Science

Nature Walks & Scouting
General Science
Labs
Natural History
Nature Notebook

Alveary

About the Course

In level 7, learners extend their relationship with science in a new direction (time), situating science in its historical, political, and cultural context, and begin to understand that science is an ever-changing process rather than a static body of knowledge. Reading level and expectations increase from previous levels.

This course includes the following topic(s): General Science: Grade 7, Natural History: Grade 7, Labs: Grade 7, Nature Notebook: Grade 7, Nature Walks & Scouting: Grades 1-8

About Nature Walks & Scouting: Grades 1-8
Students spend time once each week on a longer excursion. Prompts can be found in Outdoor Work, if desired. This digital resource is provided with all science lessons.

About General Science: Grade 7
This is the first of a two-year Physical Science course (i.e., introductory physics and chemistry). The fullness of the course includes topics in earth science, history, politics, and more. The completion of this course provides a gentle yet robust transition into the high school disciplines. The lab component is required for this course. Coordinating afternoon activities are provided in Outdoor Work.

About Labs: Grade 7
This is the required lab component for level 7 General Science. This course includes our custom laboratory book which will build foundational and progressive skills and habits.

About Natural History: Grade 7
Learners dig deeper into relationships between creatures as they read about the beginnings of ecology. Coordinating afternoon activities are provided in Outdoor Work.

About Nature Notebook: Grade 7
Students spend time at least once each week recording their observations. Prompts that coordinate with curricular content can be found in Outdoor Work, if desired. This digital resource is provided with all science lessons.

Science: Grade 7
The Big Picture:
To accomplish the goal of supporting a relationship with the Things of the Universe, a Mason science program consists of nature lore, natural history, and general science. Nature immersion, inquiry, community connection, and supportive literature are woven into each of these three parts. In Form 1, students became acquainted with this area of knowledge, science. Form 2 students extended their scope and began to encounter science as an active part of society. Form 3 students extend their relationship with science in a new direction (time) and consider science as a process by which man seeks Truth within Creation. They begin to situate science in its historical, political, and cultural context with all of the complexities of man's own story. In this way, students are prepared to think about science with a complete and holistic perspective.

Nature lore is timeless knowledge that is passed through a community, much like a grandmother passes on how to make that special bread when the dough just "feels right." Like Mason, we strive to pass on this knowledge primarily through outdoor work. Group nature walks, seasonal readings, and topics in scouting are provided as an Outdoor Work resource in the Quick Links. If desired, literature suggestions to support lore can be found in the Community Read Alouds resource (in Citizenship Grades 4+).

Placement & Combining Tips

Science: Grade 7
Learners may stay at their appropriate level for General Science while combining Natural History and Outdoor Work, or teachers can adapt the laboratory content and reading level to meet their needs.

Nature Walks & Scouting: Grades 1-8
Learners may be combined and share prompts or follow the plan of their local scouting troop or natural history club. Support accessibility and sensory development as appropriate.

General Science: Grade 7
For seventh-grade students or possibly hungry sixth-graders or eighth-graders taking their time. If combining grades is desirable: the combined grades may begin at the appropriate level and move forward together, or teachers can adapt the reading level and laboratory content to meet their needs.

Labs: Grade 7
The ideas and skills in this component are progressive, like math or grammar. Teachers should read the lab book thoroughly to understand what concepts might need to be supplemented should they choose a different sequence or a substitution.

Natural History: Grade 7
For approximately seventh-grade students, based on a balance of complexity and reading level. However, learners may be freely combined based on needs and preferences.

Nature Notebook: Grade 7
Learners may be combined and share prompts or follow their own interests. Support through varied media, scribing observations, or notebooking in tandem.

Scheduling

GRADE	SCHEDULE INFO.	BOOKS
1-8	Nature Walks & Scouting: Grades 1-8 1 time/week 30 min+	
7	General Science: Grade 7 2 times/week 30 min	The Story of Science: Aristotle Leads the Way
7	Labs: Grade 7 1 time/week 45 min	Science: Grade 7 Lab Book
7	Natural History: Grade 7 1 time/week 30 min	The Girl Who Drew Butterflies: How Maria Merian's Art Changed Science
7	Nature Notebook: Grade 7 1+ time/week 20 min+	

Sample Weekly View

Day 1	Day 2	Day 3	Day 4	Day 5
Science: Grade 7				
Natural History: Grade 7	General Science: Grade 7	General Science: Grade 7	Nature Notebook: Grade 7	Labs: Grade 7 Nature Walks & Scouting: Grades 1-8

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.

Science: Grade 7
☐ Obtain any supplies indicated on the science or grade-level supply lists.
☐ Download any apps and shortcut any desired links.

Nature Lore:
☐ Bookmark your Outdoor Work Quick Link, so that you have it available on your weekly outing. Outdoor Work is generally flexible for your location and season and can be moved around in the schedule to incorporate or substitute Natural History Club outings, except where the suggestion is to collect some Thing for a lesson.
☐ Print or bookmark grade-specific nature notebook suggestions to support natural history and general science. Notebooking can be done on a walk, during occupations, or as a field trip, as appropriate.

Special Topics & Field Trips

Science: Grade 7
Encourage students to choose their own special topic and to notice its ecological relationships. What or who are they curious about or interested in getting to know better? Teachers can choose their own special study, too!

☐ Learn a few of your local species or varieties in connection with special topics.

General Science: Grade 7
☐ Terms 1 and 3: a planetarium or local astronomy club event
☐ Term 2: a playground

Natural History: Grade 7
☐ Any term: natural history museum or butterfly house

Term Prep & Teacher Tips

General Science: Grade 7
☐ Gather household items, typically easy for students to scavenge or teachers to obtain locally:
- medium-large sized recycled box, roughly 1-2'
- knife, blade, or scissors to cut the box
- table/reading lamp
- table or countertop
- books or wood blocks to adjust height
- 1 gallon jug of milk or water, the type with a handle
- horizontal bar to support weight, such as broom handle held by 2 people. a chin up bar, a porch railing, etc.
- recycled cereal box or toothbrush
- a flat location that is in the sun at noon
- various supplies by student design
- printables
- computer
- optional: empty cereal box
- optional: orange
- optional: flashlight
- optional: calculator, such as found on most electronic devices

Natural History: Grade 7
☐ Gather household items, typically easy for students to scavenge or teachers to obtain locally:
- a flower with large, visible parts, such as a lily (Term 1)
- a sunny window
- water
- a few sprigs of any water weed obtained from a pond or pet store that sells fish (Term 3)
- various supplies by student design
- optional: salt
- optional: forceps/tweezers

Reminders

Natural History: Grade 7
☐ Note that the first lesson of Natural History is an activity, so be prepared with these and any other materials from the supply list on day 1.

Books & Resources

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

Science: Grade 7

General Science: Grade 7


The Story of Science: Aristotle Leads the Way

Labs: Grade 7

Science: Grade 7 Lab Book

Natural History: Grade 7


The Girl Who Drew Butterflies: How Maria Merian's Art Changed Science

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: Grade 7

Alveary Grade 7 Science Kit

Nature Walks & Scouting: Grades 1-8


Wild Bird Seed


Bird Feeder


Hand Lens


Small Collection Containers


Small Basin

Dip Net


Student Microscope

General Science: Grade 7

Household Items - General Science: Grade 7

Natural History: Grade 7

Household Items - Natural History: Grade 7

 Slides and Coverslips

 Prepared Microscope Slides

 Student Microscope

Quick Links

Click THIS text or scan the QR code for links.

Science: Grade 7

- Extra Helpings
- Foundations (See Section 13: Science)
- Alternate One Year Physical Science Lesson Plans
- Outdoor Work
- Seek app from iNaturalist
- SkyView Lite for Android
- SkyView Lite for iOS

Labs: Grade 7

- Grade 7 Lab Book
- Lab Notebook Examples

Science: Grade 7

How To Teach

Introduce

• Begin each lesson with learners' existing knowledge. If the book or activity is new or unfamiliar, then look at the title, a picture, or guidance in the lesson plan to help discuss what students think, drawing on previous experience. If continuing or revisiting a topic or activity, then recap.

• Often, the introduction in the lesson plans or the title of the book's section can help learners to draw out the main idea. Use this to support learners, as appropriate.

• Some learners may benefit from using pictures or looking back briefly.

• Allow them time to share any concerns and come alongside, as needed.

Read

• Read or do, as instructed in the lessons, noting any Teacher Tips provided. Learners should always have their journal, notebook, or other paper available in case they need to draw or diagram during the lesson.

• 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.

• If learners do not understand a word or concept, do not worry. Try to show them with a picture or connect the idea to something they have seen in real life. They are learning much by the way and will likely build understanding over the term, the year, and beyond.

Narrate

• Process the ideas of the lesson by retelling events, describing, explaining a concept, etc. Tips about helping learners deal with various types of passages are provided, but teachers can learn more in Charlotte Mason's School Education Chapter 16, especially p.180.

• Learners may use words, pictures, Legos, PowerPoint, etc, to process and convey ideas in their own way.

• Teachers may take turns to model.

Discuss

• Consider together any thoughts, confusion, or concerns about the passage, keeping in mind that oftentimes new concepts are not going to be 'mastered' on the first or even second introduction. Mastery is not necessarily the goal, but curiosity and thinking.

• Questions/topics for further discussion are often provided in the lesson plans (or even lab books) to help. There are no right or wrong answers to these. Alternatively, many of these can be used for composition, depending on the needs of the learner and the instructional goals of the teacher. If teachers want to keep ideas active in the mind, these can also be used at other times to keep the ideas in the working memory.

• Note that learners may need to spend more than the allotted time engaging with or even repeating a lesson before moving on or as reinforcement at a later time. Adjust the pace as needed to feed the learner.

• Notice if there were any dates that they want to keep for their Book of Centuries.

Connect

- Follow any extra links, examine any sidebars in the text, look at pictures, etc., depending on learner needs and interest.
- These can be viewed as alternative ways to engage.

Science: Grade 7

How To Teach 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 and is guided by the lab book.

• On day 1, learners read an introduction in their lab book. How does this lab activity relate to what they have learned so far, as well as any previous experience? What will they learn from the lab? This is analogous to the conversation we might have when we begin something new in any subject, but they may need to dialogue as they learn to extend these skills to the laboratory.

• Once they have had a chance to think, they will compose a prelab narration to put these introductory ideas into their notebooks. The prompt in the lab is generalized and consistent, so they learn the habit. Eventually, they will learn to formulate this as a hypothesis. For example, a learner preparing for a lab about the use of insect repellent might write:

"I have read about some diseases that are spread by insects, like Lyme disease. I also know that my sister is allergic to some insect bites. Insect repellent contains pesticides to keep insects away. Some scientists worry about how pesticides affect wildlife. I am going to compare some different insect repellants in this lab to see if they really work."

• Written narration and composition are skills that they will build over time. These prelab narrations may seem short and even incomplete at first, but that is okay. If learners have difficulty or are easily frustrated, then provide them with support. Teachers may act as scribes or allow students to keep a digital notebook to type or use assistive technology, as appropriate.

• After they complete their prelab narration, the listed materials are collected. This gives the learner some responsibility to let the teacher know if something is missing or to remind the teacher if something needs to be purchased at the store.

• If these activities on day 1 do not fill the scheduled time, that is fine. They might use the additional time to familiarize themselves with the procedure, draw a picture from their book, or catch up on any other work. Some labs may instruct the student to begin on the same day.

Lab Procedure

• Then, students begin and follow the procedure (whenever prompted by the lab book). Note that the lesson plans guide teachers as to which sections are completed each week, and the lab book instructs learners when to take a break.

• The lab gives instructions for using their notebooks to create tables and figures, as needed. Do not allow this to become an obstacle. Do it with them, first having them watch and then having them copy or help when ready.

• If teachers choose to have learners record directly in the lab book or on a photocopy, then cut out and tape these into their lab books, so that they can see how the record is built.

• Learners may feel unsatisfied with their results. This is often part of the process. Come alongside, help them learn to be okay with uncertainty and questions, and teach them what to do with it in the next step.

Analysis & Conclusions

• The last step in the lab is to analyze the data and observations and draw conclusions from them. For some simpler labs, learners will complete their analysis and concluding (or postlab) narration on the last day of the lab procedure. For labs that are more involved, a separate day has been built in to allow adequate time for this.

• Similar to the prelab narration, the concluding narration is a chance to think about and put into

words (or questions). This time, they are considering what they learned from the lab, what they could learn more about if they were to continue, and possibly how they would pursue that learning. Again, they might need support in the form of dialogue, a scribe, etc. For example, the above learner might write:

"It was clear that the Off and black pepper essential oil worked against ants because they would not even touch the line of repellent, but I wasn't sure about the Skin So Soft because it ran all over the place. I could test this one again with different insects or on a different surface."

• Depending on the interest of the learner and the priorities of the teacher, the student might be encouraged to spend more time on those ideas of what more they could learn, or it might be time to move on. Either way, it is an important part of the scientific method to reflect on what we could or would do next - our practice should help to clarify our thinking and teach that there is always more to be learned.

• Teachers should engage learners with this reflection by reviewing their lab notebooks with them, discussing the science used in the lab, and demonstrating curiosity about the lab themselves.

Science: Grade 7

Click THIS text or scan the QR code for links.

Term 1

WEEK 1

30m Natural History: Grade 7 - Lesson 1

Shoots Activity

Materials: 9 bean seeds, 3 recycled pots or cups, soil of any kind, aluminum foil (for later), sunny window, recycled box to hold 3 pots or cups, water

→ INTRO

This term, you are going to read the biography of a woman who began as a young artist and grew to be a skilled naturalist and biologist. We will begin as she did, studying the anatomy and physiology of flowering plants. Today, you will plant some bean seeds and observe how they "see" the light.

→ ACTIVITY

- Prepare 3 pots or cups with soil and plant 3 seeds in each cup.
- Set the cups near a sunny window, but inside a recycled box on its side, such that they only receive light from the direction of the window. Keep them watered so that the soil is damp, but not wet. They may only need 1-2 tablespoons of water at a time, depending on the size of your cups. It will take them 1-2 weeks to germinate, and you will need to keep the soil damp.

→ NARRATE

Draw or diagram your planted seed cups in their window in your science notebook.

• OUTDOOR WORK

Weekly walks and daily outdoor time are vital! Resources in Quick Links.

WEEK 1

30m General Science: Grade 7 - Lesson 1

Thinking About Creation

Materials: Aristotle Leads the Way

PREP: Read Teacher Tip

→ INTRO

This book tells the story of how modern science developed, beginning with the ideas of the ancient Greeks. Most of them wondered and learned from the heavens and from mathematics, eventually defining science. There are many interesting sidebars and tangents in the text, but read the main text first and then explore them, as desired. Watch the course introduction video:
∞ Video Link: Form 3 Science Intro (5:04)

→ READ, NARRATE, & DISCUSS

Ch.1 p.1-8 "The universe" - "to have them."

- Tell about the earliest beginnings of science in the ancient world. How did men begin?
- The author of this book invites all learners of different beliefs to find common ground in this discussion about how we understand the world we share. Discuss some of the ways she does this.

→ SUPPLEMENTAL

∞ Video Link: NatGeo Mesopotamia (4:10)
∞ Video Link: Mayan Creation Story (2:55)
∞ Video Link: Hindu Creation Story (2:41)

★ TEACHER TIP

Watch the course introduction video with your student(s).

★ TEACHER TIP

Even as students begin to work more independently, teacher engagement is very important. Discussion prompts are provided to help, if natural discussion is a challenge.

★ TEACHER TIP

Supplemental links for optional support are provided at the END of the lesson. They can be used at any point to help generate interest during the introduction, to enliven the lesson itself, or to add to discussion later. They are NOT required and should NOT take away from the narration and discussion. Experiment and see what works best for your student(s).

• IMPORTANT DATES

Sumerian Empire c.3100- c.2000 BC
Egyptian Civilization c.3100-332 BC

Science: Grade 7

Click THIS text or scan the QR code for links.

Term 1

WEEK 1

⬚ **30m General Science: Grade 7 - Lesson 2**
What is a Myth?

Materials: Aristotle Leads the Way

→ RECAP
What did you read last time?

→ READ, NARRATE, & DISCUSS
Ch.2 p.9-14 "Once, or so" - "makes us human."

- According to the author, what is the distinction between myth and science? And what is NOT the distinction? Is there anything to add based on your own tradition?
- Why is myth important? If you have read much of J.R.R.Tolkien's work, consider the role myth plays in his stories. Compare/contrast both authors' ideas about myth. If you haven't yet read his work, consider another author who makes use of myth, or file away this idea for the day that you do read his work!
- What is a hypothesis?
- How is science (and its limits) part of what makes us human?

→ SUPPLEMENTAL
∞ Video Link: Finding Summer Constellations (5:39)

★ TEACHER NOTE
The author invites readers to consider what is myth and what is science, a consideration that engages with religion, on p.11-12: "How do we" - "fiction usually does." Teachers might choose to allow the idea to pass by the way or to engage in discussion.

WEEK 1

⬚ **45m Labs: Grade 7 - Lesson 1**
Changing Constellations

Materials: Grade 7 Lab Book and materials listed within

PREP: Read Teacher Tip

→ LAB DAY
Complete day 1 of Changing Constellations, as directed in the Lab Book.

Suggested day 1: Students read the Introduction. Then compose the prelab narration in the lab notebook. These need not be more than 1-3 sentences at first, and teachers should feel free to scribe for students, as necessary. Spend the remaining time gathering materials for next week. If time permits, students may want to copy any helpful diagrams into their notebooks.

★ TEACHER TIP
Students study sky charts over different time periods to notice how observed movement of stars changes. Remember the most important objective is always building skills and habits. Pacing is only a suggestion. Students should engage with lab at a pace that is appropriate for their abilities and interest.

WEEK 2

⬚ **30m Natural History: Grade 7 - Lesson 2**
The Girl in the Garden

Materials: The Girl Who Drew Butterflies

PREP: Read Teacher Tip

→ INTRO
Let's begin reading about Maria Merian today. As we continue to learn about her and her work, we will see the interactions between plants, insects, and the environment. These shared relationships exist for all living things around the world and are called the study of ecology.

→ READ, NARRATE, & DISCUSS
"Prologue" p.viii-ix "A girl kneels" - "her story.

★ TEACHER TIP
The next 2 weeks are activity weeks!

• OUTDOOR WORK
Weekly walks and daily outdoor time are vital! Resources in Quick Links.

Science: Grade 7

Click THIS text or scan the QR code for links.

Term 1

WEEK 2

⬚ **30m General Science: Grade 7 - Lesson 3**
What is a Myth?

Materials: Aristotle Leads the Way

→ RECAP
What did you read last time?

→ READ, NARRATE, & DISCUSS
Ch.2 p.14-19 "We've learned" - "to be born."

- Describe the process of science.
- "The world is God's epistle written to mankind... It was written in mathematical letters." Discuss.
- The author says that the "marriage of numbers and nature... is an essential part of the scientific story." Why? Do you agree? Where have you noticed numbers in nature?
- Why do you suppose the story begins with sky watching?

→ SUPPLEMENTAL
∞ Video Link: Is Math Invented or Discovered? (5:11)

• NATURE NOTEBOOK
Prompt for General Science in Outdoor Work Quick Link.

WEEK 2

⬚ **30m General Science: Grade 7 - Lesson 4**
Thinking about Time

Materials: Aristotle Leads the Way

→ RECAP
What did you read last time?

→ READ, NARRATE, & DISCUSS
Ch.3 p.20-25 "Perhaps it was" - "around the globe."

- What kinds of observations and what kinds of questions did early sky watchers have?
- Explain the similarities and differences between the lunar calendar and the solar calendar. Which is closer to the calendar we use?

→ SUPPLEMENTAL
∞ Video Link: The Analemma (4:23)
∞ Video Link: Want to measure the analemma? (7:33)

• IMPORTANT DATES
Egyptian Solar Calendar c.4th century BC

WEEK 2

⬚ **45m Labs: Grade 7 - Lesson 2**
Changing Constellations

Materials: Grade 7 Lab Book and materials listed within

→ LAB DAY
Complete day 2 of Changing Constellations, as directed in the Lab Book.

Suggested day 2: Students conduct the Procedure today, using the website in the lab book.

WEEK 3

⬚ **30m Natural History: Grade 7 - Lesson 3**
Shoots Activity

Materials: aluminum foil, water

→ INTRO
You should have shoots by now, and they are probably growing rapidly! Today, you will change their conditions to see if they respond.

• OUTDOOR WORK
Weekly walks and daily outdoor time are vital! Resources in Quick Links.

Science: Grade 7

Click THIS text or scan the QR code for links.

Term 1

→ ACTIVITY
• Cut 3 small squares of aluminum foil (about 2" x 2") and 3 small rectangles (about 1/2" x 3").
• Form the squares over your fingertip or a pencil to form 3 small caps.
• Wrap the rectangles around your finger or pencil to form 1/2" tall tubes.
• Place the caps on the tips of the seedlings in one cup; place the tubes around the bases of the seedlings in another cup. Leave the third cup alone - this is your control. Continue watering your cups this week.

→ NARRATE
Draw or diagram your seedlings in your science notebook.

WEEK 3

⬚ **30m General Science: Grade 7 - Lesson 5**
Phases of the Moon

Materials: Aristotle Leads the Way

→ RECAP
What did you read last time?

→ READ, NARRATE, & DISCUSS
Ch.3 p.26-27 "For a long time," - "facing the sun."

• Explain the moon's phases.

→ SUPPLEMENTAL
∞ Video Link: Moon Phases (9:45)

• NATURE NOTEBOOK
Prompt for General Science in Outdoor Work Quick Link.

WEEK 3

⬚ **30m General Science: Grade 7 - Lesson 6**
Thinking about Time

Materials: Aristotle Leads the Way

→ RECAP
What did you read last time?

→ READ, NARRATE, & DISCUSS
Ch.3 p.28-31 "Palenque," - "our solar system."

• Were the ancient calendar makers doing science? Why or why not? If not science, what was it?
• What ideas have been passed down to us from the ancient calendar makers?

→ SUPPLEMENTAL
∞ Video Link: Decoding the Astronomy of Stonehenge (6:29)

• FIELD TRIP
Visit a planetarium or astronomy club event.

WEEK 3

⬚ **45m Labs: Grade 7 - Lesson 3**
Changing Constellations

Materials: Grade 7 Lab Book and materials listed within

PREP: Read Teacher Tip

→ LAB DAY
Complete day 3 of Changing Constellations, as directed in the Lab Book. Be sure to narrate the lab to your teacher by showing them your lab notebook.

Suggested day 3: Students complete the Analysis and Conclusion.

★ TEACHER TIP
Inviting students to share their lab notebooks is a great way to engage in discussion and keep up with their learning! They should be able to discuss the science and explain what they did.