

Personal Information

1. Why did you enroll in Biol18? (Select all that apply.)
 - Major requirement
 - Minor requirement
 - General interest
 - University requirement
 - Pre-health requirement
2. What class year standing are you?
 - First year
 - Second year
 - Third year
 - Fourth year
 - Post-bac
3. Did you take Biol 18b?
 - If so, during which semester did you take it?

Concept Review (Answer only if you took Bio18b in the past.)

1. Did you attend concept review?
 - Yes No
2. How frequently did you attend concept review?
 - Never Sometimes Frequently Almost every week
 - I would have gone, but I had a scheduling conflict
3. When did you start attending concept review?
 - From the beginning of the semester
 - After the first exam
 - After the first lab report
 - Only before exams
 - I never attended concept review
4. What was the most helpful aspect of concept review? (Select all that apply.)
 - Being able to ask questions
 - Trouble-shooting data
 - Going over concepts
 - Having a discussion with the professor
 - Peer discussion
 - Other _____

5. How useful was concept review in helping you prepare for the exam? Please rate on a scale of 1-7, where 7 is the most helpful and 1 is the least helpful.
6. How useful was concept review in helping you write lab reports? Please rate on a scale of 1-7, where 7 is the most helpful and 1 is the least helpful.

Project-based Lab (Answer only if you took Bio18b in the past.)

1. How valuable to your learning was it to perform an experiment that had never been performed before? Please rate on a scale of 1-7, where 7 is the most valuable and 1 is the least valuable.
2. To what extent did designing your own experiment affect your interest in the semester-long project? Please rate on a scale of 1-7, where 7 is the most valuable and 1 is the least valuable.
3. Would you elect to take another lab where you design your own experiment if it was offered?

Yes No

4. How valuable was being able to trouble-shoot real scientific experiments to your learning? Please rate on a scale of 1-7, where 7 is the most valuable and 1 is the least valuable.

Pre-lab Talks (Answer only if you took Bio18b in the past.)

Please rate on a scale of 1-7, where 7 is the most valuable and 1 is the least valuable.

1. How useful were TA pre-lab talks in:
 - a. clarifying/answering the pre-lab questions?
 - b. explaining the procedure?
 - c. tying together the practical/procedural aspects of the lab to the purpose of the experiment and the underlying scientific concepts?
2. How often did:
 - a. pre-lab talks extend beyond addressing the pre-lab questions?
Always Sometimes Rarely Never
 - b. you find the pre-lab talks to involve irrelevant information?
Always Sometimes Rarely Never

Pre-lab questions (Answer only if you took Bio18b in the past.)

Please rate on a scale of 1-7, where 7 is the most valuable and 1 is the least valuable.

1. How useful were pre-lab questions in helping you prepare for the lab?
2. How useful were pre-lab questions in helping you understand the purpose of the lab?
3. How useful were pre-lab questions in helping you prepare for the exam?
4. How useful were pre-lab questions in helping you learn to answer open-ended questions?

Post-lab questions (Answer only if you took Bio18b in the past.)

Please rate on a scale of 1-7, where 7 is the most valuable and 1 is the least valuable.

1. How useful were post-lab questions in helping you understand the data and concepts presented in lab?
2. How useful were post-lab questions in helping you understand the purpose of the lab?
3. How useful were post-lab questions in helping you prepare for the exam?
4. How useful were post-lab questions in helping you learn to answer open-ended questions?

Lab Reports(Answer only if you took Bio18b in the past.)

Please rate on a scale of 1-7, where 7 is the most valuable and 1 is the least valuable.

1. How useful were the lab reports in understanding the purpose of your experiment?
2. To what extent did writing a Discussion section help you interpret and understand your data?
3. How useful was writing your lab report in learning how to find appropriate primary literature?
4. How useful was the primary literature in understanding your experiment?
5. How useful was writing a full lab report in connecting individual labs through the semester?
6. How useful was the rubric as a guideline to write your report?
7. How challenging was it to separate the Results section from the Discussion section the first time you wrote a lab report?
 - Extremely challenging
 - Mildly challenging
 - Not challenging at all
8. How challenging was it to separate the Results section from the Discussion section the final time you wrote a lab report?
 - Extremely challenging
 - Mildly challenging
 - Not challenging at all

Rewrite (Answer only if you took Bio18b in the past.)

Please rate on a scale of 1-7, where 7 is the most useful and 1 is the least useful.

1. How useful were the rewrites in (better) understanding your experimental purpose?
2. How useful were the rewrites in learning to critique your own work?
3. How useful were the rewrites in learning to write concisely?
4. How useful was the rewrite in helping you distinguish between sections of a lab report?
5. How useful was the feedback (rubric scores and comments) from the first draft in doing the rewrite?

Retention (All students should answer this question.)

1. What is the central dogma of biology? How did we use it in Biol18b?
 - b. How confident are you in your answer? Please rate on a scale of 1-7, where 7 is the most confident and 1 is the least.
2. You perform a transformation and calculate a viable count of 5000 cells/mL of your transformed solution.
 - a. If your transformation efficiency was 5%, how many colonies would you expect to see if you plate 100 μ L of cells onto selective media?
 - b. How confident are you in your answer? Please rate on a scale of 1-7, where 7 is the most confident and 1 is the least.
3. Write a purpose for the 10 week project lab you performed last semester.
 - a. How confident are you in your answer? Please rate on a scale of 1-7, where 7 is the most confident and 1 is the least.

Other (Answer only if you took Bio18b in the past.)

1. How often did you go to **your** TA's office hours?
 - From the beginning of the semester
 - After the first exam
 - After the first lab report
 - Only before exams
 - I never attended office hours
2. How often did you go to **any** TA office hours?
 - From the beginning of the semester
 - After the first exam
 - After the first lab report
 - Only before exams
 - I never attended office hours of other TAs
3. How often did your TA time spent in office hours address grading issues?

Always	Sometimes	Rarely	Never
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4. How often did your time spent in office hours address conceptual questions?

Always	Sometimes	Rarely	Never
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Appendix B: PCR pre- and post-lab questions

Pre-lab Assignment

Please answer the following questions in your lab notebook before class. You will be required to turn answers in at the beginning of the laboratory section (1:10 pm). Late pre-labs will not be accepted under any circumstances.

- A. Write a purpose for this lab in its entirety.
- B. Draw out the result of four rounds of PCR replication on your pQE.1 plasmid. For each round of amplification, be sure to label your primers, the directionality of the primers, where and how the primers anneal, CRYGD in the plasmid, where the mutation is incorporated and the fate of the original template.

Post-lab Assignment

- A. Your PCR reaction tube contained the following:

Match each component to the correct function listed below and write your selection(s) on the line following. (Choose all that apply.)

Pfu Polymerase _____, dNTPs _____, Buffer _____

- a. unwinds DNA
- b. synthesizes new DNA strands
- c. enzymatically catalyzes PCR
- d. nucleotide source for new DNA strands
- e. energy source for reaction(s)
- f. repairs errors in base pair matching
- g. maintains pH and salt levels
- h. creates polymer chains

- B. What is a primer? (Select all that apply.)

- a. a piece of RNA responsible for replicating DNA
- b. a piece of DNA that is polymerized into chains
- c. a piece of DNA responsible for selecting the region to be “PCRed”
- d. a piece of DNA responsible for activating the polymerase
- e. a protein which binds to the region of interest
- f. a piece of DNA responsible for activating the downstream teleporter

- C. Match the following steps in a PCR cycle with their function. (Select all that apply.)

1. 94° 4 minutes _____

2.	94°	30 seconds	_____
3.	55°	30 seconds	_____
4.	70°	60 seconds	_____
5.	Repeat steps 2-4	30 times	_____
6.	4°	Indefinitely	_____

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|-------------------------|---------------------------|------------------------------|
| a. initial denaturation | b. dNTP mating | c. renaturation |
| d. primer annealing | e. new DNA extension | f. polymerase unwinding |
| g. refrigeration | h. secondary denaturation | i. degradation of excess DNA |

D. You have verified that your PCR did not work.

1. When setting up your reaction you added all components individually and forgot to add dNTPs. Why didn't your reaction work?
2. In another experiment, you added all needed components properly including your primers and template DNA, but your PCR still doesn't work. One change was made to the protocol in Part C—in step 1, you performed your reaction at 50° instead of 94°. Why didn't the reaction work?
3. In the next attempt, you add dNTP's, polymerase, buffer and your primers, but forgot to add your template DNA. While the PCR is running realizing that the third time was not the charm. Why did you know that the reaction could not work without template DNA?
4. In one final experiment, you add all of the necessary components and program the PCR to cycle under the following temperatures:

Denaturation 94°, 60 sec; Annealing 45°, 2 min; Elongation 72°, 2 min.

You find out that the third time is the charm, but now you have many small incomplete fragments instead. What happened and how do you fix it?