

Pre-survey 2007

1. What is your Student ID #?

2. Did you take Biocore 302 lab (Ecology, Evolution, & Genetics) last fall?

Yes
No

3. What is your major?

4. Do you work or do research in a faculty lab? If so, what techniques have you used?

5. What other biology or biochemistry coursework have you completed?

6. What biology or biochemistry courses are you taking this semester?

7. Rate your ability to accomplish the following tasks:

I am not confident in my ability to complete this task.	I am somewhat confident in my ability to complete this task.	I am very confident in my ability to complete this task.
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1. Explain the steps involved in PCR.
2. Explain the steps involved in primer design.
3. Explain the steps involved in gel electrophoresis.
4. Explain the steps involved in RNAi.
5. Perform BLAST alignment.
6. Use aseptic technique.
7. Use dissecting microscopes.
8. Use books to gather information about new scientific techniques and concepts.
9. Use the Internet to gather information about new scientific techniques and concepts.
10. Use databases to gather information about new scientific techniques and concepts.
11. Use colleagues/peers to gather information about new scientific techniques and concepts.
12. Interpret data from techniques and draw logical conclusions.
13. Troubleshoot problems during scientific experiments.
14. Work effectively as a member of a group.
15. Present scientific research in poster form.

8. Rate your ability to explain the theory underlying the following scientific techniques:

I am not confident I can explain the theory behind this technique.	I am somewhat confident I can explain the theory behind this technique.	I am very confident I can explain the theory behind this technique.
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1. PCR
2. gel electrophoresis
3. RNAi

9. Rate your understanding of these topics:

I have never heard of this topic.	I have heard of this topic, but I am unsure what it is or how it relates to the <i>C. elegans</i> lab.	I understand this topic, but I am unsure how it relates to the <i>C. elegans</i> lab.	I understand this topic and how it applies to the <i>C. elegans</i> lab.	I understand this topic, how it applies to the <i>C. elegans</i> lab, and I am able to apply knowledge of this topic to other contexts.
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1. DNA structure (nucleotide bases and base pairing, bonds, double helix structure)
2. DNA directionality (5 prime to 3 prime)
3. The steps in the polymerase chain reaction (PCR)
4. Sequence alignment programs such as BLAST
5. Gel electrophoresis
6. Gene structure
7. DNA deletions
8. DNA primers
9. RNA interference (RNAi)
10. Alleles
11. DNA replication
12. RNA transcription
13. Translation
14. Genotype versus phenotype
15. How genetic mutations can cause disease
16. Use of model organisms in human disease research

10. Choose the statement that best reflects your confidence in using the following online bioinformatics tools:

I have never heard of this tool.	I am not comfortable using this tool.	I can use this tool in class with guidance, but not on my own.	I can use this tool on my own.
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1. BLAST
2. Jmol imaging
3. NCBI database searches
4. SMART
5. Wormbase
6. OMIM
7. PubMed

11. What is wrong with this statement? *When using gel electrophoresis to separate DNA, RNA, or proteins by size, the largest molecules migrate faster in the agarose gel in response to the electric charge differential in the buffer.*

**12. Below is a short sequence of DNA written in the 5 prime to 3 prime direction.
Please write the reverse complementary sequence and indicate the directionality of both strands.**

5 prime ATCGTAACGTCGTGAATGCCGTAC 3 prime

13. Please answer True or False to the following questions and explain your answer.

TRUE FALSE

Positive controls, when available, are essential to scientific experiments

Negative controls are not necessary because they will not show any results.

14. How does RNA interference work? Select all that apply.

Knocks down gene function by causing mRNA degradation.

Knocks down gene function by causing DNA degradation.

Knocks down gene function by destroying ribosomes.

15. In which of the following organisms does RNA interference occur? Select all that apply:

C. elegans

plants

Drosophila

mice

humans

16. Please answer True or False to the following question about RNA interference: *RNAi* may someday be used to treat human disease.

TRUE FALSE

17. Explain your answers to the above question here:

18. Choose the statement that best reflects your confidence in proposing new experiments in cell biology:

I can do experiments that have been planned out, but have problems thinking of experiments that could be done next to learn more.

I can think of ideas for new experiments but don't know how to go about them.

I can think of ideas for new experiments and feel confident that I could carry out at least some of them (if I had the resources).

19. Choose the statement that best reflects your opinion on the utility of model organisms.

Studying model organisms like flies (*Drosophila*) and worms (*C. elegans*) can tell us about how biological processes occur in these organisms in particular, but aren't very useful for understanding how biological processes occur in humans.

Some model organisms, like mice, are useful because their bodies work similarly to humans in some ways but other model organisms, like flies (*Drosophila*) and worms (*C. elegans*) are not very useful.

Model organisms (including *Drosophila* and *C. elegans*) can be very useful for identifying and studying conserved biological processes.

20. To get credit for this check assignment, print up this final page ONLY, sign your name in the box below,