Thank you for downloading this sample of Sonlight's Science A Instructor's Guide (what we affectionately refer to as an IG). In order to give you a full perspective on our Instructor's Guides, this sample will include parts from every section that is included in the full IG.

Here's a quick overview of what you'll find in this sample.

- A Quick Start Guide
- A 3-week Schedule

SONLIGHT’S “SECRET” COMES DOWN TO THIS:

We believe most children respond more positively to great literature than they do to textbooks. To properly use this sample to teach your student, you will need the books that are scheduled in it. We include all the books you will need when you purchase a package from sonlight.com.

Curriculum experts develop each IG to ensure that you have everything you need for your homeschool day. Every IG offers a customizable homeschool schedule, complete lesson plans, pertinent activities, and thoughtful questions to aid your students' comprehension. It includes handy teaching tips and pointers so you can homeschool with confidence all year long.

If you need any help using or customizing our IGs, please reach out to our experienced homeschool advisors at sonlight.com/advisors.

We hope you enjoy using this sample. For even more information about Sonlight's IGs, please visit: sonlight.com/ig. It would be our pleasure to serve you as you begin your homeschool journey.

If you like what you see in this sample, visit sonlight.com/science to order your Science package.

Blessings!

Sarita Holzmann,
Co-founder and president
of Sonlight Curriculum
Dear Prospective Sonlighter,

Thank you so much for downloading this sample Sonlight Instructor’s Guide (referred to as the Science Schedule Plus at this level). Here’s a quick overview of what you’ll find in the full IG…and in this sample.

Science consists of two main pieces:

- A weekly SCHEDULE
- Plus some EXTRA HELPS

**SCHEDULE Overview**

- The Science Schedule Plus weekly schedules let you see your entire week at a glance.
- The first column lists the titles of each book or assignment. Follow either the Textbook OR the CD-ROM version (but not both).
- The remaining columns include the day-by-day assigned pages or tasks.
- Check off or date each assignment as you go to create instant records of what you and your children have done.

Some customers follow our schedules rigidly: they do everything listed for the day during that day. Others read ahead, or drop an assignment, or work through several days’ worth of one type of assignment one day, and several days’ worth of another subject on another day. . . .

It’s your Instructor’s Guide. Use it as best suits your needs.
EXTRA HELP Overview

Immediately following each week’s schedule page, you will find vocabulary your children will need to memorize.

Your primary task: read the assigned pages in the Textbook or on the computer (CD-ROM) listed in the schedule, then memorize the vocabulary terms.

You’ll find comprehension questions throughout the textbook or CD-ROM as well as tests for each module. Tests can be printed out from the CD-ROM or sold as a separate packet with the Textbook version.

The back section of the Science Schedule Plus includes experiment write-ups to use in conjunction with the labs you complete each week. Each experiment is scheduled out for you.

Enjoy your sample. . . . And we look forward to serving you in the very near future.

Sincerely,

Sarita Holzmann, President

PS: For more information about Sonlight’s Instructor’s Guides, please visit sonlight.com/IGs
I was feeling overwhelmed and afraid that I lacked what it takes to successfully homeschool my kids,” writes Jennifer A of Battle Creek, MI. “I contacted an Advisor on Sonlight’s online chat tool and got the help I needed. The next day I was able to put her counsel into practice!”
Science

Biology Schedule Plus

By Sandy Hotz
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3 Forms
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   Microscope Lab Documentation
   Experiment Write-Up
   Frog Dissection Lab

NOTE TO PURCHASER

Sonlight Curriculum, Ltd. is committed to providing the best homeschool resources on the market. This entails regular upgrades to our curriculum and to our Instructor’s Guides. This guide is the 2017 Edition of the Sonlight Curriculum® Science 250 “Biology Schedule Plus.” If you purchased it from a source other than Sonlight Curriculum, Ltd., you should know that it may not be the latest edition available.

This guide is sold with the understanding that none of the Authors nor the Publisher is engaged in rendering educational services. Questions relevant to the specific educational or legal needs of the user should be addressed to practicing members of those professions.

The information, ideas, and suggestions contained herein have been developed from sources, including publications and research, that are considered and believed to be reliable but cannot be guaranteed insofar as they apply to any particular classroom or homeschooling situation.

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Printed in the United States of America.

For the latest information about changes in this guide, please visit www.sonlight.com/curriculum-updates.html. Please notify us of any errors you find not listed on this site. E-mail corrections to IGcorrections@sonlight.com and any suggestions you may have to IGsuggestions@sonlight.com.
Section One
Introduction to Your Instructor’s Guide
At a Glance

Our goal in teaching science to high school students is to make them aware of the amazing realities around them and how complex and detailed this world is in which we live. You may want to join your children in this adventure, offer support as needed, or allow them to work through their book on their own since it is written to the children. Many of the science concepts he has been exposed to in the past will now come into sharper focus as more detailed study in certain disciplines begin.

- “High School Biology” includes basic study in the field of biology.
- It is a good place to start for students entering high school.
- We stress mastery of concepts and vocabulary at this level.

Your student:

- Will be introduced to the five biological kingdoms, cellular biology, genetics, evolution, as well as other related topics, along with the corresponding vocabulary.
- Will have concepts reinforced through the labs.
- Should become proficient at using a microscope and identifying major organs through dissection.
- Will then be able to use this class as a stepping-stone into Advanced Biology, which includes study in human anatomy and physiology.

We include:

- Worksheets to be used as you work through the scheduled labs.
- Weekly vocabulary lists.
- A weekly planning list to determine the lab materials needed for the coming week, as well as a look ahead to the needed items for the next week.

An Overview of this Year’s Studies

Each of the 16 modules is broken down into daily readings. Most modules are scheduled to be completed in two weeks, with four modules taking three weeks. It is important to read the introductory pages from the text book and the Solution’s Manual.

In each week’s schedule, we have noted the science supplies needed from two various kits used this year.

The three kits are the Microscopy Supplies Kit (250-25), and the Advanced Dissection Kit with Specimens (250-30). If you do not already own the non-consumable kit, and are not in need of it for a younger children, you will then need to obtain a magnifying glass (used in several modules), a cork (used in one module), and a thermometer (used in one module).

We also alert you to supplies that you need to provide. To enable you to plan ahead, if there is anything we think you might need to purchase before you do the next week’s experiments (we figure you shouldn’t need to purchase, say, water or dust!), we have also included a list of those materials. That way, we hope, you will be prepared before the time comes. If you shop less often than once a week, or if you live far away from a major shopping area, we strongly encourage you to look ahead a few weeks to find those items that you may be needing shortly.

We hope this feature will enable you to feel well-prepared and organized for your science adventure!

You will also find Microscope Lab Documentation and Biology Experiment Write-Up forms, The Classification Chart, and Frog Dissection Lab notes at the back of this guide. We have included an example of a write-up form for you. You are also free to use it as an example and come up with your own form.

CD ROM

For those using the full course of Exploring Creation with Biology on CD ROM, you will find an additional line in the schedule. Since the full course CD does not have page numbers, but is identified by sub-headings, usually it is suggested you read “through” a section. Many of these sections have questions at the end entitled “On Your Own.” If they follow a section, they are meant to work through in order to “complete” that section. Also, since the “On Your Own” questions are not numbered, you will need to keep track that you have done the correct number of them for the day. For instance, if you see that you were to do 6.3–6.7, then you would need to complete five questions during your reading time that day. For your convenience, we tried to let you know how many to expect for the day’s reading.

Parents, please note all Study Guide Questions along with their solutions are found in a separate CD titled “Solutions and Tests.” At the end of each module, you will be asked to print off the appropriate pages for the module. Your student is then to practice the material and have it corrected before you print out the test. The solutions for the tests are also found on that same CD.

Multimedia Companion CD

There is also a schedule for those who purchased the supplemental Multimedia Companion CD. The CD contains extra helps including explaining some of the examples, pronunciations and demonstrations of a concept. If you own the full course on CD ROM, you will find the material from the Multimedia Companion CD included on your full course CD ROM.

Testing

There is a test for each of the 16 modules throughout the year. Because of this, we have not scheduled any of the quarterly tests as this would have taken away some of
the extra time given for some of the harder modules. You may add a quarterly test after every four modules, if you prefer. One way of scheduling would be to complete the three week modules in two weeks (for example: Week 3 could be a study week for a quarterly test if you complete Module 1 in Weeks 1 and 2).

While we do feel that the quarterly tests are a useful evaluation tool, we don’t feel they are “required.” Certainly the end-of-module study guide questions and tests are sufficient to determine your student’s understanding of the material. If you are concerned about long-term retention, you may find the quarterly tests to be helpful.

### Corrections and Suggestions

Since we at Sonlight Curriculum are constantly working to improve our product development, we would love it if we could get you to help us with this process.

Whenever you find an error anywhere in one of our Instructor’s Guides, please check our updates page for the latest information at [www.sonlight.com/curriculum-updates.html](http://www.sonlight.com/curriculum-updates.html). Report new information by sending a short e-mail to: IGcorrections@sonlight.com. It would be helpful if the subject line of your email indicated where the problem is. For instance, “Biology/Section One/Week 1/Schedule.”

If while going through our curriculum you think of any way we could improve our product, please e-mail your suggestions to: IGsuggestions@sonlight.com. If you know of a different book we should use, or if you have any other ideas, please let us know.

Your efforts will greatly help us improve the quality of our products, and we very much appreciate you taking the time to let us know what you find. Thanks for your help!

### Summary

We hope these instructions help you. If we can be of any further assistance, please don’t hesitate to write or call or, better yet, visit us at [forums.sonlight.com](http://forums.sonlight.com). We would love to be of service. **I would especially like to encourage you to visit the Sonlight® Forums.** There you can converse with other homeschoolers, seek advice, offer your insights, and join our community. If you are looking for help and encouragement, our forums are just for YOU!
### Biology—Science Supplies

#### 250-25 (Microscopy Supplies Kit) Item

<table>
<thead>
<tr>
<th>Item</th>
<th>Week(s) Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lens paper</td>
<td>1, 11, 12</td>
</tr>
<tr>
<td>Glass slides</td>
<td>1, 4, 5, 7, 11, 12, 33</td>
</tr>
<tr>
<td>Slide covers (coverslips)</td>
<td>1, 4, 5, 7, 11, 12, 33</td>
</tr>
<tr>
<td>Glass eyedroppers</td>
<td>1, 4, 5, 7, 11, 12, 17, 31, 33</td>
</tr>
<tr>
<td>1 bottle Methylene Blue</td>
<td>1, 7</td>
</tr>
<tr>
<td>16 prepared slides</td>
<td>5, 6, 11, 14, 23, 24, 31</td>
</tr>
<tr>
<td>Magnifying glass</td>
<td>7, 17, 24, 26, 29, 33, 35</td>
</tr>
<tr>
<td>1 bottle Iodine</td>
<td>11, 12</td>
</tr>
<tr>
<td>Cork</td>
<td>11</td>
</tr>
<tr>
<td>Toothpicks</td>
<td>14</td>
</tr>
<tr>
<td>Chick embryo specimen</td>
<td>35</td>
</tr>
</tbody>
</table>

#### 250-30 (Advanced Dissection Kit with Specimens) Item

<table>
<thead>
<tr>
<th>Item</th>
<th>Week(s) Used</th>
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</thead>
<tbody>
<tr>
<td>Gloves</td>
<td>7, 24, 26, 29</td>
</tr>
<tr>
<td>Thermometer</td>
<td>21</td>
</tr>
<tr>
<td>3 disposable dissection trays</td>
<td>24, 26, 29</td>
</tr>
<tr>
<td>Dissection tools</td>
<td>24, 26, 29</td>
</tr>
<tr>
<td>Worm specimen</td>
<td>24</td>
</tr>
<tr>
<td>Crayfish specimen</td>
<td>26</td>
</tr>
<tr>
<td>Yellow perch specimen</td>
<td>29</td>
</tr>
<tr>
<td>Frog specimen</td>
<td>29</td>
</tr>
</tbody>
</table>
Section Two
Schedule and Notes
Week 1—Module 1

<table>
<thead>
<tr>
<th>Date:</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploring Creation with Biology-CD ROM</td>
<td>&quot;Introduction&quot; through two &quot;On Your Own&quot;</td>
<td>&quot;Sensing and Responding to Change&quot; through three &quot;On Your Own&quot;</td>
<td>&quot;Limitations of the Scientific Method&quot;</td>
<td>&quot;Spontaneous Generation: The Faithful Still Cling to It&quot; through five &quot;On Your Own&quot;</td>
<td>&quot;The Definition of Species&quot; through Experiment 1.1</td>
</tr>
<tr>
<td>Multimedia Companion CD</td>
<td>Related to Figures 1.1 &amp; 1.2</td>
<td>Related to Figure 1.4</td>
<td>Related to Figure 1.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On Your Own</td>
<td>1.1–1.2</td>
<td>1.3–1.5</td>
<td>1.6–1.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experiments</td>
<td></td>
<td></td>
<td>1.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experiment Notes</td>
<td>The answers to Experiment 1.1 are found on page 34 of the book or on the CD ROM toward the end of the Module under “Answers to Experiment 1.1.”</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocabulary²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplies³</td>
<td>You Provide: only your textbook is required for this week.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shopping/Planning List</td>
<td>For next week: We Provide: 250-25—(for microscope work) lens paper, slides, coverslips, eyedropper, methylene blue stain. You Provide: cotton swabs, water, piece of bright thread.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other Notes

1. The “Exploring Creation with Biology—CD ROM” schedule is for the full course CD ROM version of the text. It is identical to the page designations given for the text, Exploring Creation with Biology. You will use either the textbook Exploring Creation with Biology or the CD ROM version. You do not need both versions to complete this course.

2. Define vocabulary terms and names found in each day’s reading, then place a check in the box.

3. When supplies are listed as “We provide:” they are materials found in either your Microscopy Supplies Kit (250-25), or the Advanced Dissection Kit with Specimens (250-30). When supplies are listed as “You provide:” they are materials you can generally find around your home.

Vocabulary | Terms and Names

What is Life?

Criteria for life [p. 1]

1. All life forms contain deoxyribonucleic acid, which is called DNA.

2. All life forms have a method by which they extract energy from the surroundings and convert it into energy that sustains them.

3. All life forms can sense changes in their surroundings and respond to those changes.

4. All life forms reproduce.

Energy Conversion and Life

Metabolism: The sum total of all processes in an organism that convert energy and matter from outside sources and use that energy and matter to sustain the organism’s life functions. [p. 2]
**Anabolism:** The sum total of all processes in an organism which use energy and simple chemical building blocks to produce large chemicals and structures necessary for life. [p. 2]

**Catabolism:** The sum total of all processes in an organism which break down chemicals to produce energy and simple chemical building blocks. [p. 2]

**Photosynthesis:** The process by which green plants and some other organisms use the energy of sunlight and simple chemicals to produce their own food. [p. 3]

**Herbivores:** Organisms that eat only plants. [p. 3]

**Carnivores:** Organisms that eat only organisms other than plants. [p. 3]

**Omnivores:** Organisms that eat both plants and other organisms. [p. 3]

**Producers:** Organisms that produce their own food. [p. 4]

**Consumers:** Organisms that eat living producers and/or other consumers for food. [p. 4]

**Decomposers:** Organisms that break down the dead remains of other organisms. [p. 5]

**Autotrophs:** Organisms that are able to make their own food. [p. 6]

**Heterotrophs:** Organisms that depend on other organisms for their food. [p. 6]

**Receptors:** Special structures that allow living organisms to sense the conditions of their internal or external environment. [p. 7]

**Inheritance:** The process by which physical and biological characteristics are transmitted from the parent (or parents) to the offspring. [p. 7]

**Mutation:** An abrupt and marked change in the DNA of an organism compared to that of its parents. [p. 8]

**Hypothesis:** An educated guess that attempts to explain an observation or answer a question. [p. 9]

**Theory:** A hypothesis that has been tested with a significant amount of data. [p. 9]

**Scientific law:** A theory that has been tested by and is consistent with generations of data. [p. 10]

**Microorganisms:** Living creatures that are too small to see with the naked eye. [p. 13]

**Spontaneous Generation: The Faithful Still Cling To It!**

**Abiogenesis:** The idea that long ago, very simple life forms spontaneously appeared through chemical reactions. [p. 15]

**Prokaryotic cell:** A cell that has no distinct, membrane-bound organelles. [p. 18]

**Eukaryotic cell:** A cell with distinct, membrane-bound organelles. [p. 18]

**Membrane-bound organelle:** A structure within a cell that performs a specific task. [p. 18]

**Species:** A unit of one or more populations of individuals that can reproduce under normal conditions, produce fertile offspring, and are reproductively isolated from other such units. [p. 21]
<table>
<thead>
<tr>
<th>Date:</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exploring Creation with Biology</strong></td>
<td>pp. 27–32</td>
<td>Study Guide p. 35 #1(a–t); 2–7 (Review)</td>
<td>Study Guide pp. 35–36 #1(u–aa); 8–16 (Review)</td>
<td>pp. 545–546 Summary of Module 1 (Review)</td>
<td>Module 1 Test</td>
</tr>
<tr>
<td><strong>Exploring Creation with Biology-CD ROM</strong></td>
<td>“Naming Organisms Based on Classification” through “The Microscope 2”</td>
<td>Study Guide #1 (a–t); 2–7 (Review)</td>
<td>Study Guide #1 (u–aa); 8–16 (Review)</td>
<td>Summary of Module 1 (Review)</td>
<td>Module 1 Test</td>
</tr>
<tr>
<td><strong>Multimedia Companion CD</strong></td>
<td>Related to Experiment 1.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Experiments</strong></td>
<td>Microscope 1.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vocabulary</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Supplies</strong></td>
<td><strong>We Provide:</strong> 250-25—(for microscope work) lens paper, slides, coverslips, eyedropper, methylene blue stain. <strong>You Provide:</strong> cotton swabs, water, piece of bright thread.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shopping/Planning List</strong></td>
<td>For next week: <strong>You Provide:</strong> 4 jars with lids (see book p. 52), chopped hay or grass, uncooked white rice, egg yolk, small amount of rich soil, long-handled ladle, pond, notebook, colored pencils.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Other Notes**

---

**Vocabulary** | Terms and Names

**Naming Organisms Based on Classification**

**Taxonomy:** The science of classifying organisms. [p. 27]

**Binomial nomenclature:** Naming an organism with its genus and species name. [p. 27]
**Vocabulary | Terms and Names**

**Bacteria**

**Pathogen:** An organism that causes disease. [p. 37]

**Cell wall:** Holds the contents of the cell together and holds the cell’s shape. [p. 38]

**Capsule:** A protective layer that tends to deter infection-fighting agents. [p. 38]

**Plasma membrane:** It protects the interior of the cell by sensing the nature of the chemicals in the surroundings and then determining whether or not they can enter the cell. [p. 39]

**Cytoplasm:** A semi-fluid substance that supports the DNA and the Ribosomes. [p. 39]

**DNA:** Holds all the information required to make this mass of chemicals a living entity. [p. 39]

**Ribosomes:** They make special chemicals known as proteins. [p. 39]

**Flagellum:** Moves the bacterium from one place to another. Locomotion. [p. 40]

**The Eating Habits of Bacteria**

**Saprophyte:** An organism that feeds on dead matter. [p. 41]

**Parasite:** An organism that feeds on a living host. [p. 42]

**Aerobic organism:** An organism that requires oxygen. [p. 42]

**Anaerobic organism:** An organism that does not require oxygen. [p. 43]

**Asexual Reproduction in Bacteria**

**Steady state:** A state in which members of a population die as quickly as new members are born. [p. 46]
Exponential growth: Population growth that is unhindered because of the abundance of resources for an ever-increasing population. [p. 47]

Logistic growth: Population growth that is controlled by limited resources. [p. 47]

Genetic Recombination in Bacteria
Conjugation: A temporary union of two organisms for the purpose of DNA transfer. [p. 48]

Plasmid: A small, circular section of extra DNA that confers one or more traits to a bacterium and can be reproduced separately from the main bacterial genetic code. [p. 48]

Transformation and Transduction
Transformation: The transfer of a DNA segment from a nonfunctional donor cell to that of a functional recipient cell. [p. 49]

Transduction: The process in which infection by a virus results in DNA being transferred from one bacterium to another. [p. 50]

Endospore: The DNA and other essential parts of a bacterium coated with several hard layers. [p. 50]
<table>
<thead>
<tr>
<th>Phylum or Class or Order (Example of Organism)</th>
<th>Prokaryotic or Eukaryotic</th>
<th>Gram Positive or Gram Negative</th>
<th>Feeding/Digestion Method</th>
<th>Reproduction Method</th>
<th>Respiration Method</th>
<th>Special Features</th>
<th>Feeding/Digestion Method</th>
<th>Reproduction Method</th>
<th>Respiration Method</th>
<th>Special Features</th>
</tr>
</thead>
</table>
Microscope Lab Documentation

Date: __________________________

Experiment Title and Number: ___________________________________________

Supplies Used: __________________________________________________________

Object: __________________________

Observation: (illustrate with colored pencils)

Remember: Answer lab questions from your book on a separate piece of paper. Be sure to clearly identify the question and answer.
Experiment Write-Up

Date:

Experiment: #

**Purpose** (from the introduction):

**Supplies:**

**Procedure:**

**Observation/Data:**

(what happened)

**Conclusion:**

(what was learned)