1. What is the purpose of this lab?

2. What precautions will ensure the health of your snails?

3. What 4 things should your scientific drawings include?

4. What is a hypothesis?

5. Why do you include a control group in your snail experiment?
Lab #1: To Know A Snail

Form groups of 3 or 4 students. In this lab, you will use the majestic snail as a model for the scientific inquiry into life. You will follow the scientific method: 1) Observation, 2) Hypothesis, 3) Prediction, 4) Experimentation, and 5) Conclusion. You will design and conduct experiments to test a hypothesis about snail biology. From this experience you will develop a greater appreciation for the scientific process.

Precautions: Keep your snails INTACT and HEALTHY throughout the entire lab. Do not grasp its shell too strongly as it can crack. Don’t expose the snail to large amounts of sugar or salt as this can dehydrate the snail and cause it to foam. If your snail begins to foam, rinse it well in tap water.

Activity 1: Observation and Drawing

A prerequisite of any biological research is careful, thorough observation of a living organism or process. You can then use your observations to create hypotheses about the snail.

1. Obtain 2-3 snails, a tray or Petri dish, a glass rod, some water and a dissecting microscope. Place your snails in the tray. Use a few drops of water on the snail if it is inside its shell and not moving. Use a dissecting scope to see the detail of the shell, head, and skin surface. Watch the snail’s movement and behavior for at least 5 minutes.

While watching your snail, describe it in detail (write down its movement, behavior, size, shape, color patterns, speed, etc). Make note of anything interesting about snail biology that you observe.

2. Take about 20 minutes and make a large scientific drawing (a side view) of your snail (~3/4 page of an 8 1/2” x 11” sheet of paper). Your scientific drawing must include; 1) a title, 2) your name and date, 3) a scale bar, and 4) labels of the prominent features of your specimen (see page 376 of your textbook as an example). Submit this drawing, along with your notes and observations, with your lab report.

Activity 2: Plan Your Experiment

Your group will now design a scientific experiment to test a hypothesis. Each experiment needs to have an experimental group and a control group. The experimental group will be exposed to a variable that you wish to test (a substrate, food, or stimulus). The control group experiences the same conditions as the experimental group but does not have the one variable you are testing. So you might choose 4 snails of roughly the same size and activity level. Place two in an empty tray and wait for one minute, recording the behavior of both snails (your control group). Place the other two snails in an identical tray and test them with a variable, recording the behavior of both of these snails (your experimental group). Compare your observations from both groups to see if there was any significant difference. The purpose of the control group is to have a set of results that you can compare to the results from the experimental group in order to make meaningful conclusions.

Write down 3 questions about any aspect of snail biology that you might be able to answer by performing a simple experiment.

1. With the members of your group, discuss and choose a hypothesis. A hypothesis is a tentative explanation, or educated guess, about an observation or event. A hypothesis is a statement that can be tested using the scientific method. Consider the available materials (see below) when choosing a hypothesis to test.
Write down the hypothesis your group wishes to test (i.e., Snails are carnivores and eat only meat, or Snails move faster on water than on land).

2. Design your experiment(s). An array of experimental materials is available to you in the classroom (see the list below). Be creative, but keep it simple. For example, if you want to test your snail’s response to sand, do not put food onto the tray at the same time. Test only one thing at a time, decide exactly what data you will collect (should include both observations and some measurements) and set a time limit for the actual experiment (~5 minutes should be adequate). Here are a few ideas for experiments that have been done in the past.

Test speed of snails over a particular substrate Test response of snail to a food or stimulus
Test response of snail to light or shade Test food preference of snail

Experimental materials:

- Petri dishes and trays
- Thermometer
- Squirt bottles with water
- Lamps to create heat at one end of a temperature gradient
- Variety of substrates for snails to crawl on (stones, sand, gravel)
- Selection of food items (e.g. lettuce, sprouts, sugar, tomato, carrot)
- Paper towels
- Glass rods

3. Create a prediction of what you expect to see before you perform your experiment. Your prediction can be different from that of your other team members. Think carefully about why you think your prediction is accurate.

Write down your prediction(s) and explain why you think it is accurate.

Activity 3: Perform Your Experiment

1. Following your experimental design, gather the materials needed. Place your snails into trays (experimental group and control group) and give them time to adjust to their new environment. This will allow you to distinguish between the snail’s response to being moved and it’s response to the experimental variable. Remember, have only one factor that is being tested. In every other way the control group should be identical to the experimental group.

2. Perform the experiment and collect your data. Your data should include careful detailed notes of each group’s responses and behaviors in the experiment. Each person should make their own observations and record results as they are happening.

Record your experimental results (observations, measurements, # of trials, etc).

3. Reflect on the experimental data. Record your answers to the following questions: Did the data support your hypothesis? Was your prediction supported by the experimental results? What can you conclude about snail biology from your experiment? What new experiments might be performed to answer any questions that arose from the experiment?
Lab Report and Questions

1. Submit your drawing and your detailed notes describing the snail that you observed.

2. From your observations, what 3 things did you learn about snail biology that was interesting or that you did not know before?

3. What was your hypothesis? Explain how and why you came up with that particular hypothesis.

4. Submit your experimental design and procedure. Include a list of all materials used. Describe how you ran your experiment, what your control was, what was the variable being tested, and what qualitative and quantitative data you collected.

5. Using a table (or graph), display the results of your experiment (for both control and experimental groups).

6. Discuss your results. Compare the results from both control and experimental groups and discuss any differences/similarities. Were the differences due to the variable tested? Submit your answers to questions in Activity 3, #3.

7. What did you learn about the scientific process from this lab activity? Was it what you expected? Was it fun, difficult? Was creating a hypothesis, an experimental design, and collecting results challenging? Was it creative?