Science

Nature Notebook
Nature Walks & Scouting
Botany Lessons
Botany Labs

SAMPLE

Alveary

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Science: Botany

GRADE(S): 9-12

About the Course

This course includes the following topic(s): Botany Lessons, Botany 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 Botany Lessons
An elective in Life Science, Botany guides learners through the basic foundations of the discipline, while incorporating historical context, modern developments, current events, and citizenship. This course provides guidance and flexibility for teachers and learners to adjust the course for personal needs and preferences.

About Botany Labs
Note that 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.

Botany Lessons
There are no specific prerequisites or concurrents for this course.

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+	
9-12	Botany Lessons 5 times/week 45 min	A Peterson Field Guide To Western Trees Botany in a Day Growing a Revolution: Bringing Our Soil Back to Life Pacific Coast Tree Finder Rocky Mountain Tree Finder Shanleya's Quest Card Game The Milkweed Lands: An Epic Story of One Plant: Its Nature and Ecology Oaxaca Journal Tree Finder - Eastern US What a Plant Knows Winter Tree Finder (Eastern US) The Hidden Life of Trees: The Illustrated Edition

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GRADE	SCHEDULE INFO.	BOOKS
		The Sibley Guide to Trees Elementary Studies in Plant Life
9-12	Botany Labs 1 time/week 60 min	

Sample Weekly View

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

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

☐ Bookmark or print Quick Links, as needed.

Term Prep & Teacher Tips

Botany Lessons
☐ Gather household items, typically easy for students to scavenge or teachers to obtain locally:
- various plants specimens, found or obtained as detailed in Elementary Plant Studies
- lily flower (Term 1)
- found twigs and fruits/seeds
- needle and/or blade for dissecting
- forceps/tweezers for dissecting
- large, transparent cup/glass
- masking tape
- aluminum foil
- 2 glass jars
- salt
- oil
- microscope coverslips and slides
- paper towels
- saucer
- recycled box
- pins
- cotton ball
- various corks
- recycled measuring spoon/cup marked in tsp/Tbsp or mL
- recycled apple corer or trowel
- place to dig soil
- distilled water
- zip top sandwich bags for soil samples
- small jars with secure lid for each soil sample
- dropper
- pea/bean seeds
- potting materials
- denatured alcohol
- iodine
- potato
- matches

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- candle
- red food coloring/dye
- straw
- materials by student choice
- optional: tulip bulb

Reminders

Botany Lessons
☐ Note that Lab in week 7 requires a lily flower. Make a calendar note to obtain this closer to the appropriate time.

Books & Resources

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

Science: Botany

Botany Lessons

A Peterson Field Guide To Western Trees

Botany in a Day

Growing a Revolution: Bringing Our Soil Back to Life

Pacific Coast Tree Finder

Rocky Mountain Tree Finder

Shanleya's Quest Card Game

The Milkweed Lands: An Epic Story of One Plant: Its Nature and Ecology

Oaxaca Journal

Tree Finder - Eastern US

What a Plant Knows

Winter Tree Finder (Eastern US)

The Hidden Life of Trees: The Illustrated Edition

The Sibley Guide to Trees

Elementary Studies in Plant Life

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

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- Calcium Hydroxide
- Cobalt Chloride
- Glass Rod
- Household Items - Science: Botany
- Calcium Carbonate
- Prepared Microscope Slides
- Student Microscope

Botany Labs

- Slides and Coverslips

Quick Links

Click THIS text or scan the QR code for links.

Science: Botany

- Extra Helpings

Botany Lessons

- Seek app from iNaturalist
- Nature Journal Connection
- Alveary Bookshelf
- Elementary Studies in Plant Life
- Elementary Studies in Plant Life Annotations
- AmScope key for slide IDs

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Science: Botany

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: Botany

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 Botany Lessons - Lesson 1

Botany Literature

Materials: What a Plant Knows

→ INTRO
At least one day each week will be spent reading important works of botanical literature. The lesson plans give you an idea of how many pages to read each week to finish the book by the end of the term. If one day is not enough, you might read about half on one day and half on the flex day. If one day is enough, then decide how you would like to use your flex day. Consider the ideas provided on Day 4 of the week.

→ READ, NARRATE, & DISCUSS
Read about 14 pages per week; p.3-17.

→ WRITE
Write a narration in your Botany Notebook.

• PLAN WEEKLY
Nature walk - Look for the plants and/or features mentioned in your books. Record observations.
science free read

WEEK 1

45m Botany Lessons - Lesson 2

How Plants Work, Life Cycle of Flowering Plants

Materials: Elementary Studies in Plant Life

→ READ, NARRATE, & DISCUSS
Ch.1. Work through the material, adding drawings to your notebook. You may need to visit local nurseries, botanical gardens, neighbors' yards, and gardens to find specimens to examine. Pick a question at the end to answer fully in your notebook for your narration.

WEEK 1

45m Botany Lessons - Lesson 3

Identification

Materials: Botany in a Day

→ READ, NARRATE, & DISCUSS
Forward, Region Covered, and p.1-9

→ NOTE
You may or may not agree with the author's presentation of the evolution of plants. Still, it is important to know current botanical thinking, especially as we seek to understand how plants have been organized. This will help us as we begin to learn plant families.

WEEK 1

45m Botany Lessons - Lesson 4

Flex Day

Materials: Selected botany literature OR lab/field supplies

→ INTRO
Use this flex day to finish the week's reading from What a Plant Knows, or continue any lab/field activities. Suppose you have completed the week's activities. In that case, you may use this day to tailor the course to be more literary by reading an additional text, such as Growing a Revolution, or more active by pursuing a special study of interest.

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Term 1

WEEK 1

45m Botany Lessons - Lesson 5
Special Study

Materials: The Milkweed Lands

→ INTRO
Notice how the author and illustrator make a study of and learn so much about this one plant. Whether you have milkweed near you and can notice their observations, or you make a similar study of a particular plant in your locale, enjoy their method as you develop your own.

→ READ, NARRATE, & DISCUSS
Half of Ch.1 (to the end of "Dangerous Colors" p.8)

WEEK 1

60m Botany Labs - Lesson 1

Materials: Elementary Studies in Plant Life

Prep: Read Student Tip.

→ OBSERVE
Notice a variety of plants this week, doing the practical work from Ch.1. Notice root and shoot, and how the leaves and branches are attached in the different cases. Notice plants in which flowers are fading, and fruit is ripening in their place. Some activities may be delayed depending on the time of year and your geographic location. Do what you can to gain the most from the chapter. If the plants or trees mentioned are unavailable locally, look up the item online. Also, you may need to visit local nurseries, botanical gardens, and neighbors' yards and gardens to find specimens to examine.

• STUDENT TIP
Labs and prompts for your field work are included in your lesson plans, but it is important to establish a personal habit of outdoor walks as a part of life!

WEEK 2

45m Botany Lessons - Lesson 6
Botany Literature

Materials: What a Plant Knows

→ READ, NARRATE, & DISCUSS
Read about 14 pages per week; p.17-31.

→ WRITE
Write a narration in your Botany Notebook.

• PLAN WEEKLY
Nature walk - Look for the plants and/or features mentioned in your books. Record observations.
science free read

WEEK 2

45m Botany Lessons - Lesson 7
How Plants Work, Use of Water

Materials: Elementary Studies in Plant Life

→ READ, NARRATE, & DISCUSS
Ch.2

WEEK 2

45m Botany Lessons - Lesson 8
Identification

Materials: Botany in a Day

→ READ, NARRATE, & DISCUSS
p.10-18

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Click THIS text or scan the QR code for links.

Term 1

WEEK 2

45m Botany Lessons - Lesson 9
Flex Day

Materials: Selected botany literature OR lab/field supplies

→ NOTE
Use this flex day to finish the week's reading from What a Plant Knows, or continue any lab/field activities. Suppose you have completed these activities for the week. In that case, you may use this day to tailor the course to be more literary by reading an additional text, such as Growing a Revolution, or more active by pursuing a special study of interest.

WEEK 2

45m Botany Lessons - Lesson 10
Special Study

Materials: The Milkweed Lands

→ READ, NARRATE, & DISCUSS
Finish Ch.1 from p.8.

WEEK 2

60m Botany Labs - Lesson 2

Materials: Elementary Studies in Plant Life

→ LAB DAY
Perform the practical work from Ch.2. Record your work in your notebook.

WEEK 3

45m Botany Lessons - Lesson 11
Botany Literature

Materials: What a Plant Knows

→ READ, NARRATE, & DISCUSS
Read about 14 pages per week; p.31-45.

→ WRITE
Write a narration in your Botany Notebook.

• PLAN WEEKLY
Nature walk - Look for the plants and/or features mentioned in your books. Record observations.
science free read

WEEK 3

45m Botany Lessons - Lesson 12
How Plants Work, Soil Science

Materials: Links

→ INTRO
Scientists now know that soil science is fundamentally important to plant growth and even human health. This is because of the vast number of organisms that live in the soil food web. Look at a basic diagram of this web at the link and copy it into your Botany Notebook. Then, watch the videos to consider how it works and why it's important.

→ VIEW
∞ Image Link: Soil Food Web

→ VIEW, NARRATE, & DISCUSS
∞ Video Link: The Living Soil Beneath Our Feet (2:49)
∞ Video Link: How Regenerative Agriculture Brings Life Back (15:22)

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Click THIS text or scan the QR code for links.

Term 1

WEEK 3

45m Botany Lessons - Lesson 13
Identification

Materials: Botany in a Day, Shanleya's Quest card game

→ READ, NARRATE, & DISCUSS
p.19-21

→ VIEW
Watch the author explain further.
∞ Link: Tutorial
∞ Link: Written Explanation in larger print from the website

→ PLAY
Find a friend and begin playing the card games to familiarize yourself with the families and recognize the patterns.

WEEK 3

45m Botany Lessons - Lesson 14
Flex Day

Materials: Selected botany literature OR lab/field supplies

→ NOTE
Use this flex day to finish the week's reading from What a Plant Knows or continue any lab/field activities. Suppose you have completed these activities for the week. In that case, you may use this day to tailor the course to be more literary by reading an additional text, such as Growing a Revolution, or more active by pursuing a special study of interest.

WEEK 3

45m Botany Lessons - Lesson 15
Special Study

Materials: The Milkweed Lands

→ READ, NARRATE, & DISCUSS
Half of Ch.2 (to p.27)

WEEK 3

60m Botany Labs - Lesson 3

Materials: Link, household items indicated, microscope, and glass slides

Prep: Read Student Tip.

→ LAB DAY
Use the procedure at the link to evaluate microbial life in soil from at least 3 locations. The locations may be at the same site, but they should be some distance apart. Soil that is even 10-20 yards apart may be quite different. It is okay to be unsure of what you are viewing under the microscope.

→ VIEW
∞ Link: Soil Sampling Procedure

• STUDENT TIP
Plan to go to another type of habitat next week. If you collected soil from a neighborhood this week, perhaps go to a forest or a pond next week.

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