Where's the Starch?
Lab Practice

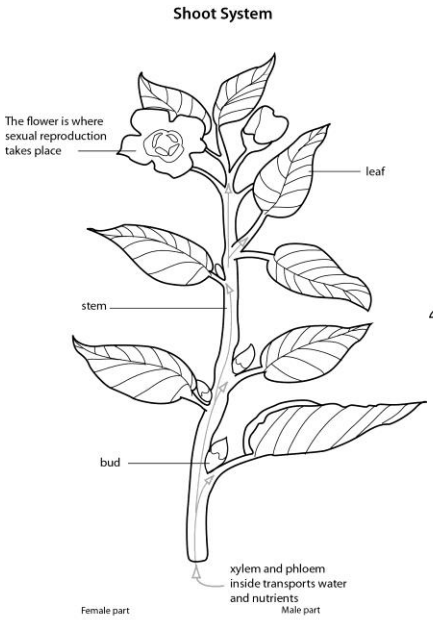
In recent years there has been a focus on practices in science classes. The use of practice here means a focus on how scientists **practice** science. With a science practice such as this one, students are given a problem and asked to solve it. Students are expected to solve it using what they have learned or can learn. In addition to solving the problem, students are asked to design an experiment and to write the materials list and procedure portion for the experiment. It is a good exercise for understanding the process scientists use when practicing science, starting with the question and working with it until he or she has produced a written piece so that others can use the same procedure to get the same results.

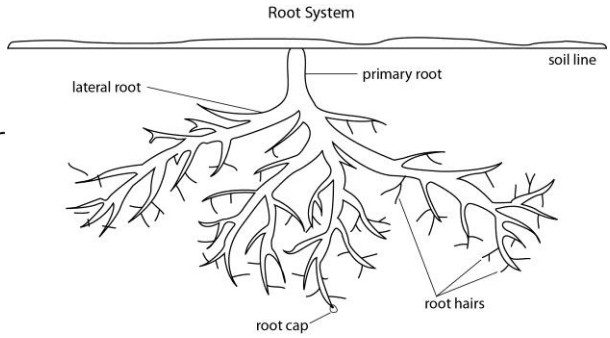
If you do use it, I would love to hear your feedback about it. Did you have fun practicing science?

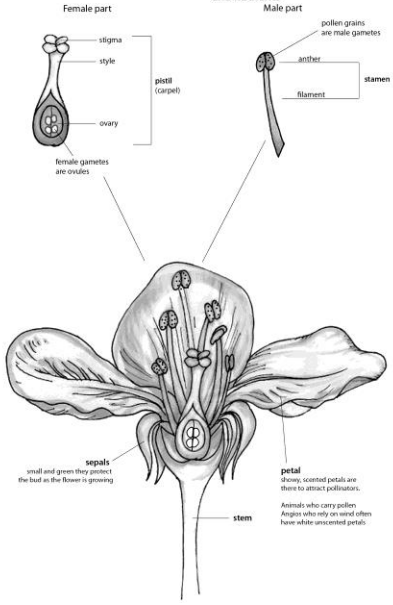
An Experiment within an Experiment
As I was dissecting the plant and flower for the chapter 12 and 13 labs in *RSO Biology 2*, I wondered where the plant and flower I was dissecting stored its starch. I started to write the procedure into the experiments to tell you how to answer that question. Then I realized how much fun **you** would have designing an experiment to answer that question.

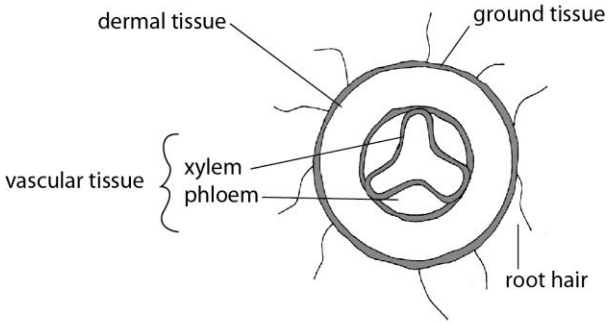
1. Experiments start with a question. The question for this experiment is: **Where does a plant and flower store starch?**
2. You might, or might not if you have been using *RSO Biology 2* and paying attention, need to do a little research to find out what starch is and why plants store it. However, research alone is not enough. **You should not look for the answer to this question on-line**. You have enough knowledge to develop an experiment without someone else doing it for you.
3. You need to think of a procedure to use for this experiment. The procedure for an experiment is the set of steps you will perform to try and answer your question. Write down the procedure. The procedure is figured out first, and then you will write the materials list based on the procedure.
4. You need to make the list of materials you will use. Write down your materials list.
5. Perform the experiment to see if your method works. If it doesn't, don't give up. Go back to the drawing board, rethink it, and come up with a different or refined method.

If you have one, don't forget your microscope when looking for signs of where starch might be stored.









The root has all 3 tissues in it.

Hypothesis:
Materials
Procedure
Observations:
Diagrams and Pictures: see attached lab sheets
Results and Calculations:
Conclusions:

Lab Report Format

1. **Title** - Make it short and descriptive.

2. **Purpose** - Describe your reason for conducting the experiment. What are you trying to learn, or discover?

3. **Hypothesis** - Briefly, make an educated guess about the outcome for the experiment. Do this BEFORE conducting the experiment.

4. **Materials** - Make a list of the items you used for the experiment.

5. **Procedure** - Make a list of the steps you performed when conducting the experiment.

6. **Results or Results and Calculations** (depending on whether the lab has calculations) - The results section will have your findings. It will not have a paragraph telling what you learned. That goes in the conclusion (sometimes called discussion and conclusion) section. The results section will include:

- Observations
- Data tables, graphs, and charts
- Notes and drawings

Example: Let's say you performed a study looking at the distribution of bird species in your area, you saw ten birds total. Three of the birds were blue jays. The raw numbers would be in the results and calculations section. In the calculations section you would have calculated the percentage of blue jays 3/10 x 100 = 30%

7. **Conclusion**

- **Summarize what you learned, in paragraph form.**
- **Include the numerical results from your results and calculation section.**

Example: The sentence in the conclusion section would be: 30% of the birds in the study area are blue jays.

There are exceptions, but in science write-ups, it is usually best to leave the numbers as numbers not written up as words. The numbers are important and should "pop" out at you.

- **State whether you accepted or rejected your hypothesis.**
- **If you think there are problems or weaknesses with your experiment, discuss them in this section.**

Example: The bird study has a big weakness. Ten birds is a very small a sample size from which to make significant conclusions about a population distribution. You need to address this weakness in your paper. Maybe other bird species are shyer than blue jays, or maybe it is the dead of winter in a very cold location and you feel lucky you saw even ten birds.

If you are having trouble getting started with the written part of your experiment, read over the write-up for the experiment. You can use what the author of the lab instructions has written **as a starting point**. Do not copy language directly from the author. That is plagiarism.

Notes for Parents

I am not going to give any advice about how to do it. Email me if you need help blairleescience@gmail.com. The lab activity fits well while students are doing chapters 12 and 13, but this lab activity could be done any time. You do not even need to be using *RSO Biology 2* to do it however. For students who are not using *RSO Biology*, kids should be familiar with the starch test.

I have included a Lab Report Sheet and guidelines for writing a lab report, in case you want your student to write a lab report to go along with this. If you are using this with a high school student, I recommend having them write a lab report for this lab practice. You can include this lab practice in his or her portfolio.

If you need to give advice to get him or her started, start with this. “Have you researched how starch is detected in plants?”