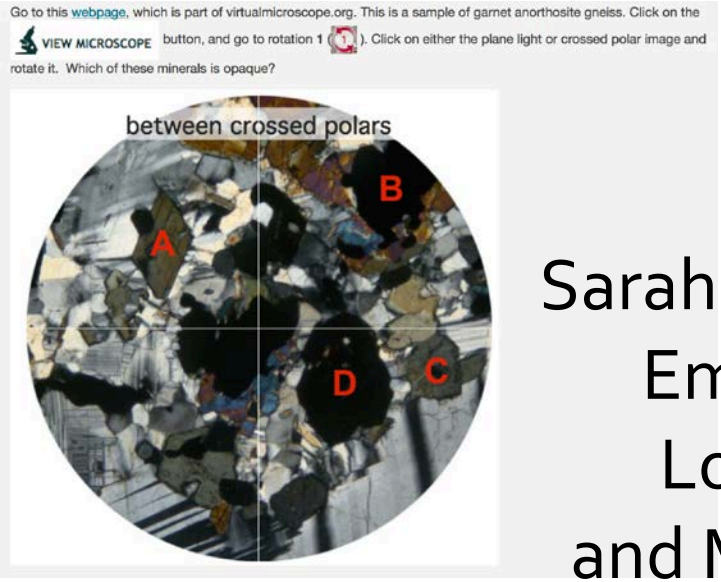
Benefits and Challenges of Pre-lab Assignments





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Structure:

1) What are the benefits & challenges of pre-lab assignments?
2) How to make effective pre-lab assignments
3) Results of mid-semester surveys
4) Future Improvements

1. Benefits of pre-laboratory assignments:

- Attempt to understand material the first time at own pace
- Students are better prepared for labs
- low-level knowledge addressed in pre-lab; better use of lab time
- Ensure students have the same background knowledge
- Provide feedback that promotes learning
  - immediate feedback allows students to monitor performance
- TA's can identify possible trouble areas and address in lab

1. Potential Challenges

1) Labs must be completed w/in lab period due to access to equipment and/or samples
   - Completion rather than comprehension is outcome
2) If multiple lab sections trouble with timing of lectures with lectures
   - Timing of lectures and labs differ; some labs before lecture
3) Lectures aren't correlated with labs
4) Students don't prioritize preparing for labs

1. Potential Challenges

5) Simulating equipment online
   - Virtual microscope
6) Website dependency
7) Student buy-in
   - Difficult to see the value of pre-labs and relationship to labs initially

2. How to make effective pre-lab assignments

Goal-directed practice with **targeted feedback**

1) Clearly articulate goals
   - ~~"understand how to…"~~
   - State in terms of something students **do**
     - e.g., plot (both lines and planes) on stereographic projections.
2) Identify appropriate level of difficulty of questions

From How Learning Works, Ambrose et al.,2010

2. How to make effective pre-lab assignments

3) Allow for multiple opportunities for practice
4) Provide scaffolding of questions
5) Model how to solve a problem
   - Provide links to videos, ppt slides, or websites
6) Give examples of what you don't want
7) Provide immediate feedback

From How Learning Works, Ambrose et al.,2010

Explicit about student expectations

The goal is NOT to trick them – they're just beginning to learn

- This is a formative assessment
- promotes regular and consistent effort all term

Must be EXPLICIT with the students about expectations,

- NOT expected to 'teach' themselves the material and understand it all 100%
- re-iterate the benefits to the students for why they should DO the pre-lab (properly).

after Cynthia Heiner

3. Results: mid-semester survey

Table 1. Results from Likert-style questions on mid-semester survey on pre-labs for EOSC 323 Structural Geology

Question	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. "I think the pre-lab assignments are too easy."	5	32	16	4	0
2. "I think the amount of time I spend on the pre-lab assignments is reasonable for the amount of marks they are worth."	1	13	7	35	1
3. "I find it confusing when there are two parts to a pre-lab assignment, which have to be submitted in different ways."	7	16	8	22	4
4. "If the pre-lab assignments were not worth marks, I would not complete them."	8	15	11	15	7
5. "Completing the pre-lab assignments ensures that I am prepared for the lab."	2	9	11	29	6
6. "I learn more in the lab because I have completed the pre-lab assignment."	2	10	8	32	5
7. "The amount of feedback I receive on my answers to the pre-lab questions is sufficient."	3	15	15	21	2
8. "I will use my marked pre-lab assignments to study for the final lab exam."	2	7	9	30	7

3. Results: mid-semester survey

Structural Geology:

The thing that is most helpful about the pre-labs is…

- Forces myself to be prepared, to have the materials read before lab.
- I get familiar with the actual lab and learn a lot more, because you get to experience the exercises several times.
- The fact that they help me better understand the material in the lab.
- They are a good level of difficulty and don't take up too much time. They help me get thinking about the lab beforehand so that I'm not jumping straight in at the deep end.
- They make sure the majority of the people in the lab are on the same page and can make better use of their time in the lab. Also, there are less people wasting the TA's time so that the TA can be available to everyone. In short, it is actually more fair.

3. Results: mid-semester survey

Structural Geology:

If there was one thing I could **change** about the pre-labs it would be…

- Nothing.
- Nothing really, the pre-labs are good.
- To maybe add in an optional section not worth marks which covers harder material similar to those encountered in lab, or maybe a section that doesn't include questions, but covers more advanced concepts.

3. Results: mid-semester survey

Structural Geology: (Changed for Petrology pre-labs)

If there was one thing I could **change** about the pre-labs it would be…

- *Have the pre-labs due before my lab
- **Give immediate feedback

*All pre-labs were due on Monday

** Feedback given on Friday after last pre-lab due

4. Future Improvements based on Student Feedback

- "...have them more related to the particular lab that was being completed that week."

  Restatement of lab learning goals to reinforce connection between pre-labs and labs

- "...document with all the information I need to know, including images of things I am supposed to see."

  Create Pre-lab videos, model what an expert would do.

  e.g. steps to identify a mineral in thin section