

CHEMISTRY III: It's ELEMENTary!

INSTRUCTOR'S GUIDE

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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.
(Source: The New Testament Greek Lexicon)
3. Train the brain.
(Source: our 8 year-old son)

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

Scripture taken from the NEW AMERICAN STANDARD BIBLE®,
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Welcome

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 experiment kits 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. 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!

Our 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. Romans 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.

Understanding the Noeo Science Curriculum

You will find that the Noeo Homeschool Science curriculum is different from any other that is available. 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 Homeschool 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 the worksheet and test methodology, as we think that this approach is less valuable for long-term retention. The following table illustrates these characteristics:

<u>Teaching Method</u>	<u>Corresponding Noeo Science Curriculum Qualities:</u>
<p style="text-align: center;">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 style="text-align: center;">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 feel 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 science, 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. Optional Internet references are also provided throughout the curriculum.

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 instructor's 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 3 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 3 major science studies. For example, astronomy is studied in parallel with the study of gravity within the physics curriculum.

	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
Biology III 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 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

The Science and Lab Notebooks

We provide reproducible sheets for creating science and lab notebooks for use with the Noeo Science curriculum. The notebooks are an integral part of the curriculum. Feel free to modify these sheets and to tailor your expectations for each child.

Your student will be asked to describe, sketch or summarize what they learn from the reading assignments, or to complete a lab sheet for their experiments. This method will encourage concentration and attention to detail. In addition, the lab sheets are designed to help your student to apply the scientific method in all of their experiments.

Younger students may need to “narrate” their descriptions and observations to you or an older sibling. You will need to determine the length and amount of detail that your student is capable of. We encourage you to increase this expectation over the course of time.

Science Experiments

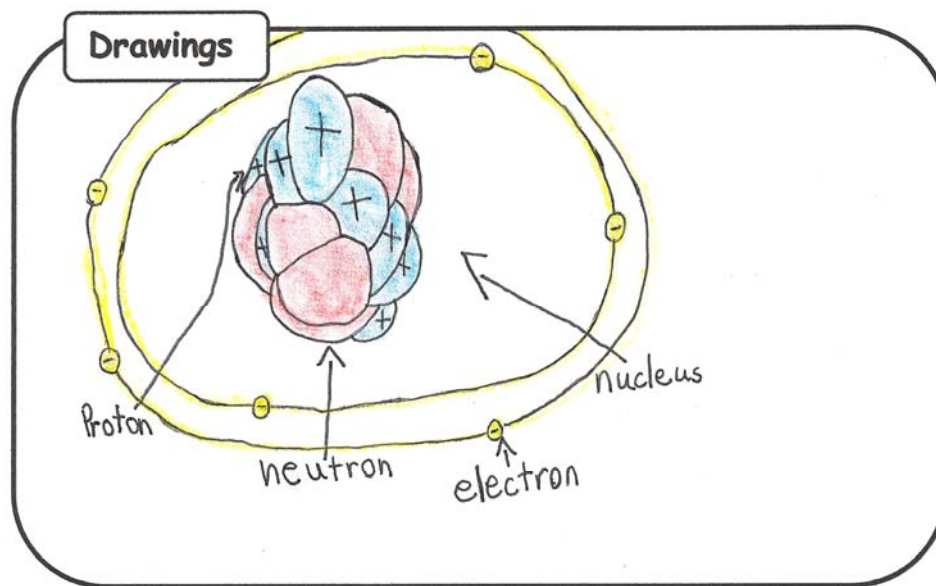
Science is not a spectator sport. The best way for your child to learn and truly comprehend science is by doing hands-on experiments and activities. We understand that this is probably the most difficult part of science for many homeschool families. That is why we were determined to find sources of high quality, yet simple, experiments.

We are pleased to say that the experiments in our curriculum will provide a strong science foundation without wreaking havoc on your daily schedule. For

example, many of our experiments are provided through a unique arrangement with *The Young Scientists Club*. These experiment kits come complete with all of the items that are normally difficult to find. They have won multiple awards for their high quality and have become increasingly popular among homeschoolers in recent years. We think you will be pleasantly surprised as your child progresses through these well organized, fully explained experiment kits while actually having fun learning science.

Our other experiments and activities are also carefully selected to provide relevant and interesting examples of the topics being studied. We provide a supply list for each week of the year, along with a “Master Supply List” at the beginning of the Instructor’s Guide. You’ll notice that most, if not all, of the items on this list can already be found in your home (honest!).

The following pages are samples copied from a science notebook of a nine-year-old that is using our Chemistry II course. Younger students would orally "narrate" their summaries to an older sibling or adult. Older children should be expected to provide more detailed narrations (summarizations). It is not necessary to complete an experiment sheet for every experiment, especially with younger students. However, it is good to complete them often in order to establish a strong understanding of the scientific method.



Reading Notes

Atoms are made up of: electrons, neutrons, and protons.
Atoms are tiny particles of what everything is made.

Definitions

nucleus- The core section of an atom that contains protons and neutrons.

neutron- a subatomic particle with no electrical charge in the nucleus of an atom.

Proton- a positively charged subatomic particle in the nucleus of an atom.

electron shells- an energy level around the nucleus.

Date 2/2/06

Experiment Name A feast for Yeast

What have you learned about this subject?
(observation/research)

That yeast is alive!

What question are you trying to answer?
(question)

What happens when you
feed sugar to yeast?

What things do you need?
(materials)

1. a bottle
2. yeast
3. sugar
4. warm water
5. a balloon
6. _____
7. _____
8. _____

What will you do to answer the question? (experiment/test)

put yeast in a bottle, put in sugar and put
a balloon over it.

What do you think will happen? (hypothesis/prediction)

the balloon will blow up with CO₂ that the
yeast makes

What happened? (results)

the balloon inflated.

Why do you think this happened? (conclusion)

The balloon catches the CO₂.

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CHEMISTRY 3

**Weekly
Reading and Assignment
Schedule**

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CHEMISTRY 3

Book List

Exploring the World of Chemistry, John Tiner

Material Matters: Acids and Bases, Carol Baldwin

Material Matters: Chemical Reactions, Carol Baldwin

Material Matters: Mixtures, Compounds, and Solutions, Carol Baldwin

Material Matters: Metals, Carol Baldwin

Material Matters: Nonmetals, Carol Baldwin

Material Matters: States of Matter, Carol Baldwin

DK Eyewitness: Chemistry, Dr. Ann Newmark

The Periodic Table: Elements with Style!, Adrian Dingle, Basher Science

Experiment Kit

Thames and Kosmos - CHEM C2000 (Ver. 2.0)

WARNING! – This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision.

NOTE: The CHEM C2000 kit must be used under adult supervision. Please read the cover, inside front cover, pages 1-15 and 123-124, and complete experiments 1 and 2 in the CHEM C2000 Experiment Manual prior to beginning any other experiments contained in this kit.

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CHEMISTRY 3

The following is a complete list of items that will be used for the required experiments over the entire 36-week course. This list includes many items that are common in most homes. The list does not include the items that are provided in *Thames and Kosmos CHEM C2000* kit.

Master Supply List	
Item needed:	Week(s) used:
Rubbing alcohol (70% ethyl alcohol)	Multiple weeks - for alcohol burner
Sugar	5, 6, 25, 28
Aluminum foil	7, 17, 21, 25, 36
Small tea light candle	7, 12, 24, 26
Steel wool	9, 20
Permanent marker	9, 13
Coffee filter	10
Sewing needle	11
Liquid dishwashing soap	11, 31
Paper clip	9, 12
Red ink or food coloring	13
Hydrogen peroxide (3% solution)	14, 20, 36
Wood splint (or skewer)	14, 24
Yeast	14
White vinegar	16, 18, 26, 32, 35
9-volt battery	17, 21, 24, 36
Table salt	17, 30
Egg	18
Scissors	19
Pliers	19
Iron nail(s)	20, 21, 24
Baking soda	24, 26, 34
Old metal spoon	25
Carbonated water (“sparkling” water)	26
Drinking straw	26
Low-fat milk	31
Small cloth	31
Rubber band	31
Cooking oil	31
Lemon juice	33
Bar of soap	33
Apple	34
Cola	34
Red cabbage	35
Screw-top jar	36
Laundry detergent	36

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CHEMISTRY 3

Weekly Schedule	
Week 1	The History and Foundations of Chemistry
Week 2	The History and Foundations of Chemistry
Week 3	The History and Foundations of Chemistry
Week 4	The History and Foundations of Chemistry
Week 5	Chemical Reactions
Week 6	Chemical Reactions; Atoms; Elements
Week 7	Compounds; Periodic Table; Chemical Reactions
Week 8	Chemical Reactions
Week 9	Chemical Reactions
Week 10	Mixtures
Week 11	States of Matter
Week 12	States of Matter
Week 13	States of Matter
Week 14	States of Matter
Week 15	States of Matter; Chemical Analysis
Week 16	Metals; Electricity and Chemistry
Week 17	Metals; Electricity and Chemistry
Week 18	Metals
Week 19	Metals
Week 20	Metals
Week 21	Metals
Week 22	Metals; Oxidation and Reduction
Week 23	Metals; Metalloids; Nonmetals
Week 24	Water; Hydrogen; Oxygen
Week 25	Carbon
Week 26	Carbon Dioxide; Nitrogen
Week 27	Phosphorus; Sulfur; Halogens
Week 28	Combustion; Noble Gases
Week 29	Mixtures; Compounds; Solutions
Week 30	Mixtures; Compounds; Solutions
Week 31	Mixtures; Compounds; Solutions
Week 32	Acids and Bases
Week 33	Acids and Bases
Week 34	Acids and Bases
Week 35	Acids and Bases; Biochemistry
Week 36	Chemiluminescence

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CHEMISTRY 3

Week 1 - The History & Foundations of Chemistry				
	Day 1	Day 2	Day 3	Day 4
Exploring the World of Chemistry	Chapter 1	Chapter 2	Chapter 3	Chapter 4

Supply List: none

Assignments:

Days 1 - 4: Answer the questions at the end of the chapter (the key is on page 137). Be sure and look up any thing you may have missed.

Also, create a timeline of the scientists mentioned in your reading, briefly summarizing their contributions to the field of chemistry.