Science

Nature Notebook
Nature Walks & Scouting
Microbiology Lessons
Microbiology Labs

SAMPLE

Alveary

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Science: Microbiology

GRADE(S): 12

About the Course

This course includes the following topic(s): Microbiology Lessons, Microbiology Labs, Nature Notebook: Grades 9-12, Nature Walks & Scouting: Grades 9-12

About Nature Notebook: Grades 9-12
Outdoor work is established or continued as a lifelong habit. Optional resources are provided in science lessons and on the Alveary bookshelf.

About Nature Walks & Scouting: Grades 9-12
Outdoor work is established or continued as a lifelong habit. Optional resources are provided in science lessons and on the Alveary bookshelf.

About Microbiology Lessons
An elective in Life Science, Microbiology is a challenging course for the Alveary senior. Some self-direction is required.

About Microbiology Labs
Labs are an essential part of science in which students engage with the Things they are reading about and practice the scientific method.

Placement & Combining Tips

Nature Notebook: Grades 9-12
Learners may be combined and follow their own interests.

Nature Walks & Scouting: Grades 9-12
Learners may follow their own interests or follow the plan of their local scouting troop or natural history club.

Microbiology Lessons
Students should take General Biology before Microbiology. Note that there is some sensitive content in this course, and it is recommended for students in Grade 12.

Scheduling

GRADE	SCHEDULE INFO.	BOOKS
9-12	Nature Notebook: Grades 9-12 1+ time/week 20 min+	
9-12	Nature Walks & Scouting: Grades 9-12 1 time/week 30 min+	
12	Microbiology Lessons 5 times/week 45 min	A Field Guide to Bacteria A Planet of Viruses Growing a Revolution: Bringing Our Soil Back to Life I Contain Multitudes Micro Life Microbe Hunters The Immortal Life of Henrietta Lacks
12	Microbiology Labs 1 time/week 60 min	Illustrated Guide to Home Biology Experiments

Sample Weekly View

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Day 1	Day 2	Day 3	Day 4	Day 5
Science: Microbiology				
Microbiology Lessons Nature Walks & Scouting: Grades 9-12	Microbiology Lessons	Microbiology Lessons	Microbiology Lessons Nature Notebook: Grades 9-12	Microbiology Lessons Microbiology Labs

Planning & Prep

Permission to print for non-commercial use. See Alveary group use policy to use lessons in a group context.

LINKS: Click text or scan the QR code in the top corner of the lesson plan pages to view online resources associated with the lessons.

Responsibility for previewing all links rests with the teacher. All links were checked at the time of publication; however, websites change frequently and may contain objectionable content. Please report broken links by contacting us through our website.

Microbiology Lessons
☐ Select a science book from the Alveary bookshelf for personal reading time, as appropriate.

☐ Bookmark or print Quick Links, as needed.

☐ Gather supplies for the first microbiology labs initially. You will gather additional supplies once you decide on additional labs.

☐ Teacher Note: Preread Chapter 15. Henrietta Lacks's children had to deal with a lot of abuse of every kind. Discuss with your student(s). The note for the student is in Week 1 of Term 2.

Books & Resources

For book rationales and purchase options, click the Book List link or scan the QR code below.
∞ View Book List Details

Science: Microbiology

Microbiology Lessons


A Field Guide to Bacteria


A Planet of Viruses


Growing a Revolution: Bringing Our Soil Back to Life


I Contain Multitudes


Micro Life


Microbe Hunters


The Immortal Life of Henrietta Lacks

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Microbiology Labs

Illustrated Guide to Home Biology Experiments

Supplies

For supply list details and basic supplies helpful to have on hand, click the links or scan the QR code below.

- View Basic Supplies
- View Supply List Details

Science: Microbiology

The Illustrated Guide to Home Biology Experiments

Student Microscope

Quick Links

Click THIS text or scan the QR code for links.

Science: Microbiology

Microbiology Lessons

- Nature Journal Connection
- Alveary Bookshelf
- Illustrated Guide to Home Biology Experiments
- Seven Wonders of the Microbe World
- Microbiology from A to Z
- Microbiology Current Events

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Science: Microbiology

How To Approach

Introduce

• If starting a new book or a new topic in the book, then look at the title or a picture and take a moment to consider previous ideas and experiences.

• If continuing a previous reading, recap what was read previously. Often, the title of the book's section can help to draw out the main idea.

Read

• Read or do, as instructed in the lessons, making note of or flagging unfamiliar terms, interesting ideas, important dates, inspiring quotes, etc.

• Use supportive strategies and educational tools to reduce frustration and better engage the mind, as appropriate. These could include, but are not limited to, the use of eBooks, pictures, audio, read-aloud, buddy reading, colored reading strips, etc.

• As they read, learners record ideas in a notebook or binder using outlines, diagrams, graphic organizers, or other methods (or a combination of methods) that suit them. These recordings can be a helpful mechanism for remembering or a mini-narration to support understanding.

• If learners do not understand a word or concept, do not worry. Try reading over the passage again, studying a picture or diagram, connecting the idea to something from real life, or practicing chapter exercises. The lab/field work further supports major concepts from the text.

Narrate

• Process the ideas of the lesson by retelling, defining a concept, explaining the links in a chain of thought, etc. Do this orally or silently to yourself.

• Use words, pictures, outlines, etc.

• If a particular idea cannot be narrated, then read or examine the text again.

Discuss

• Consider with the teacher any thoughts, confusion, or concerns about the passage.

• If understanding is still uncertain, try rereading the passage or do some personal research on the topic.

Connect

• Follow any extra links, examine any sidebars in the text, or pursue additional reading, depending on student interest.

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Science: Microbiology

How To Approach Labs

Introduce

• Regardless of how many days are required to complete a particular activity, every Science Lab has the same flow, which follows the scientific method.

• Relevant concept(s) are introduced in the text.

• Your notebook entry begins with the introductory/prelab narration, including relevant information that you have read or previously experienced, what you plan to do in the lab, and any hypothesis or anticipated result.

Lab Procedure

• Perform the procedure according to the instruction, recording in your notebook what you do as it happens. This can be a challenge, but is an extremely important skill.

• Record all data and observations in the lab notebook.

Analysis & Conclusions

• After all data is collected, analyze the results by considering how the data reflects the introduced concepts and whether the hypothesis is supported by the data.

• If the data and observations do not support the hypothesis, reflect on why and what further testing would be interesting or helpful.

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Click THIS text or scan the QR code for links.

Term 1

WEEK 1 ⬚ **45m Microbiology Lessons - Lesson 1**

Materials: I Contain Multitudes

→ READ, NARRATE, & DISCUSS
Read and narrate 8 pages each week.

• PLAN WEEKLY
⬚ nature walk - record observations
⬚ science free read

WEEK 1 ⬚ **45m Microbiology Lessons - Lesson 2**

Materials: A Field Guide to Bacteria

→ READ, NARRATE, & DISCUSS
Read and narrate 10 pages each week, starting with the Appendices. Continue with the Introduction and read forward. Sometimes there will be practical things to do with the microscope and bacteria, but other times you will be reading to gain a greater understanding of bacteria from many different places. Sometime before next week, watch the author's video on bacteria. You may or may not agree with the author's perspective, but the point of the video is to see where some of the more recent thinking is concerning microbes.

→ VIEW
∞ Video Link: Talk by Betsey Dexter

WEEK 1 ⬚ **45m Microbiology Lessons - Lesson 3**

Materials: Microbe Hunters or A Planet of Viruses

→ READ, NARRATE, & DISCUSS
Read and narrate 10 pages each week.

WEEK 1 ⬚ **45m Microbiology Lessons - Lesson 4**

Materials: The Immortal Life of Henrietta Lacks

→ READ, NARRATE, & DISCUSS
Read and narrate 10 pages each week.

★ STUDENT/TEACHER TIP
Gather some family and friends and watch the video "Seven Wonders of the Microbe World."
∞ Video Link: Seven Wonders

WEEK 1 ⬚ **45m Microbiology Lessons - Lesson 5**

Materials: Illustrated Guide to Home Biology Experiments

→ READ
Read p.3-51 at your own pace over the next few lab periods. If you already have a good working microscope of reasonable quality, you may be able to skim through the microscope chapter. If you are not that familiar with your microscope, you may benefit from reading it. You will move at your own pace through the microbiology labs in this book after completing the first 6 in order (Labs I-1 through II-3). Then, you are free to pick and choose based on your interests and/or the availability of needed supplies. The more you do, the more you will grow in your understanding of microbiology! There are several labs in the book that are general biology labs (10-12,18,20,21,23, and 24). You will skip over these and focus on the ones that require a microscope.

WEEK 1 ⬚ **60m Microbiology Labs - Lesson 1**

Materials: Illustrated Guide to Home Biology Experiments

→ LAB DAY
Continue reading p.3-51. Then, skim through the rest of the book and plot out a rough plan of which experiments you'd like to explore. Order the needed supplies. Home Scientist has a kit that contains the basic supplies

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Term 1

needed. You can add on bacterial cultures and prepared slides, if desired. If you order supplies elsewhere, you can still order the DVD with answers to the review questions in the book and high-resolution images as a separate item. As the introductory material in the book says, if you decide to do labs that require bacterial cultures or prepared slides of certain items that you cannot procure locally, you will need to order those items from Home Scientist ahead of time. They suggest that you could use the high-resolution images that come with their DVD kit instead of purchasing slides.

→ VIEW
∞ Link: Home Scientist

WEEK 2 ⬚ **45m Microbiology Lessons - Lesson 6**

Materials: I Contain Multitudes

→ READ, NARRATE, & DISCUSS
Read and narrate 8 pages each week.

• PLAN WEEKLY
⬚ nature walk - record observations
⬚ science free read

WEEK 2 ⬚ **45m Microbiology Lessons - Lesson 7**

Materials: A Field Guide to Bacteria

→ READ, NARRATE, & DISCUSS
Read and narrate 10 pages each week. Come up with an interesting way to present or summarize the information in this book. It could be a map, chart, diagram, or something else.

WEEK 2 ⬚ **45m Microbiology Lessons - Lesson 8**

Materials: Microbe Hunters or A Planet of Viruses

→ READ, NARRATE, & DISCUSS
Read and narrate 10 pages each week.

WEEK 2 ⬚ **45m Microbiology Lessons - Lesson 9**

Materials: The Immortal Life of Henrietta Lacks

→ READ, NARRATE, & DISCUSS
Read and narrate 10 pages each week.

WEEK 2 ⬚ **45m Microbiology Lessons - Lesson 10**

Materials: Illustrated Guide to Home Biology Experiments

→ READ
Finish reading p.3-51.

WEEK 2 ⬚ **60m Microbiology Labs - Lesson 2**

Materials: Illustrated Guide to Home Biology Experiments

→ LAB DAY
Today, you will complete LAB I-1: Using a Microscope. Gather all of the needed materials. Prepare your Lab Notebook for the experiment. Read the lab carefully before beginning and adhere to all safety requirements. Record what you do and what you observe in your Lab Notebook. Then clean up and dispose of any materials as instructed.

Complete the lab write-up in your notebook, including the review questions. After you have finished your work, use the answers in the PDF

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Click THIS text or scan the QR code for links.

Term 1

that came with your supplies and see if there was anything significant that you did not understand. Use your Biology textbook from Grade 10 and the internet to learn more or aid in understanding terms and concepts.

You will complete your lab report following the book's guidelines. Choose 6 throughout the year to complete as full lab reports. Use what you have learned about writing lab reports. Use the guidelines for the rest of your reports.

WEEK 3

- ⬚ **45m Microbiology Lessons - Lesson 11**
  - Materials: I Contain Multitudes

→ **READ, NARRATE, & DISCUSS**
Read and narrate 8 pages each week.

- **• PLAN WEEKLY**
- ⬚ nature walk - record observations
- ⬚ science free read

WEEK 3

- ⬚ **45m Microbiology Lessons - Lesson 12**
  - Materials: A Field Guide to Bacteria

→ **READ, NARRATE, & DISCUSS**
Read and narrate 10 pages each week.

WEEK 3

- ⬚ **45m Microbiology Lessons - Lesson 13**
  - Materials: Microbe Hunters or A Planet of Viruses

→ **READ, NARRATE, & DISCUSS**
Read and narrate 10 pages each week.

WEEK 3

- ⬚ **45m Microbiology Lessons - Lesson 14**
  - Materials: The Immortal Life of Henrietta Lacks

→ **READ, NARRATE, & DISCUSS**
Read and narrate 10 pages each week.

WEEK 3

- ⬚ **45m Microbiology Lessons - Lesson 15**
  - Materials: Illustrated Guide to Home Biology Experiments

→ **LAB DAY**

WEEK 3

- ⬚ **60m Microbiology Labs - Lesson 3**
  - Materials: Illustrated Guide to Home Biology Experiments

→ **LAB DAY**

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