

**NOEO
SCIENCE
CHEMISTRY 1**
INSTRUCTOR'S GUIDE

**NOEO
SCIENCE
CHEMISTRY 1**

INSTRUCTOR'S GUIDE

Created by Dr. Randy Pritchard

noeo science
MOSCOW, IDAHO

Noeo Science Packages

**GRADES 1-3 /
AGES 5-8**

Biology 1
Chemistry 1
Physics 1

**GRADES 4-6 /
AGES 9-12**

Biology 2
Chemistry 2
Physics 2

**GRADES 7-8 /
AGES 12-15**

Chemistry 3
Physics 3

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INTRODUCTION

Welcome to Noeo

Welcome to Noeo Science! Thank you for trusting us to provide you with quality materials for teaching science at home. We understand that many homeschooling parents do not have a science background and may feel a bit intimidated about teaching science . . . especially when it comes to the experiments! Our books and experiments have been carefully selected to be of the highest quality available, yet simple enough for even the most science-phobic teachers and students. We intensely searched through library catalogs, websites, and hundreds of books before deciding on what we believe are the “best-of-the-best.” We hope that you will agree and we’re always open to your comments and suggestions.

Our Instructor’s Guides provide a logical, focused progression through the books and experiments. Each week you will find an overview of what your student will learn as well as an answer key for the student lab manual reading and experiment questions. Multiple sources of information are used to teach each science topic. However, you won’t need to spend your time searching for books or cross-checking indexes to make the curriculum flow. That work has been done for you!

What does noeo mean?

noeo | (no eh’ o) | verb

1. To perceive with the mind, to understand, to have understanding.
2. To think upon, heed, ponder, consider. (*The New Testament Greek Lexicon*)
3. Train the brain.

ROMANS 1:20

For since the creation of the world His invisible attributes, His eternal power and divine nature, have been clearly seen, being **understood** through what has been made, so that they are without excuse.

noeo

The Noeo Philosophy

The essence of science is simply observing and describing God’s creation. When scientists make a new discovery, they are seeing another part of creation revealed. Ro-

mans 1:20 tells us that His attributes, power, and divine nature are clearly seen in what has been made.

While some scientists deny that their discoveries are evidence of God’s creation, there are many that do recognize His attributes in all of creation. Our children should not be protected from science because of some scientific theories that deny God. They should instead be immersed in the sciences so that “His invisible attributes, His eternal power and divine nature” will be clearly seen.

The Noeo Method

You will find that the Noeo Science curriculum is different from all the rest. Each year of science will fill your child with wonder and excitement as they build a strong foundational knowledge of science. They’ll be having so much fun that the learning will come naturally for them . . . and painlessly for you.

Noeo Science is variety-filled, with a structure that is best described as a balance between the classical method and the Charlotte Mason approach. We emphasize narration and summarization, vocabulary development, observation, and the scientific method. We do not promote rote memorization or tests, as we think that this approach is less valuable for long-term retention. The following table illustrates these characteristics:

TEACHING METHOD	CORRESPONDING NOEO SCIENCE CURRICULUM QUALITIES
<p>Classical</p>	<ul style="list-style-type: none"> • Emphasizes vocabulary development, especially in the younger years. • Develops critical thinking skills and logic through the use of the scientific method. • Incorporates the classical stages of learning, i.e., the Trivium (grammar, logic, and rhetoric).
<p>Charlotte Mason</p>	<ul style="list-style-type: none"> • Provides the best books available (including “living books”). • Utilizes a child’s natural curiosity to acquire knowledge. “Studies serve for delight”. • Uses narration and notebooks rather than worksheets, tests, or repetitive drills to evaluate learning.

We think it is important to learn science from a variety of sources, using a variety of teaching techniques. Our curriculum does not use the traditional, single textbook approach to science education. We think variety will encourage more interest in sci-

ence, particularly with younger students. All of the books are carefully selected to allow children to discover the beauty, complexity, orderliness, and wonder of God’s design. While some written work is expected, many hands-on activities are included within the bright, colorful, and well-written books. Living book biographies of many important scientists are included to provide a practical perspective.

Occasionally, a book may introduce a particularly secular viewpoint. We view these times as an opportunity for discussions and encourage you not to skip over or “cover up” this information. We do not provide “canned” answers for these discussions, but encourage instructors to study the issues for themselves and to pray for guidance and understanding in providing answers to each student’s unique questions.

Just as creation is orderly and well organized, we think a good science curriculum should follow an orderly design. Each year of the curriculum will focus on biology, chemistry, or physics. Each of these three foundational sciences is studied independently for an entire year rather than jumping randomly from one subject to another without reason. The study of biology, chemistry, and physics is then repeated at a higher level and in more detail upon the completion of each three-year course of study (e.g. biology in 1st and 4th grade, chemistry in 2nd and 5th grade, etc.). Subjects that overlap multiple science disciplines, such as geology, weather, and astronomy, are included at logical points within the three major science studies. For example, astronomy is studied in parallel with the study of gravity within the physics curriculum.

NOEO COURSE	APPROXIMATE AGES	GRADE EQUIVALENT	CLASSICAL TRIVIUM STAGE
Biology I Chemistry I Physics I	5-8	1-3	Early Grammar
Biology II Chemistry II Physics II	9-12	4-6	Late Grammar or Early Logic
Chemistry III Physics III	12-15	7-9	Late Logic or Early Rhetoric

Our curriculum is designed on a 4-day per week schedule. If you would prefer to do science twice weekly, then simply complete the first two days of scheduled readings and assignments on your first day, and the last two days of reading and

assignments on your second day. Alternatively, you may wish to do all of the reading on the first day and the assignments and experiments on the second day. The key is to understand what works best for you and your children and to adjust the schedule as necessary.

The daily time necessary to complete the assignments will vary with individual student ability and will be based on the content being studied. We provide the following table as a guideline of the approximate time that you can expect to spend on daily assignments:

	4-DAY SCHEDULE	2-DAY SCHEDULE
Grades 1-3	15-20 minutes	30-40 minutes
Grades 4-6	20-30 minutes	40-60 minutes
Grades 7-9	30-40 minutes	60-80 minutes

Experiment Guide

Science is not a spectator sport. The best way for your child to learn and truly comprehend science is by doing hands-on experiments and activities. We know that this is one of the most dreaded parts of science for many homeschool families; that's why we were determined to put together high quality but straightforward experiments.

Noeo provides a strong foundation in science without wreaking havoc on your daily schedule. Each experiment and activity builds on the material that you cover in the week's readings, but don't worry—at the end of each experiment there is a section that explains what should have happened, and why it happened. So, if you decide to change things up, it won't be an issue.

The experiment kits come with any items that are normally difficult—or just plain inconvenient—to find. Both the Experiment Guide and Instructor's Manual have a complete supply list at the back, showing you which materials we're providing, and which materials you'll need from home. And yes, the home materials are real, honest-to-goodness, home materials—things for school, from your cabinets, and your pantry. Watch as your student progresses through these well organized, fully explained experiment kits, while actually having fun learning science.

You might notice that in between the Experiments there are some Activities and Optional Activities. Activities include the supplies you'll need, but they don't require as much explanation as Experiments, and your student won't be answering questions

about them. Optional Activities are fun, optional things to do related to the reading of the week—most of the time they’re outings or family activities, or they need materials that we didn’t want to require you to buy.

Experiment Kits

There are 4 experiment kits, including all of the wild and wacky materials that you would normally spend hours (and let’s face it: way too much money) sourcing on Amazon. Each kit lists its contents sorted by what you’ll need for each week’s experiments. Why 4 kits? It’s much less overwhelming than opening a box full of loose food dye and pipettes. But there is an even better reason: say your child opens their Noeo box, and sees a toy car for an experiment 20 weeks away. Realistically, that car is toast. With the materials sorted into kits, the materials are a little easier to manage—and you only have a few weeks to make sure you don’t lose that car, instead of 36.

Student Lab Manual

In the Student Lab Manual, your student will answer questions about key points both from their reading and experiments. The experiment questions in particular are centered around drawing results, making observations, asking questions, and making connections—all things that will slowly introduce your student to the scientific method and lab reports.

Younger students may need to “narrate” their descriptions and observations to you or an older sibling. It’s completely up to you to determine the length and amount of detail you expect from your student, but we do encourage you to increase this expectation over time.

Instructor’s Guide

Schedules, answers keys, lists of books and home supplies—it’s all here. Everything you need to make Noeo work for you is right here in the Instructor’s Guide. A list of the supplied books is provided, so that you can keep an eye on exactly which books you need for the course.

Lists of both home and included supplies are at the back of the book. The materials list is organized by weeks; so, if an experiment calls for a carrot, you won’t be stuck with a slowly decomposing root vegetable in your fridge until you need it thirty weeks later.

Every week, you can refer to our provided schedule (flexible enough that you could do it all in 1 day if you've got an enthusiastic scientist, or stretch it out as much as you need), overview of the week's subject matter, and answers to both reading and experiment questions. If your student ends up begging to do more, no need to worry—you don't work for your curriculum, Noeo works for you.

Resource List

Books

- *A Drop of Water*, by Walter Wick
- *The Dynamic World of Chemical Reactions with Max Axiom* (Graphic Science Library), by Agnieszka Biskup
- *Everyday Materials: Plastic*, by Andrew Langley
- *George Washington Carver* (National Geographic Kids), by Kitson Jazynka
- *The Kid's Book of the Elements: An Awesome Introduction to Every Known Atom in the Universe*, by Theodore Gray
- *Mad Margaret Experiments with the Scientific Method*, by Eric Braun
- *Many Kinds of Matter: A Look at Solids, Liquids, and Gases*, by Jennifer Boothroyd
- *Marie Curie*, by Elizabeth MacLeod and John Mantha
- *Pop! A Book about Bubbles*, by Kimberly Brubaker Bradley
- *Rocks and Minerals* (Teacher Created Materials), by Torrey Maloof
- *Super Science Concoctions* (A Kids Can! Book), by Jill Frankel Hauser
- *What's Smaller Than a Pygmy Shrew?*, by Robert Wells
- *What's the Matter in Mr. Whiskers' Room?*, Michael Elsohn Ross

Experiment Kits

- *Noeo Experiment Kits 1-4*

**DAILY LESSON
PLANS FOR
READING &
EXPERIMENTS**



unit 1:
**THE SCIENTIFIC
METHOD**

Week 1: How Scientists Learn.....15



Week 1: How Scientists Learn

Schedule

	DAY 1	DAY 2	DAY 3	DAY 4
<i>Mad Margaret Experiments with the Scientific Method</i>	pp. 3-7	pp. 8-9	pp. 10-13	pp. 14-22
<i>Experiment Guide</i>				Exploring the Scientific Method

Overview

This first week is so important for all of Noeo that we made it its own unit: We will be learning about the scientific method: It's how scientists observe and analyze to get information. That sounds complicated, but it's not: it's what we all do, all the time. You are going to learn how to "look" and to "answer," and how to learn from what other scientists have already "looked at and answered." After all, that's what science is all about.

Reading Questions

DAY 1

1. What is the scientific method? (use the glossary on p. 23) **The scientific method is a step-by-step process that scientists use to solve problems.**
2. What is the first step in the scientific method? **The first step is to ask a question.**

DAY 2

1. What is the second step in the scientific method? **The second step is to gather information.**

DAY 3

1. What is the third step in the scientific method? **The third step is to form a hypothesis.**
2. What is a hypothesis? (use the glossary on p. 23) **A hypothesis is a guess about how or why something happens.**

DAY 4

1. What is the fourth step in the scientific method? **The fourth step is to test the hypothesis.**
2. What is the fifth step in the scientific method? **The fifth step is to share the results.**

Activity: Exploring the Scientific Method

ASK A QUESTION

What do you want to learn about?

LEARN ABOUT IT

Find information about your question.

MAKE A HYPOTHESIS


Hypothesis is a fancy word for a guess. Guess the answer to your question—make a *hypothesis*.

EXPERIMENT

See if your hypothesis was right by testing it out.

SHARE YOUR RESULTS

What was the answer to your question?



unit 2:

WHAT MATTER IS

Week 2: Gloop and Oobleck	19
Week 3: Solids and Liquids	21
Week 4: Gases	25
Week 5: Phases of Matter	27



Week 2: Gloop and Oobleck

Schedule

	DAY 1	DAY 2	DAY 3	DAY 4
<i>What's the Matter in Mr. Whiskers' Room?</i>	pp. 9–15, Water Droppers	pp. 16–19, Gloop		pp. 20–23, Oobleck
<i>Experiment Guide</i>			Gloop	Oobleck

Overview

Last week, you learned about how to “do science”: the scientific method. Now, you get to move on to asking (and answering) questions about the huge and wonderful variety of “stuff” in our world. Noeo Chemistry 1 is really about one of the most basic questions: what is that (point at anything here) made of? But first, there’s an even more important question: how are liquids, solids, and gases different?

Reading Questions

DAY 1

1. What is the big idea in Mr. Whiskers’ classroom? (see p. 15) **Everything around us is matter, and all matter takes up space.**

DAY 2

1. What is the big idea in Mr. Whiskers’ classroom? **We can find out about matter by using our senses.**
2. What are the five senses? **The five senses are touch, sight, hearing, smell, and taste.**

DAY 3

Experiment

DAY 4

1. What is the big idea in Mr. Whiskers' classroom? **Matter can come in different forms.**
2. What are the three forms matter can come in? **The three forms are solid, liquid, and gas.**

Optional Activity: Gloop

From Home

- $\frac{3}{4}$ teaspoons borax
- $\frac{1}{2}$ cup of liquid glue
- $\frac{1}{4}$ cup water
- 3 cups with 1 tablespoon + 1 teaspoon warm water in each cup
- 3 small cups or bowls

Experiment: Oobleck

MATERIALS

Included

- 7 tablespoons cornstarch

From Home

- bowl
- spoon

EXPERIMENT QUESTIONS

1. How does the oobleck feel when it is in the bowl? **It feels hard.**
2. How does the oobleck feel when you pick it up? **It feels squishy and drips through your fingers.**
3. What form of matter is oobleck? **It changes from a solid to a liquid, and back again.**