

Science

Nature Walks & Scouting
General Science
Labs
Natural History
Nature Notebook





About the Course

In level 4, learners begin to notice science in their community and begin to develop their own interests as they discover a variety of topics from the microscopic world, physical science, and more. A mixture of more and less challenging books is included in this course.

This course includes the following topic(s): General Science: Grade 4, Natural History: Grade 4, Labs: Grade 4, Nature Notebook: Grade 4, 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 4

Learners engage with microscopes, airplanes, and sound as they practice beginning lab skills and learn to construct bar graphs from their data. The lab component is required for this course. Coordinating afternoon activities are provided in Outdoor Work.

About Labs: Grade 4

This is the required lab component for Level 4 General Science. This course includes our custom laboratory book, which will build foundational and progressive skills and habits.

About Natural History: Grade 4

Learners encounter microscopic creatures, pursue the mysterious octopus, and watch the unfolding of life through primary succession. Coordinating afternoon activities are provided in Outdoor Work.

About Nature Notebook: Grade 4

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 4

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. Building on the familiarity and foundational knowledge of Form 1, Form 2 learners in grades 4-6 extend the scope of the Things they encounter and begin to notice that science is active in their world. Growing in their self-knowledge at this age, they may notice that they gravitate toward some of these Things more than others. This is a bit like noticing that you have a natural rapport with a particular friend because they seem to understand the way you think and share the same interests. This is wonderful and very typical, but we still want them to get to know more “friends” in science and try different Things, even though one might be their particular interest. Their sense of community is expanding, as well: who are the scientists in their world, and what are they doing? Special care has been taken to build vocabulary and conceptual knowledge “by the way” and to maintain the connection between scientific endeavors and the human experience. In Form 3, students will continue to build on this knowledge of what science is doing in the world when they examine science in its historical context.

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 4

For fourth-grade students or possibly hungry third-graders or fifth-graders taking their time. If combining grades is desirable: the combined grades may begin at the appropriate level and move forward together, learners may stay at their appropriate level for General Science while combining Natural History and Outdoor Work, or teachers can adapt the reading level and laboratory content 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 4

For fourth-grade students or possibly hungry third-graders or fifth-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 4

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 4

For approximately fourth-grade students based on a balance of complexity and reading level. However, learners may be freely combined or sequence reordered based on needs and preferences.

Nature Notebook: Grade 4

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+	
4	General Science: Grade 4 1 time/week 20 min	The Elephant Scientist To Fly: The Story of the Wright Brothers The Universe in You: A Microscopic Journey
4	Labs: Grade 4 1 time/week 30 min	Science: Grade 4 Lab Book
4	Natural History: Grade 4 1 time/week 15 min	A World in a Drop of Water: Exploring with a Microscope Life on Surtsey: Iceland's Upstart Island The Octopus Scientists: Exploring the Mind of a Mollusk
4	Nature Notebook: Grade 4 1+ time/week 15 min+	

Sample Weekly View

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



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 4

- ☐ 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.
- ☐ 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.

Labs: Grade 4

- ☐ Preview science labs and purchase materials, or have students gather them. Print or shortcut any links, as desired.

Nature Notebook: Grade 4

- ☐ 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.
- ☐ 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 4

Encourage students to begin choosing their own special topic to observe, study, and research in their field guides. What or who are they curious about or interested in getting to know better? Teachers can choose their own special study, too! Suggested field trips include:

General Science: Grade 4

- ☐ Term 1: a museum with a microscopy exhibit
- ☐ Term 2: an airport observation deck and/or a museum with airplanes
- ☐ Term 3: a museum with a sound exhibit and a zoo

Natural History: Grade 4

- ☐ Term 1: a pond
- ☐ Term 2: an aquarium
- ☐ Term 3: a controlled burn site

Term Prep & Teacher Tips

Science: Grade 4

Object lesson prompts are woven into the lessons, as appropriate, but teachers are encouraged to read corresponding Handbook of Nature Study (HoNS) selections each term and/or any that support special topics chosen by students:

General Science: Grade 4

- ☐ Term 1: introduction to rocks p.743-745
- ☐ Term 2: one or more birds from p.62-142
- ☐ Term 3: sedimentary, igneous, and metamorphic rocks p.745-748
- ☐ Gather household items, typically easy for students to scavenge or teachers to obtain locally:
 - lighter or a match for candle
 - penny
 - flashlight
 - a few salt crystals
 - water
 - table or counter with overhang
 - hair dryer

- a few sheets of multipurpose paper
- long hallway for flying paper airplanes
- large-medium-sized bowl
- paper towels
- empty can or cup
- voice recorder, such as found on most electronic devices
- friendly animal, such as yours or a neighbor's pet (Term 3)
- printables
- optional: computer
- optional: sewing needle
- optional: metal coathanger
- optional: metal spoon
- optional: 2 pieces of string ~30cm

Natural History: Grade 4

- ☐ Term 1: water lily p.495-497, pondweed p.498-500
- ☐ Term 2: snails/mollusks p.416-421
- ☐ Term 3: one or more insects from p.301-367

Reminders

General Science: Grade 4

- ☐ Note that there is an activity during Lesson 1. Be sure to have your materials ready!

Natural History: Grade 4

- ☐ Students will need to collect a sample of pond water for use during Term 1: weeks 1, 8, and 10. There is a reminder to visit a pond in the Nature Notebook section of their Outdoor Work resource, but teachers may want to make a note in their calendars, as well.



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 4

General Science: Grade 4



The Elephant Scientist



To Fly: The Story of the Wright Brothers



The Universe in You: A Microscopic Journey

Labs: Grade 4



Science: Grade 4 Lab Book

Natural History: Grade 4



A World in a Drop of Water: Exploring with a Microscope



Life on Surtsey: Iceland's Upstart Island



The Octopus Scientists: Exploring the Mind of a Mollusk



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](#)

Science: Grade 4



Alveary Grade 4 Science Kit



48 Prepared Microscope Slides for Beginner



Student Microscope

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 4



Hand Lens



Household Items - General Science: Grade 4

Labs: Grade 4



Hand Lens



Small Collection Containers



Slides and Coverslips



Safety Goggles

Natural History: Grade 4



Slides and Coverslips



Quick Links

Science: Grade 4

- ∞ [Extra Helpings](#)
- ∞ [Outdoor Work](#)
- ∞ [Microscope Coloring Book](#)
- ∞ [Seek app from iNaturalist](#)
- ∞ [SkyView Lite for iOS](#)
- ∞ [SkyView Lite for Android](#)
- ∞ [Foundations \(See Section 13: Science\)](#)

Labs: Grade 4

- ∞ [Grade 4 Lab Book](#)

Click THIS text
or scan the QR
code for links.



SAMPLE

Science: Grade 4

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.
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SAMPLE

Science: Grade 4

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.

SAMPLE



Term 1

WEEK 1 15m Natural History: Grade 4 - Lesson 1

A New World

Materials: A World in a Drop of Water

PREP: Read Teacher Tip

→ INTRO

Look at the picture on the cover. Have you ever seen such creatures before? In our book, the author will take us on a walk to find such creatures.

→ READ, NARRATE, & DISCUSS

p.3-5 "Let's go out" - "we have caught."

★ TEACHER TIP

Leave the microscope accessible throughout the term, so that samples can be observed easily in just a few minutes.

★ TEACHER NOTE

Students need to collect samples from a pond this week, as suggested in their nature notebook prompt. These will be used for several weeks DURING lesson activities.

● OUTDOOR WORK

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

WEEK 1 20m General Science: Grade 4 - Lesson 1

Zooming In

Materials: The Universe in You, penny/dime, ruler, hand lens, image link

→ INTRO

What's the smallest Thing you've ever seen? Do you think there is anything smaller? Look at the picture on the cover. What do you think you are seeing? Did you know that there are such Things that are so small that we can't usually see them? This book is about the smallest Things we know of. You can use your ruler to track how small Things are for the first few pages.

→ READ

p.1-8 "The Calliope Hummingbird" - "of a vellus hair."

→ ACTIVITY

Can you see your skin cells or bacteria? How can we know they exist? Sometimes we can sense the effect of something we can't see, like the wind; sometimes we can use a tool to make it visible. To look closer at small Things, scientists use a tool called a microscope. We do 2 things with a microscope: magnify and focus.

- Look at ∞ Image Link: Penny & Salt or Dime & Salt
- This image has been magnified. Compare it to your coin. What does it mean to be magnified? How much bigger is it? How many of your coins could fit across this image?
- Did you notice that there are some salt crystals on the magnified coin? How much has the salt been magnified? (same as the coin)
- Use your hand lens to look at your coin. What details do you notice that you couldn't see without the hand lens? Look at the other side: Penny: Can you find the little man between the columns of the building? Notice what happens as you move the penny and lens closer together/farther apart. What does it mean to focus? Dime: Notice that the plants on either side of the torch are different. One is an olive and the other an oak. Can you tell the difference? Notice what happens as you move the dime and lens closer together/farther apart. What does it mean to focus?

→ NARRATE & DISCUSS

★ TEACHER TIP

Spend as much time as is wanted looking at the artwork in this book before going on to each successive page. Share the captioned facts, as desired.

★ TEACHER NOTE

Note that next week is an activity day. Check your supplies!



Term 1

WEEK 1 30m Labs: Grade 4 - Lesson 1

Lab: Meeting the Microscope

Materials: Grade 4 Lab Book and materials listed within

PREP: Read Teacher Tip

→ LAB DAY

Complete day 1 of Meeting the Microscope, as directed in the Lab Book.

Suggested day 1: Students read the Introduction and 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 remaining time gathering materials for next week.

★ TEACHER TIP

Pacing is only a suggestion. Students should engage with the lab at a pace that is appropriate for their abilities and interests.

WEEK 2 15m Natural History: Grade 4 - Lesson 2

A Drop of Water Activity

Materials: microscope, water sample, dropper, slide, cover slip

→ INTRO

Examine your pond water today.

→ ACTIVITY

- Make a few slides by transferring a drop of water to a slide and adding a cover slip. It helps to rest the edge of the coverslip on the slide, holding it at an angle. Then allow it to fall onto the drop of water.
- Observe your slide under low power.
- If you find something under low power, try moving up to a higher power objective to see more. Adjust the focus, as needed.

→ NARRATE & DISCUSS

Use a nature journal to record what the student noticed. When you are finished, let the samples sit away from direct sunlight until you look at them again.

- Living things need food, water, and habitat. Would a living thing in the pond water have all of those?

• OUTDOOR WORK

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

WEEK 2 20m General Science: Grade 4 - Lesson 2

The Microscope

Materials: video/image links, microscope, flashlight, slide, salt crystals

→ INTRO

What did we learn about in the last lesson? How do we see very small Things? What two things does a microscope do? Let's look at a very old microscope, and then we'll compare that to ours. Watch for him to show you the tube where the magnifying lenses are and the mirrors that direct the light.

→ VIEW

∞ Video Link: A 1750s Compound Microscope (5:06)

→ ACTIVITY

- Where is the tube and where are the lenses on your microscope? Refer to the diagram that came with your microscope. The one at the link may help for comparison. How much does the lens at your eyepiece (the ocular lens) magnify? How much do the lenses at the bottom of your tube (the objective lenses) magnify?

∞ Image Link: Compound Microscope Parts

- How did he use the mirror? Where is your light source? Place a slide



Term 1

with a few salt crystals on the stage. Does this direct light through the specimen or onto the surface? Look at the crystals and describe/draw what you see.

- Turn the light source off and instead shine the flashlight down onto the surface of the salt crystals. Adjust the flashlight to point as much light onto the surface as you can. Look at the crystals and describe how this is different from the lower light source.

→ NARRATE & DISCUSS

WEEK 2 30m Labs: Grade 4 - Lesson 2

Lab: Meeting the Microscope

Materials: Grade 4 Lab Book and materials listed within

→ LAB DAY

Complete day 2 of Meeting the Microscope, as directed in the Lab Book.

Suggested day 2: Students conduct the Procedure today, drawing, diagramming, or dictating in their lab notebook what they observe, just as they would in their nature journals.

WEEK 3 15m Natural History: Grade 4 - Lesson 3

Inventing the Microscope

Materials: A World in a Drop of Water

→ INTRO

Recall what we read about in the last passage. Let's find out how the microscope was invented before we go further with it.

→ READ, NARRATE, & DISCUSS

p.6-9 "We are about" - "hundred years ago."

- Why do you think the scientists didn't believe Leeuwenhoek at first? What are some things that can be hard to believe because we can't see them?

• OUTDOOR WORK

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

WEEK 3 20m General Science: Grade 4 - Lesson 3

Zooming in Further

Materials: The Universe in You

PREP: Read Teacher Tip

→ INTRO

What did the girl in this book see last time? Look at the pictures, as needed.

→ READ, NARRATE, & DISCUSS

p.9-end "The smallest hairs" - "the universe within."

★ TEACHER TIP

Students don't need to remember all of the scientific language. Just let them hear it "by the way."

WEEK 3 30m Labs: Grade 4 - Lesson 3

Lab: Meeting the Microscope

Materials: Grade 4 Lab Book and materials listed within

→ LAB DAY

Complete day 3 of Meeting the Microscope, as directed in the Lab Book.

Suggested day 3: If students have a few last observations to make before completing their notebook, give them a few minutes to do so. Complete the postlab narration, as directed in the Analysis and Conclusion section



Term 1

of the lab. Teachers may scribe, journal in tandem, provide digital tools, or provide any other support as needed. If time remains, students may add a diagram of their microscope.

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