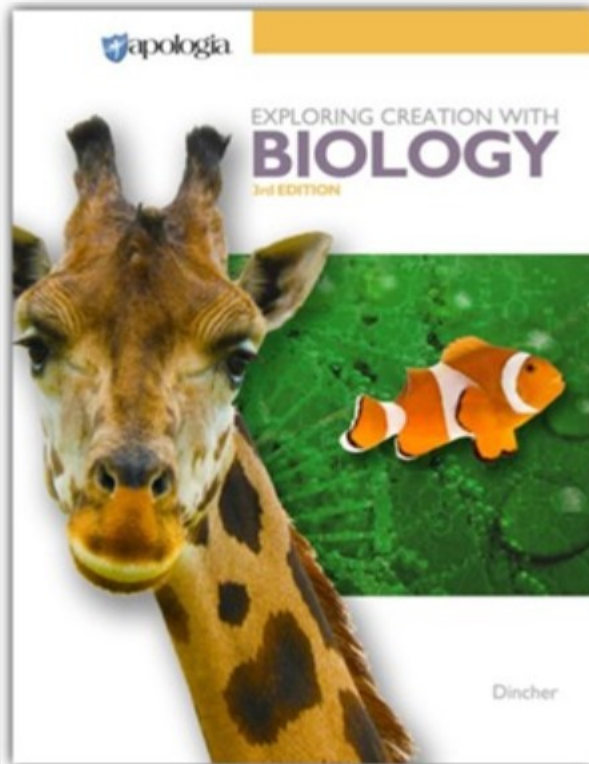


**LJ-B3**

**Apologia  
Exploring Creation  
With Biology  
3rd Edition  
Lapbook Journal**



This Lapbook Journal has been specifically designed for use with the book, Exploring Creation with Biology 3rd Edition by Apologia Science.

Designed by  
Cyndi Kinney  
of Knowledge Box Central  
with permission from Apologia Science



Exploring Creation With Biology  
3<sup>rd</sup> Edition Lapbook Journal  
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ISBN #

Ebook: 978-1-62472-747-4

CD: 978-1-62472-745-0

Printed: 978-1-62472-746-7

Publisher: Knowledge Box Central

[Http://www.knowledgeboxcentral.com](http://www.knowledgeboxcentral.com)

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**PLEASE, PLEASE, PLEASE**

**Read THIS First!!**

I know it's tempting to go ahead and get to "the good stuff," but I promise that your use of this product will be greatly enhanced if you take a few minutes to read a little more about it.

Within this document, you'll learn how to set up your binder, which files to print, what types of paper to use, frequently asked questions, what can be easily omitted due to time constraints, and so much more. Also, if after reading this, you think of tips that would have helped you assemble and use your product, please feel free to let me know. I do want to make sure that we are providing the best product to supplement these awesome Apologia books.

# Knowledge Box Central

[www.knowledgeboxcentral.com](http://www.knowledgeboxcentral.com)

Welcome to our Lapbook Journal for Apologia's Exploring Creation With Biology 3rd Edition. We are very pleased to offer this product, as authorized by Apologia.

## **So...now you bought it...what do you do with it?**

I'll try to answer your questions here. Please note that there are several ways to use our Lapbook Journal, and the BEST way is the way that works for your student. Below, I'm going to tell you which way worked best for us.

First, purchase a 4-inch, 3-ring binder and 16 dividers. On the dividers, write the numbers 1 - 16 (1 for each module/chapter) on them, and they should be placed in order.

## **Now you have your binder ready...so what's next?**

It's time to print! As for the order of printing, there are options. You may choose to print needed pages as you finish one module and begin the next, or you may choose to print all of the sections that you will use (you won't use them all) up front. The choice is yours, but I would suggest marking off some time to print it all (only the sections you need—explained on the next page) at once—That is just what worked best for us.

**DO NOT PRINT before reading the next few pages, because you DON'T need to print EVERYTHING!!!!**

**CONTINUE to the NEXT page for  
VERY IMPORTANT INFO!**

## **NOTE: You do NOT need to print EVERYTHING.**

Read below to see what I'm talking about.

The accompanying textbook has 16 modules (chapters). The next section of this product is divided by module. Within each module of this product, you will find the following the following 5 different sections.

1. On Your Own Questions Journal Pages
2. Study Guide Journal Pages
3. Study Guide Lapbook Pages—Booklet Templates and Background Page  
(By the way, print as many of these Background Pages  
as needed for your booklets)
4. Lab Reports - Partially Completed
5. Lab Reports - Blank

**Now I will go into detail about how to print each of these ,  
what type of paper to use, and how to use them.**

**ALL pages for each module will go behind the divider  
labeled with that module number.**

### **1. On Your Own Question Journal Pages**

*Supplies Needed:* Regular white copy paper (unless you desire differently)

These pages will solely be devoted to the On Your Own questions that appear throughout each module. Instead of the student having to re-write the questions in a notebook, we have provided the questions in a “journaling” styled setting. There will be ample space for the student to answer the questions within each of these pages. Print and place behind the corresponding divider number for each module.

**CONTINUE to the NEXT PAGE for more VITAL  
instructions!**

**IMPORTANT NOTE** about the next couple of pages:

**NOTE:** There are **TWO DIFFERENT OPTIONS** for the Study Guide Questions. They are Journal Pages (#2 in next sections) and Lapbook Pages (#3 in next section). You will **ONLY** print 1 of those or the other.

**There is NO NEED TO PRINT BOTH!!!**

**The Study Guide Questions explanations are next.**

**HELP! How do I know which one of these options to use???**

\*\*\*If your child does NOT enjoy hands-on projects, scrapbooking, or other crafty projects but prefers a journaling style, then you will probably want to use the **Study Guide Questions Journal Pages (#2 on the net page)**.

\*\*\*If your child enjoys hands-on projects, scrapbooking, or other crafty projects, then you will probably want to use the **Study Guide Lapbook Pages and their Background Page (#3 on the next page)**.

**NOTE:** You may change up for every module if you want!! Maybe your student has extra time during one module and WANTS to do the hands-on Lapbook Pages, or maybe he or she changes his mind about which way he would prefer to document the answers to the Study Guide Questions. The change is easy!

**REMEMBER:** The Study Guide Questions are the ones that will help the student most in preparing for the tests, so make sure your student chooses what he or she feels most comfortable with using.

**2. Study Guide Question Journal Pages (Option #1 for Study Guide Questions - DO NOT print these AND the Study Guide Questions Lapbook Pages BOTH. Only choose one!)**

*Supplies Needed:* Regular white copy paper (unless you desire differently)

As stated on the previous page, these pages are **OPTIONAL** and **COULD** be replaced with the Study Guide Questions Lapbook Pages discussed in the next section if desired. These pages will be solely dedicated to the Study Guide Questions found at the end of each module. These questions are very important, as they will help the student prepare for the tests. Instead of the student having to re-write the questions in a notebook, we have provided the questions in a journal style setting. There is ample space for the student to answer the questions. If you choose to use these pages, print them out and place them behind the On Your Own Questions Journal Pages discussed in #1 of this section.

**3. Study Guide Lapbook Pages & Background Pages (Option #2 for Study Guide Questions - DO NOT print these AND the Study Guide Questions Journal Pages BOTH. Only choose one!)**

*Supplies Needed:* Colored paper, cardstock (if desired), glue, scissors, staples/stapler, and any types of embellishments that your student likes. I prefer to glue (sometimes hot glue) ribbon, buttons, etc. over the areas with staples. Also, I sometimes punch holes and tie ribbon instead of using staples. The choice is up to your student. Be creative!

We recommend that you print these booklet templates on the colored paper, while the Background Pages are printed on white cardstock. You may use just regular white paper for the Background Pages if you want, but cardstock does hold up better. Print as many of the Background Pages as needed, usually 3 - 5 per module, depending on the number of booklets).

These Lapbook-style booklets will provide a 3-dimensional aspect to your student's learning experience. Science has proven that the more senses a student uses when learning and reviewing material, the more he or she will retain. So, in adding this section, your student will be able to use his or her own hands to create these memories. Also, the colors and shapes of the booklets will stimulate memory!



Your student will cut out, fold, and assemble these booklets and then glue them to the Background Pages. Answer the questions within each booklet. Glue to the Background Pages. Then place these pages in the notebook, behind the On Your Own Journal Pages for each module.

Your student may refer to these booklets when studying for the tests.

I know that this is the most time consuming portion of the Lapbook Journal and that time is very precious. So if you simply cannot make time for creating ALL of the booklets, or if your student is at first resistant to this hands-on method, you may choose to have your student only complete a few of the booklets...maybe the ones that covers area where he or she needs extra study.

Allow the student to have fun with this section. He or she is creating something that will be wonderful to look back on for years to come. There is no better way, my opinion, than for the student to be intensely involved in the process by using his or her hands.

**IMPORTANT NOTE about the next couple of pages:**

**NOTE: There are TWO DIFFERENT OPTIONS for the Lab Reports They are Partially Completed Lab Reports and Blank Lab Reports. You will ONLY print 1 of those or the other. There is NO NEED TO PRINT BOTH!!!**

**The Lab Report explanations are next.**

**HELP! How do I know which one of these options to use???**

**I will explain on the following page!**



## **More on how to choose which Lab Reports to use:**

\*\*\*If you don't mind that all of the Purpose, Supplies, Procedure, and sometimes Questions are already typed out for your student (like in the textbook), then you will probably want to use the **Partially Completed Lab Reports**. Your student will still be responsible for writing out their observations, data, drawings, and conclusion or summary.

\*\*\*If you prefer for your student to write out ALL of the Lab Report information on his or her own, then you will probably want to use the **Blank Lab Reports**.

**NOTE:** You may change up for every module if you want!! You don't have to stick with the same method. The choice is yours!

### **4 & 5: Lab Reports**

*Supplies Needed:* Regular, white paper

This section is where the student will document all of the lab experiments.

I conducted a poll, before finalizing this section. I wanted to know if parents would prefer the lab Reports to be partially completed, or if they would prefer to have their students write in all of the information themselves. The responses were split right down the middle! So I decided to just include both so that you have options.

BOTH Partially Completed AND Blank Lab Reports are included in this section. The partial ones come first, and then the blank ones after. These are meant to be printed double-sided, but the choice is yours. Don't always assume that there are only 2 pages for each Lab Report. Some are up to 20 pages long, so be aware of that when printing!

These will be placed behind the Study Guide Questions pages (which are glued to the Background Pages) in each module's section of your notebook.

## **Frequently Asked Questions:**

### **1. What if I don't have enough time to do all of this? What's ok to leave out?**

If you are really pushed for time, please don't feel that you have to "do it all!" I am cursed with this syndrome, and it rears it's head every time I get in a new piece of curriculum. YOU alone know what is best for your student, school, and family.

With that said, I'll say this. If I had to choose something to omit, I would probably first allow my student to use the Lab Reports that are partially filled in. This will save a lot of time....and frustration on the part of the student. If I still needed to omit something else, I would allow my student to answer the Study Guide Questions using the Journal Pages instead of the Lapbook Pages. However, be very careful with the Study Guide Questions, as they are the ones used to study for the tests.

### **2. What if I only have white paper, and I cannot afford to get (or don't have time to get) colored paper or cardstock?**

I have made suggestions as to the colors and paper types that I like best, but they are ONLY suggestions. If your daughter is really into pink, and everything has to be pink....then print the whole thing on pink! If you are cramped for extra money, and you only have white paper, then print it all on white! I assure you that the color of the paper will not KEEP your child from learning. There is scientific research to support the improvement in memory when using colored paper, but who says the child can't color the paper himself (the lapbook booklets)...draw pictures on them...make them his own. Or...just leave them white. The choice is ALWAYS yours.

### **3. My friend wants to use this Lapbook Journal too. Can I let her use my copy? Oh, and my Co-Op might want to use it too.**

Our copyright states that any Ebook or CD is purchased for use by ONE household. If your Aunt Mary, Cousin Martha, and all of their children live in YOUR household (God Bless You!), then that includes them. You may print as many copies of the material as you need from the Ebook or CD for those in your household. However, PLEASE do not share these with friends and family who do NOT live with you. The printed format of this product is meant for use by ONE student and may not be copied.



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#### **4. Why are there very few color graphics in this product?**

After much research, we believe that the children of this generation are visually over-stimulated. Between video games, internet, smartphones, and television, there is very little left to the imagination. While colors play an important role in memory and retention of information, OVER-stimulation with colors has just the opposite affect.

Research ALSO shows that colored shapes have an effect on the memory that is amazing. Students will remember colored shapes much more than they will remember colored graphics on white paper.

Another reason.....colored ink costs homeschool moms TONS!

Without colored graphics, students will create their own! Allow them to draw pictures, color the borders, use their imaginations.

For these reasons, we have chosen to use few color graphics. We feel that this decision, although not the popular one, will benefit your students in the long run.

#### **5. My child doesn’t like lapbooks, so why use this product?**

If your child has never used lapbooking, he may not know what he’s missing. However, if he just doesn’t want to do it – no how and no way – then we have included “Study Guide Journal Pages” to replace the lapbooking portion of the product. They are included within the product as well!

#### **6. What if I don’t have a printer, or my printer isn’t working?**

Most print shops will allow you to email your document to them for printing. Or, you may choose to burn the Ebook to a CD and take it to them for printing.



**7. Is it OK to burn the Ebook to a CD?**

Yes, absolutely! In fact, I would suggest it. My computer crashed last year, and I lost SO many wonderful homeschool products that were in Ebook format!! (still crying!)

**8. What if I'm not creative, crafty...etc....and I don't really want to be?**

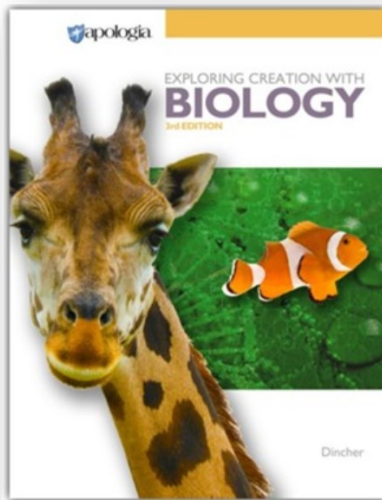
That's ok. Not everyone enjoys working with "hands-on" products. That's why this product will work for you! All of the planning is done, and the instructions are written so that the student can read and follow them without assistance from an adult!

**ALSO, don't forget that we have Vocabulary Word Flash Cards to go with this textbook too!**

**Following is a page to use at the beginning of your notebook. After that are pages to use at the beginning of each module in your notebook. If you don't want to use them, that's fine too.**

**It is all your choice!**

# **Exploring Creation With Biology 3rd Edition**



**Name:**

**Date Started:**

**Date Completed:**



**Exploring  
Creation With  
Biology  
3rd Edition**

**Module 1**



**Exploring  
Creation With  
Biology  
3rd Edition**

**Module 2**



**Exploring  
Creation With  
Biology  
3rd Edition**

**Module 3**





**Exploring  
Creation With  
Biology  
3rd Edition**

**Module 4**



**Exploring  
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**Module 5**



**Exploring  
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**Module 6**



**Exploring  
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3rd Edition**

**Module 7**



**Exploring  
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**Module 8**



**Exploring  
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**Module 9**



**Exploring  
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**Module 10**



**Exploring  
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**Module 11**





**Exploring  
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**Module 12**



**Exploring  
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**Module 13**



**Exploring  
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**Module 14**



**Exploring  
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Biology  
3rd Edition**

**Module 15**



**Exploring  
Creation With  
Biology  
3rd Edition**

**Module 16**



# **Apologia Biology 3<sup>rd</sup> Edition**

## **Module 1**

**The following pages are divided into 6 sections, with a page like this one between each section.**

**The sections are:**

- \* On Your Own Questions Journal Pages**
- \* Study Guide Questions Journal Pages**
- \* Study Guide Lapbook Pages – Booklet  
Instructions & Templates**
- \* Study Guide Questions Lapbook Pages  
– Background Page**
- \* Lab Reports (Partially Completed)**
  - \* Lab Reports (Blank)**

**The following section is:**

**Apologia Biology 3<sup>rd</sup> Edition  
Module 1**

**On Your Own Questions  
Journal Pages**



1.1 When trying to convince you of something, people will often insert "Science has proven..." at the beginning of a statement. Can science actually prove something? Why or why not?

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1.2 A scientist makes a few observations and develops an explanation for the observations that she has made. At this point, is the explanation a hypothesis, theory, or scientific fact?

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1.3 Why is it important for scientists to test only one variable at a time when experimenting?

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1.4 Explain the relationship between an independent variable and a dependent variable.

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1.5 Describe the impact Pasteur's work had on the scientific community.

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1.6 Should scientific laws be considered 100% reliable? Explain.

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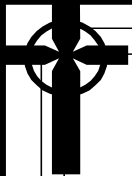
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1.7 List the criteria all living organisms possess.

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1.8 A biologist studies an organism and then two of its offspring. They are all identical in every possible way. Do these organisms reproduce sexually or asexually?

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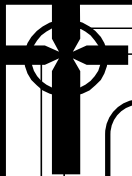
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1.9 How are unicellular and multicellular organisms alike? How are they different?

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1.10 Why is it important that scientists use a common SI system of measurement?

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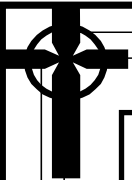
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1.11 What is the difference in the way light microscopes and electron microscopes produce images?

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1.12 A biologist is studying viruses, which are much smaller than cells. Which type of microscope should the biologist use if she wants to study the internal structure of the virus?

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**The following section is:**

**Apologia Biology 3<sup>rd</sup> Edition**

**Module 1**

**Study Guide Questions**

**Journal Pages**

**You MAY choose to use these**

**Study Guide Questions**

**Journal Pages OR the Study**

**Guide Questions Lapbook**

**Pages, but do NOT need to**

**print out both**

1. Write the definitions for the following terms:

a. Evidence:

b. Observation (include the different types):

c. Inference:

d. Hypothesis:

e. Variable (include the different types):

f. Experimental group:

g. Control group:

h. Theory:

i. Scientific law:

j. Microorganisms:

k. Abiogenesis:

l. Metabolism:

m. Anabolism:

n. Catabolism:

o. Photosynthesis



p. Autotrophs:

q. Heterotrophs:

r. Herbivores:

s. Carnivores:

t. Omnivores:

u. Homeostasis:

v. Endotherm:

w. Ectotherm:

x. Receptors:

y. Asexual reproduction:

z. Sexual reproduction:

aa. Inheritance:

bb. Mutation:

cc. International System of Units:

dd. Compound light microscope:

ee. Transmission electron microscope:

ff. Scanning electron microscope:

2. What are the criteria for life?

3. Why are cells considered the most basic unit of life?

4. An organism has receptors on tentacles that come out of its head. If those tentacles were cut off in an accident, what life function would be most hampered?

5. A parent and two offspring are studied. Although there are many similarities between the parent and the offspring, there are also some differences. Do these organisms reproduce sexually or asexually?

6. What is wrong with the following statement?  
"Science has proven that energy must always be conserved."

7. Suggest two observations and two inferences a biologist might make about the scene in Figure 1.20.



**FIGURE 1.20**  
Photo: Ikiwaner (GNU 1.2)

8. Briefly explain the scientific method.

9. Why does the story of spontaneous generation illustrate the limitations of science?

10. Where does the wise person place his or her faith: science or the Bible?

11. Why is the theory of abiogenesis just another example of the idea of spontaneous generation?

12. What are some common tools scientists use in the study of biology?

13. Why do scientists use the metric system? Why do they use tables and graphs?

14. What is the difference between a compound light microscope, a transmission electron microscope, and a scanning electron microscope? What is one advantage of a light microscope and one advantage of electron microscopes?

15. Why do scientists have procedures and protocols in the laboratory?

**The following section is:**

**Apologia Biology 3<sup>rd</sup> Edition**

**Module 1**

**Study Guide Questions**

**Lapbook Pages**

**You MAY choose to use these  
Study Guide Questions  
Lapbook Pages OR the Study  
Guide Questions Journal  
Pages, but do NOT need to  
print out both**

## Module 1, Question 1 (continued on next 4 pages)

# Module 1, Question 1

1. Write the definitions for the following terms:

a. Evidence:

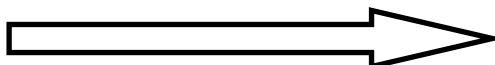
b. Observation (include the different types):

c. Inference:

d. Hypothesis:

e. Variable (include the different types):

**Instructions:** Cut out along the outer black line edges of each page. Stack in order. Fold along the dotted line, except on the last page. Staple **ONLY** on the left side of the dotted line. Glue the booklet into your notebook.





## Module 1, Question 1 (continued from previous page)

# Module 1, Question 1

f. Experimental group:

g. Control group:

h. Theory:

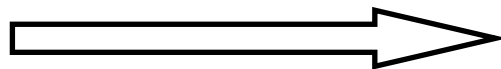
i. Scientific law:

j. Microorganisms:

k. Abiogenesis:

l. Metabolism:

m. Anabolism:



## Module 1, Question 1 (continued from previous page)

# Module 1, Question 1

n. Catabolism:

o. Photosynthesis

p. Autotrophs:

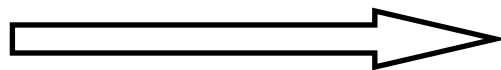
q. Heterotrophs:

r. Herbivores:

s. Carnivores:

t. Omnivores:

u. Homeostasis:



## Module 1, Question 1 (continued from previous page)

# Module 1, Question 1

v. Endotherm:

w. Ectotherm:

x. Receptors:

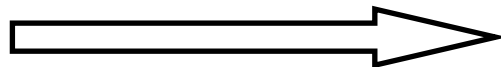
y. Asexual reproduction:

z. Sexual reproduction:

aa. Inheritance:

bb. Mutation:

cc. International System of Units:



## Module 1, Question 1 (continued from previous page)

### Module 1, Question 1

dd. Compound light microscope:

ee. Transmission electron microscope:

ff. Scanning electron microscope:

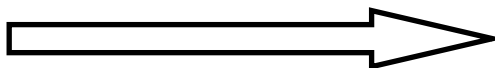
**Module 1, Questions 2-6 (Continued on next 3 pages)**

# **Module 1, Questions 2-6**

2. What are the criteria for life?

**Question 2**

**Instructions: Cut out along the outer black line edges of each page. Stack so that the title is on top and the questions are in order. Staple at the top to secure. If you need extra room for writing on any page, you may add your own blank page that is the size of the title page. Just cut it out of your own paper, using the title page as a template. Write your answer on each page. Glue the booklet into your notebook**



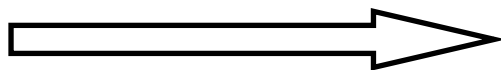
## Module 1, Questions 2-6 (Continued from previous page)

3. Why are cells considered the most basic unit of life?

**Question 3**

4. An organism has receptors on tentacles that come out of its head. If those tentacles were cut off in an accident, what life function would be most hampered?

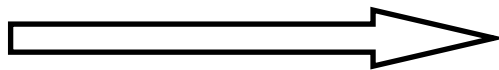
**Question 4**



## Module 1, Questions 2-6 (Continued from previous page)

5. A parent and two offspring are studied. Although there are many similarities between the parent and the offspring, there are also some differences. Do these organisms reproduce sexually or asexually?

Question 5



## Module 1, Questions 2-6 (Continued from previous page)

6. What is wrong with the following statement? "Science has proven that energy must always be conserved."

**Question 6**



## Module 1, Question 7

### Module 1, Question 7

Suggest two observations and two inferences a biologist might make about the scene in Figure 1.20.

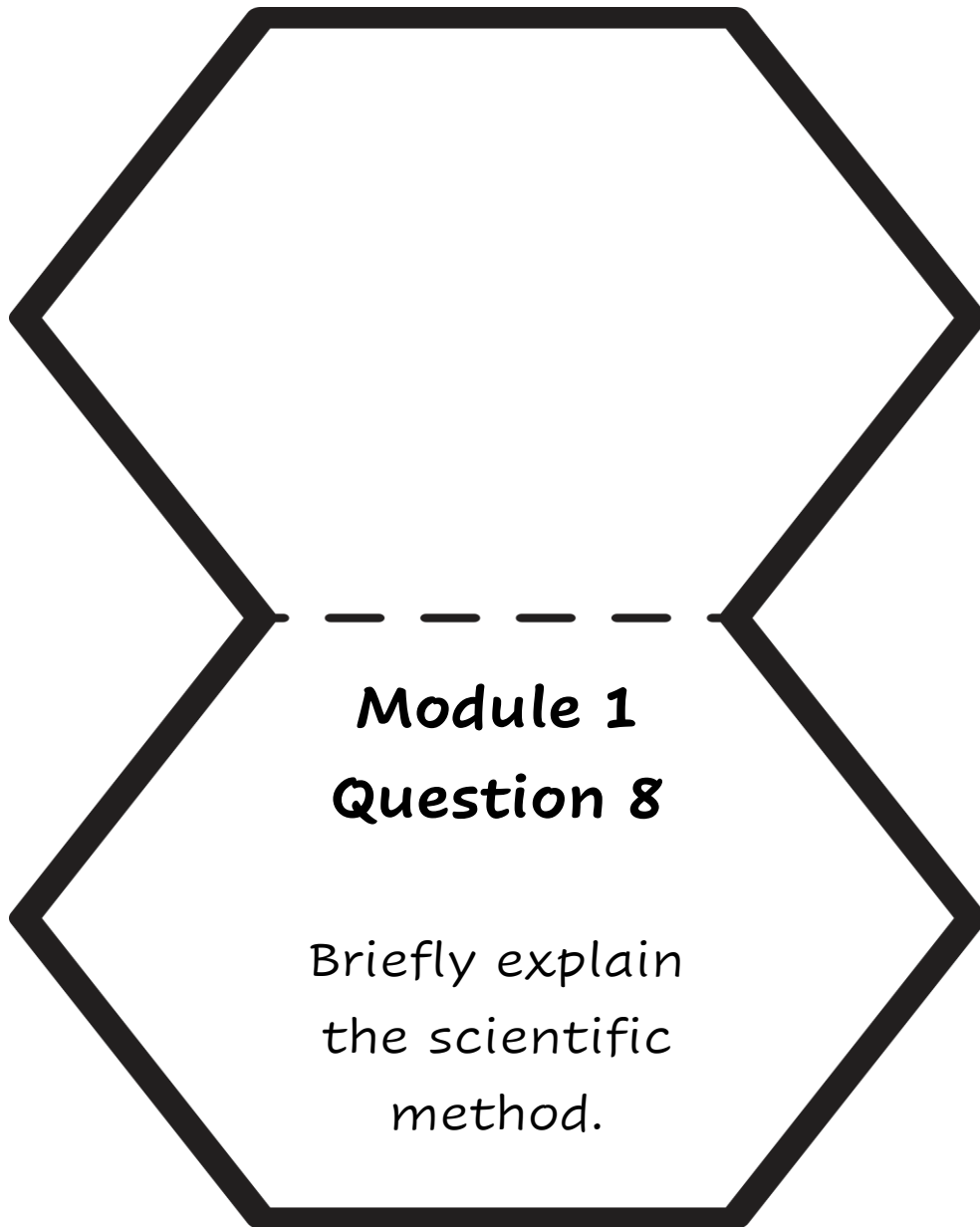


**FIGURE 1.20**  
Photo: Ikiwaner (GNU 1.2)

**Instructions:** Cut out along the outer black line edges of this one-page booklet. Glue to another piece of paper of a different color. Cut around the edges to create a small border. Answer the question under the picture. Glue the last page into your notebook.

**Print suggestion: white paper**

## Module 1, Question 8



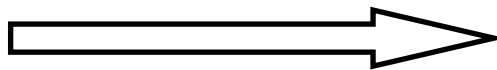
**Instructions: Cut out along the outer black line edges of the booklet. Fold along the center line so that the question is on the front. Answer your question inside. Glue the last page into your notebook.**

## Module 1, Questions 9-11 (Continued on the next page)



9. Why does the story of spontaneous generation illustrate the limitations of science?

10. Where does the wise person place his or her faith: science or the Bible?



**Instructions:** Cut out along the outer black line edges of the booklet and extra pages. Fold the booklet along the dotted lines so that the title is on the front and the curved edges almost touch. Stack the extra pages in order and put inside the booklet. Staple at the top. Glue the last page into your notebook.

## Module 1, Questions 9-11 (Continued from previous page)

11. Why is the theory of abiogenesis just another example of the idea of spontaneous generation

## Module 1, Questions 12-13

Module 1, Questions 12-13

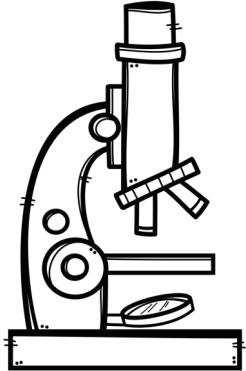
12. What are some common tools scientists use in the study of biology?

13. Why do scientists use the metric system? Why do they use tables and graphs?

**Instructions:** Cut out along the outer black line edges of each page. Cut out along the solid horizontal line between the question (first page ONLY). Stack so that the questions are on top. Secure with a staple on the left. Fold along the dotted line (top page ONLY) to create flaps. Write your answers on page 2 (under the flap). Glue the last page into your notebook.

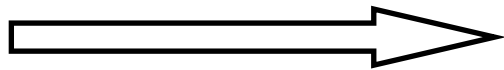
# Module 1, Questions 14-15 (Continued on the next page)

**Module 1  
Questions  
14-15**



14. What is the difference between a compound light microscope, a transmission electron microscope, and a scanning electron microscope? (Continue your answer on the next page)

14, continued:



**Instructions: Cut out along the outer black line edges of the booklet and the extra pages. Fold the booklet along the center line, keeping the title on the outside. Stack the extra pages in order. Place them inside the booklet, and staple at the top to secure. Write your answers after each question. Glue the last page into your notebook.**

## Module 1, Questions 14-15 (Continued from last page)

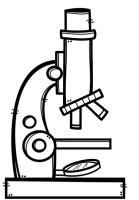
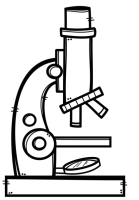
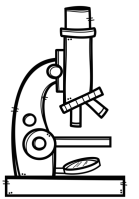
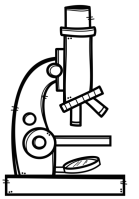
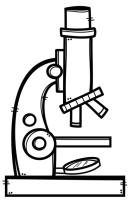
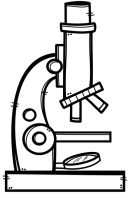
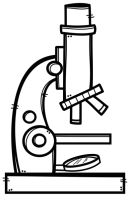
15. Why do scientists have procedures and protocols in the laboratory?

**The following section is:**

**Apologia Biology 3<sup>rd</sup> Edition  
Module 1**

**Study Guide Lapbook Pages  
Background Page  
(print as many as needed)**





**The following section is:  
Apologia Biology 3<sup>rd</sup> Edition  
Module 1**

**Partially Completed  
Lab Reports**

**\*\*Designed to be printed  
double-sided, but may be  
printed single-sided**

**You MAY choose to use these  
Partially Completed Lab  
Reports OR the Blank Lab  
Reports, but do NOT need to  
print out both**

# Apologia Biology 3rd Edition

## Lab Report Experiment 1.1 Introduction to the Microscope

Date: \_\_\_\_\_ Name: \_\_\_\_\_

### Purpose:

To learn the various parts of the microscope and to learn to use the microscope properly

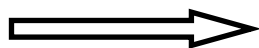
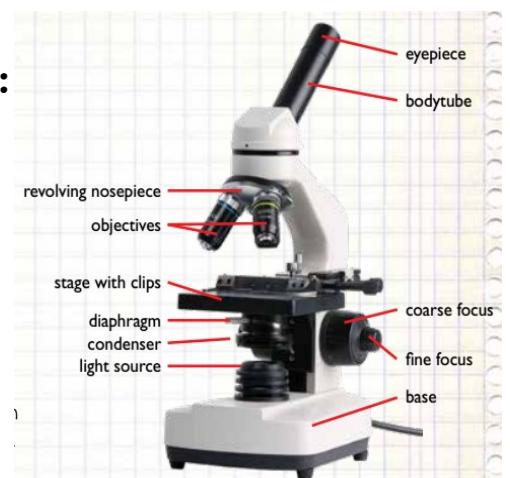
### Materials:

- \*Microscope
- \*Lens paper
- \*Slides
- \*Coverslips
- \*Cotton swabs
- \*Eyedropper
- \*Water
- \*Small pieces of brightly colored thread
- \*Prepared slide: Ranunculus root or Zea mays root
- \*Methylene blue stain

### Procedure:

#### A. Learn the parts of the microscope:

1. Place the microscope on your table with the arm of the microscope nearest you. With the aid of the illustration, locate all the parts of the microscope and become familiar with them.

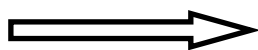


# Apologia Biology 3rd Edition

## Lab Report Experiment 1.1 Introduction to the Microscope

### Procedure, continued:

2. As you read the parts below, find each on your own microscope, using the illustration on the previous page. .
  - a. The **eyepiece (the ocular)** is what you look through. It usually contains a 10x lens.
  - b. The **body tube** starts at the eyepiece and runs to the part that holds the revolving nosepiece.
  - c. The **revolving nosepiece** is the disc that holds the lenses (which are called objectives).
  - d. The **objectives** are metal tubes that contain lenses of varying powers, usually 4x, 10x, and 40x. Some microscopes have a 100x objective as well.
  - e. The **arm** supports the body and stage and is attached to the base.
  - f. The **stage with clips** is a platform just below the objectives and above the light source. The clips are used to hold the slide in place.
  - g. The **diaphragm** regulates the amount of light that passes through the specimen. It is located between the stage and the light source. It might be a disc that has several holes (a disc diaphragm), or it might be a single hole whose diameter can be varied (an iris diaphragm).
  - h. The **condenser** is also located between the light source and stage. It is a lens system that bends and concentrates the light coming through the specimen.



# Apologia Biology 3rd Edition

## Lab Report Experiment 1.1 Introduction to the Microscope

### Procedure, continued:

- i. The **coarse focus** is controlled by two large knobs on each side of the microscope. It allows for quick focus, but it does not make the image as sharp as it could be.
- j. The **fine focus** knobs are used to produce sharp focus. They are usually smaller and lower than the coarse focus knobs, but in some scopes they are mounted on top of the coarse focus knobs.
- k. The **light source** is on the base and provides necessary light for the examination of specimens.
- l. The **base** is the heavy structure at the bottom that supports the microscope and makes it steady.

Magnification is an important feature of any microscope. **In the Data & Illustrations section of this Lab Report, create a table, and write down the magnifications of the objectives on your microscope.** You calculate the total magnification of the scope by multiplying the power of the ocular (usually 10x) by the power of each objective. Thus, if your ocular is 10x and your objectives are 4x, 10x, and 40x, your three magnifications are 40x, 100x, and 400x. **In the table that you create, label your three magnifications as low, medium, and high and include the total magnification of each.**



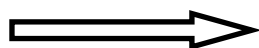
# Apologia Biology 3rd Edition

## Lab Report Experiment 1.1 Introduction to the Microscope

### Procedure, continued:

#### B. The letter e slide:

1. Make a wet-mount slide by cutting out a piece of newsprint with a letter e on it. (You can use newspaper, but a magazine works best.) Place the letter on a clean slide right side up and mark the slide on the bottom below the e. Add one drop of water on top of the paper letter. Add the coverslip by sliding it at a 45° angle until it touches the water drop, and then drop it onto the slide. If there are air bubbles, gently tap the coverslip with the eraser of your pencil. (You can also use a prepared e slide if you have it.)
2. Look at the slide with the unaided eye (without the microscope). **Draw the letter as you see it (Do this in the Data & Illustrations section of this Lab Report. Try to draw it as close to what you see (size and shape) as possible inside the observation circle. Record the magnification and identify what you are drawing.**
3. Place your microscope in front of you with the eyepiece toward you and projecting over the arm. Plug it in and turn your light on. If you have a mirror instead of a light, look through the eyepiece and adjust the mirror until you see bright light.
4. Before placing your slide on the stage, turn the revolving nosepiece until the low-power (4x) objective is directly over the opening in the stage. You will feel a slight click as the objective moves into correct position. You should always focus using the low-power objective first before using a higher-power objective



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## Lab Report Experiment 1.1 Introduction to the Microscope

### Procedure, continued:

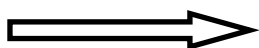
for any slide you are viewing.

5. Using the coarse adjustment knob, lower the stage away from the objective. This allows more room to put the slide onto the stage. Place the slide on the stage and use the stage clips to hold.

6. Three adjustments must be made in order to clearly see the letter on the slide. These same adjustments are necessary when viewing any slide:

- a. First, use your hands to move the slide in order to center the object to be viewed (letter e) directly over the stage opening so light can pass through it.
- b. Second, if you have an electric microscope, adjust the light by moving the diaphragm knob so that you can see the letter best. The light may need to be readjusted with each objective—a low-power lens has a larger opening to allow in more light than a high-power lens. This means that more light is required as the power of the lens increases.
- c. Third, focus the object being viewed. Using your coarse adjustment knob, raise the stage while looking through the eyepiece until the letter is visible. Then, slowly turn the fine adjustment knob until the image comes into sharp focus. Do not force the adjustment knobs beyond their stops.

As you look through the eyepiece, you should see your letter with a white circle of light as its background. This



# Apologia Biology 3rd Edition

## Lab Report Experiment 1.1 Introduction to the Microscope

### **Procedure, continued:**

is called the field of view. You will also notice a dark line extending from the periphery to the center of the field of view. This is a pointer which can be used to point out objects to anyone else looking through the microscope.

7. In the **Data & Illustration** section of this Lab report, **draw the letter as it appears under low power. Make sure to record the total magnification power used. Describe in the position of the image of the letter e through the microscope compared to the position of the letter e as viewed with the naked eye.** You should notice two differences between the appearance of your letter when unmagnified compared to what you see using low-power magnification.

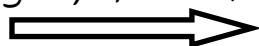
8. Move the slide to the left and **describe in the Data & Illustrations section of this Lab Report how the image moves.**

9. Move the slide away from you and **describe in your in the Data & Illustrations section of this Lab Report how the image moves.**

10. Remaining in focus without touching anything else, rotate the nosepiece until the 10x (medium power) objective clicks into place.

11. To see the letter clearly, the same three adjustments used with the low-power lens may be needed:

- a. Move your letter into the center of the field of view, if needed.
- b. Increase the light, if needed.





# Apologia Biology 3rd Edition

## Lab Report Experiment 1.1 Introduction to the Microscope

### Procedure, continued:

c. Focus the lens, but use only the fine adjustment knob.

12. Redraw your letter as it appears under 10x (medium power) in the Data & Illustrations section of this Lab Report and label the total magnification.

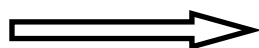
13. Again, remaining in focus, rotate the nosepiece until the 40x (high power) objective clicks into place. Use the same three adjustment steps to see your letter clearly, making certain to use only the fine focus adjustment knob to focus your lens. Never use the coarse focus adjustment knob on high power (40x) since the working distance is so minimal. If you are unable to get a clear image using fine focus, return to 10x and begin the focusing process again.

14. Redraw the letter as it appears under 40x (high power) in the Data & Illustrations section of this Lab Report and label the total magnification.

15. When you are finished, always rotate your nosepiece to the lowest power objective. This is important so that you do not scratch your lens. When you are at the lowest power, it is safe to remove your slide.

C. Now that you are familiar with the parts of the microscope, you are ready to use it to view thread.

1. Rotate the low-power objective so that it is in line with the eyepiece. Listen for a click to make sure it is in place.

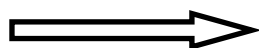


# Apologia Biology 3rd Edition

## Lab Report Experiment 1.1 Introduction to the Microscope

### Procedure, continued:

2. Turn your light on. If you have a mirror instead of a light, look through the eyepiece and adjust the mirror until you see bright light.
3. Using the coarse focus, raise the stage (or lower the body tube) until it can move no more. (Never force the knobs.)
4. Place a drop of water on a clean slide and add several short pieces of brightly colored thread.
5. Add a coverslip. Remember, this works best by sliding the coverslip at a 45-degree angle until it touches the water drop, and then drop it gently onto the slide. If air bubbles form, tap the coverslip gently with the eraser of your pencil. **When you have the slide made, draw what you see with the unaided eye in the Data & Illustrations section of this Lab Report, identify your drawing, and note the magnification.**
6. Put the slide on the stage and clip it down, making sure the coverslip is over the hole in the stage.
7. Looking in the eyepiece, gently move the stage down (or body tube up) with the coarse focus. If you do not see anything after a couple of revolutions, move your slide a little to make sure the threads are in the center of the hole in the stage. This indicates that the threads are in the field of view.
8. When you have focused as best you can with the coarse focus, fine-tune the image with the fine focus. **When you have the image in focus, draw what you see in the microscope in in the Data & Illustrations section**



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## Lab Report Experiment 1.1 Introduction to the Microscope

### Procedure, continued:

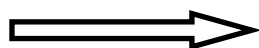
**identify your drawing, and note the magnification.**

9. Place the threads in the very center of the field of view by moving the slide as you look at it through the microscope. Make sure that the threads are at the center of the field, or you will lose them when you change to a higher magnification.

10. Turn the nosepiece so that the medium-power objective is in place. Until you are very familiar with any microscope, do not turn the nosepiece without checking to make sure it will not hit the slide. Always move the nosepiece slowly, making sure that it does not touch the slide in any way. A lens can easily be damaged if it hits or breaks a slide.

11. Once the medium-power objective is in place, you should use only the fine focus to make the image sharp. Once again, move the slide so that the thread is at the center of the field. **When you have the image in focus, draw what you see in the microscope in the Data & Illustrations section of this Lab Report, identify your drawing, and note the magnification.**

12. Again, watching to make sure you don't hit the slide, turn the nosepiece so that the highpower objective is in place. You should use only the fine focus to sharpen the image. **When you have the image in focus, draw what you see in the microscope in the Data & Illustrations section of this Lab Report, identifying your drawing and noting the magnification.**



# Apologia Biology 3rd Edition

## Lab Report Experiment 1.1 Introduction to the Microscope

### **Procedure, continued:**

13. (Optional) If you like, repeat steps 1–12 using a strand of your own hair. If we wanted to look at the threads at high magnification, why didn't we just start with the highpower objective?

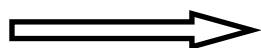
If we had tried to bring the threads into focus under high magnification without first looking at them under low and then medium magnification, we almost certainly would have never found them. When you look at the slide at high magnification, you are looking at a very, very tiny portion of the slide, and it is unlikely that what you are looking for will be there. As a result, you should always start your microscope investigation with the lowest magnification and then work your way up, centering the specimen in the field of view each time before you increase magnification.

### **D. Now it is time to get your first look at cells!**

1. Place the prepared slide of either Ranunculus root or Zea mays root on the microscope and begin the procedure outlined in section B, looking at the cells under low, then medium, and then high magnifications.

**Draw what you see at each magnification in the Data & Illustrations section of this Lab Report; identify each drawing; and note the magnification.**

2. Clean up and return everything to the proper place. To properly clean slides, coverslips, and eyedropper, wash them carefully with soap and water and dry .



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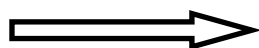
## Lab Report Experiment 1.1 Introduction to the Microscope

### **Procedure, continued:**

them carefully with paper towels. To properly clean microscope lenses, wipe them carefully with lens paper.

3. Be sure to record any changes you made to your materials or procedure. Sometimes we are required to make changes to procedures that are listed. This can be for many reasons, such as you drew a letter e instead of cutting one out of the newspaper. If you make any changes to the materials or existing procedure, you need to make note of it in your notebook so that others would be able to make the same changes if they want to duplicate your experiment. In the Data & Illustrations or Results sections of this Lab Report list any changes to the materials or procedure.

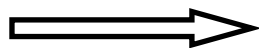
4. In the Conclusions & Summary section of this Lab Report, summarize what you learned in this experiment and make connections to the readings in your text. While this might seem simple or even silly in this first experiment, as you progress through this textbook, you will begin to experience science in addition to just reading about it. It is very important that you can connect the facts presented in your studies to your actual experiences. This is also a good place to discuss what you might consider changing in the future to further test an idea.



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## Lab Report Experiment 1.1 Introduction to the Microscope

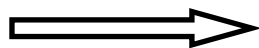
Data & Illustrations:



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## Lab Report Experiment 1.1 Introduction to the Microscope

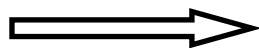
Data & Illustrations:



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## Lab Report Experiment 1.1 Introduction to the Microscope

Observations & Results:

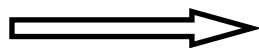




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## Lab Report Experiment 1.1 Introduction to the Microscope

**Conclusion & Summary:**



**The following section is:  
Apologia Biology 3<sup>rd</sup> Edition  
Module 1**

**Blank  
Lab Reports**

**\*\*Designed to be printed  
double-sided, but may be  
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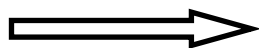
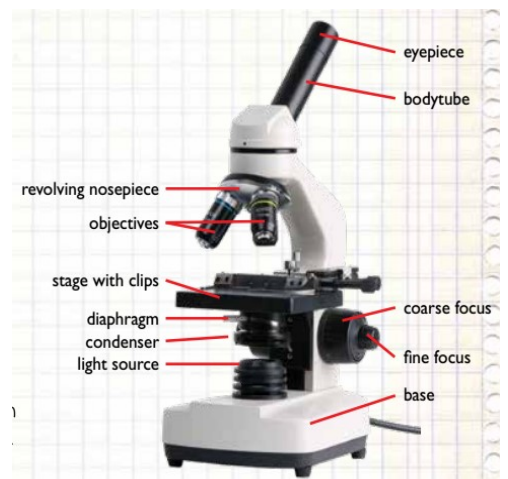
## Lab Report Experiment 1.1 Introduction to the Microscope

Date: \_\_\_\_\_ Name: \_\_\_\_\_

**Purpose:**

**Materials:**

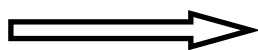
**Procedure:**



# Apologia Biology 3rd Edition

## Lab Report Experiment 1.1 Introduction to the Microscope

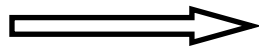
Procedure, continued:



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## Lab Report Experiment 1.1 Introduction to the Microscope

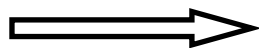
Procedure, continued:



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## Lab Report Experiment 1.1 Introduction to the Microscope

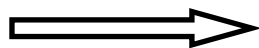
Procedure, continued:



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## Lab Report Experiment 1.1 Introduction to the Microscope

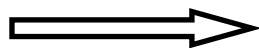
Procedure, continued:



# Apologia Biology 3rd Edition

## Lab Report Experiment 1.1 Introduction to the Microscope

Procedure, continued:

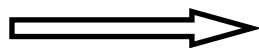




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## Lab Report Experiment 1.1 Introduction to the Microscope

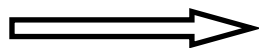
Procedure, continued:



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## Lab Report Experiment 1.1 Introduction to the Microscope

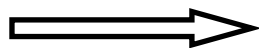
Procedure, continued:



# Apologia Biology 3rd Edition

## Lab Report Experiment 1.1 Introduction to the Microscope

Procedure, continued:

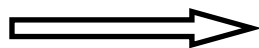


# Apologia Biology 3rd Edition

## Lab Report Experiment 1.1 Introduction to the Microscope

Procedure, continued:

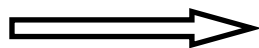
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# Apologia Biology 3rd Edition

## Lab Report Experiment 1.1 Introduction to the Microscope

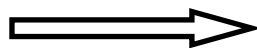
Procedure, continued:



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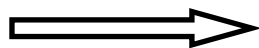
Data & Illustrations:



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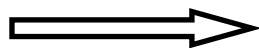
Data & Illustrations:



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Observations & Results:





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**Conclusion & Summary:**

