

noeo science

biology 1

Noeo Science Packages:

Biology 1
Physics 1
Chemistry 1

Biology 2
Physics 2
Chemistry 2

Physics 3
Chemistry 3

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biology 1

by Dr. Randy Pritchard



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Table of Contents

What does “Noeo” Mean?	7
Book List & Experiment Kits.....	9
Weekly Schedule of Topics.....	11
Additional Materials Needed.....	13
Introduction.....	15
The Noeo Philosophy.....	15
The Noeo Method	16
Noeo Notebooks.....	18
Lab Experiments	19
Samples	20
Reproducible Pages	23
Weekly Reading & Experiments.....	39

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.

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.

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noeo science
biology 1

Book List

Audubon's Birds of America Coloring Book, by Paul E. Kennedy

The Boy Who Drew Birds: A Story of John James Audubon, by Jacqueline Davies

DK First Animal Encyclopedia

Experiments in Earth Science and Weather with Toys and Everyday Stuff, Sohn, Emily

My First Book About Weather, Donald M. Silver & Patricia J. Wynne

One Small Square: Cactus Desert, by Donald M. Silver

One Small Square: Seashore, by Donald M. Silver

One Small Square: Woods, by Donald M. Silver

Pasteur's Fight Against Microbes, by Beverley Birch & Christian Birmingham

Usborne Internet-Linked First Encyclopedia of the Human Body

Usborne Science Activities: Science with Plants

Weather Clues in the Sky: Clouds, by Belinda Jensen

Weather Ready-to-Read by Marion Dane Bauer

Wind,

Rain

Clouds

Snow

Rainbow

Sun

Experiment Kits

The Young Scientist Club Kits:

- Kit #10 Bacteria and Fungi
- Kit #17 Heart and Lungs
- Kit #18 The Digestive System
- Kit #19 Bones and Muscles
- Kit #20 The Senses

Weekly Schedule of Topics

Week 1	Weather
Week 2	Weather
Week 3	Weather
Week 4	Weather
Week 5	Louis Pasteur
Week 6	Bacteria and Fungi
Week 7	Creepy Crawlies (Invertebrates)
Week 8	Creepy Crawlies (Invertebrates); Habitats (Cactus Desert)
Week 9	Habitats (Cactus Desert); Reptiles
Week 10	Habitats (Cactus Desert)
Week 11	Habitats (Cactus Desert); Flying Insects
Week 12	Mammals; Habitats (Woods)
Week 13	Habitats (Woods)
Week 14	Habitats (Woods); Mammals
Week 15	Habitats (Woods); Birds
Week 16	Birds; John James Audubon
Week 17	Birds; John James Audubon
Week 18	Birds; John James Audubon; Habitats (Seashore)
Week 19	Habitats (Seashore); Crustaceans
Week 20	Habitats (Seashore)
Week 21	Fish
Week 22	Fish; Water Mammals
Week 23	Wild Animals
Week 24	Wild Animals
Week 25	Wild Animals
Week 26	Human Body (Heart and Lungs)
Week 27	Human Body (Heart and Lungs)
Week 28	Human Body (Digestive System)
Week 29	Human Body (Digestive System, Kidneys)
Week 30	Human Body (Skin, Hair, Bones, and Joints)
Week 31	Human Body (Bones and Muscles)
Week 32	Human Body (Bones and Muscles, Brain, Senses)
Week 33	Human Body (Senses)
Week 34	Human Body (Senses); Plants
Week 35	Plants
Week 36	Plants

Additional Materials

The following is a complete list of items that will be used for the 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 *The Young Scientists Club* kits.

Item Needed	Week(s) Used
Pencil with eraser	1
Thumbtack	1
Ruler	1
Scissors	1, 3, 27, 28, 29, 31, 32
3 identical washcloths	2
large, clean glass jar	2, 34, 35
A grown-up to light and hold a match	2
Matches	2
Gallon-sized zip-top bag filled with ice	2
Aluminum Pie tin	3
Styrofoam piece, flat	3
Tape	3, 27, 29, 31, 32
2 rubber toys	3
2 metal toys	3
2 plastic toys	3
1 clear glass	4
A piece of white paper	4
Duct tape	4
Empty 2-liter bottle	4 (two), 26, 27
3 small plastic cups	6
Flour	6, 29
Salt	6
Milk	6
Butter or margarine	6, 29
Sugar	6, 29
Crayons or colored pencils	17, 18
2 liter plastic soda bottle	26, 27
Plastic wrap	27
Bucket	27
Food coloring (red)	27
Apple (+/- banana, pear, other fruit)	29
Bread	29
Vegetable oil	29
Syrup (or vanilla)	29

Newspaper	31
Oil or Vaseline	31
4 round objects (similar in size)	33
Blindfolding cloth	33
Dried beans (e.g. pinto, kidney, or red)	35
Paper towels	35
Celery	35
Blue ink (can substitute food coloring)	35
Clear plastic bag	34, 35
Potted plant	35
Plastic planting pots (or similar containers)	36
Potting soil/compost/soil	34, 36
½ liter plastic soda bottle (with cap)	34
Tree twigs	36
Onion	36
Carrot tops	36

Introduction

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!

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. 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.

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 the worksheet and test methodology, 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:
Classical	<ul style="list-style-type: none"><li data-bbox="584 903 1356 976">• Emphasizes vocabulary development, especially in the younger years.<li data-bbox="584 1018 1258 1092">• Develops critical thinking skills and logic through the use of the scientific method.<li data-bbox="584 1134 1339 1207">• Incorporates the classical stages of learning, i.e. the "Trivium" (grammar, logic, and rhetoric).
Charlotte Mason	<ul style="list-style-type: none"><li data-bbox="584 1333 1299 1407">• Provides the best books available (including "living books").<li data-bbox="584 1449 1291 1522">• Utilizes a child's natural curiosity to acquire knowledge. "Studies serve for delight".<li data-bbox="584 1564 1347 1669">• 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 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 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.

	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

Noeo 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.

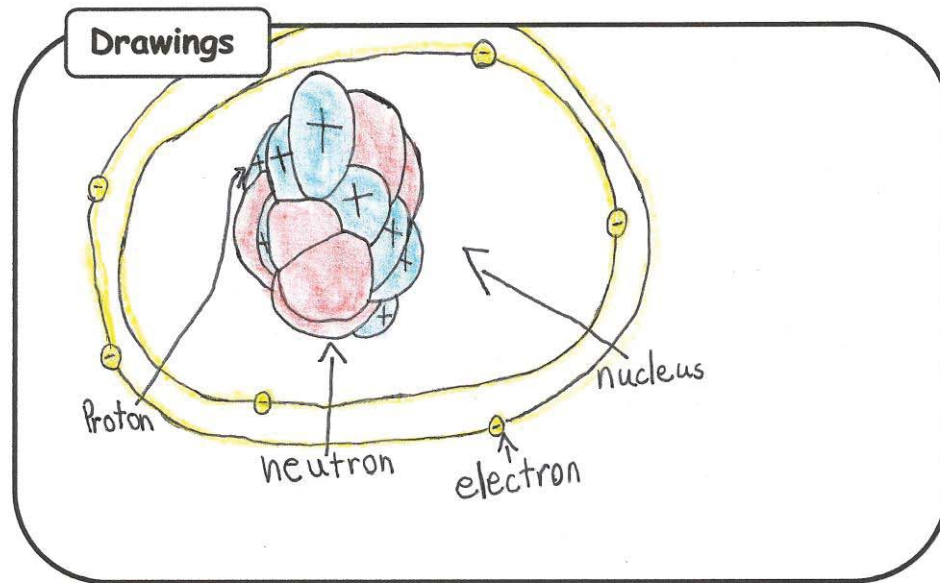
Lab Experiments

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 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 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.

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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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Reproducibles

Science & Lab Notebook Pages

The following pages are provided for your convenience. They may also be found on our website (www.logospresonline.com) for free downloading and printing. New pages will also be added occasionally on the website. There are a variety of page styles to be used for notebook creation. Some contain a space for drawing *and* writing; others have space only for drawing *or* writing. Different line spacing options are also provided for young writers. Feel free to make as many copies as you need.

Please remember that younger students should begin by orally “telling back” what they have just learned. You may prefer to write their thoughts down in a notebook for them. As they become better writers, then begin to have them write a sentence or two. Increase your expectations over time until you can find a balance between the student’s love for learning and their need for applied narration.

The lab notebook pages (experiment page) are intended to be used as a tool for teaching the scientific method. Again, younger students should not be expected to complete this sheet without assistance. Begin by orally asking some of the questions on the sheet after completing an experiment. Progressively increase your expectations for the completion of the experiment sheet. Older students should eventually be able to write a complete lab report without the need for this sheet.

Drawings

A large, empty rounded rectangular box with a black border, intended for drawing. The box is positioned in the upper half of the page and is connected to the 'Drawings' label at its top-left corner.

Drawings

A large, empty rounded rectangular box with a black border, intended for drawing. It is connected to the 'Drawings' label by a horizontal line.

Reading Notes/Definitions

A series of horizontal lines for writing notes. Each line set consists of a solid top line, a dashed middle line, and a solid bottom line. There are ten such sets of lines stacked vertically.

Drawings

A large, empty rounded rectangular box with a black border, intended for drawing. It is positioned in the upper half of the page.

Reading Notes

A series of ten horizontal lines spaced evenly down the page, intended for writing reading notes.

Date _____

Lab Experiment _____

What I did:

A large, empty rounded rectangular box with a black border, intended for students to describe the steps of their experiment.

What I saw:

A large, empty rounded rectangular box with a black border, intended for students to describe the observations made during the experiment.

I think this happened because...

A writing area consisting of four horizontal lines: a solid top line, a dashed middle line, a solid bottom line, and another solid bottom line. This format is typical for teaching handwriting or structured writing.

Date _____

Lab Experiment _____

What I did:

What I saw:

I think this happened because...

Date _____

Lab Experiment _____

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

What question are you trying to answer? (question)

**What things do you need?
(materials)**

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

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

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

What happened? (results)

Why do you think this happened? (conclusion)

noeo science
biology 1

Weekly Reading & Experiments

noeo science
biology 1

Week 1 – Weather				
The Atmosphere and Winds				
	Day 1	Day 2	Day 3	Day 4
<i>My First Book About Weather</i>	Page 1 & 2 – Earth’s Atmosphere	Pages 3 & 4 – The Sun Changes the Weather	Pages 5-7 (winds)	
<i>Ready-to-Read: Sun</i>		Read the whole book		
<i>Ready-to-Read: Wind</i>			Read the whole book	
<i>Experiments in Earth Science and Weather</i>				Pg. 12-13: Blown Away!

Supply List:

Pencil & Eraser
Thumbtack

Pencil
Ruler

Scissors
Small fan

Assignments:

Day 1 - Read the assigned pages and describe and/or sketch what you learned in your science notebook. Make sure you can explain the “atmosphere.” Draw a picture of the four main layers of the earth’s atmosphere in your notebook. You may also color the picture in your book.

NOTE: Younger students will “narrate” what they have learned. You may need to ask prompting questions to get younger students to begin to concentrate on the important topics in the reading assignments.

Day 2 – Read the assigned pages and describe and/or sketch what you learned in your science notebook.

Day 3 – Read the assigned pages and describe and/or sketch what you learned in your science notebook.

Day 4 – Set up the experiment and record your observations in your lab notebook using one of the reproducible pages (include in the Instructor’s Guide or available for download from the NOEO website)

noeo science
biology 1

Week 2 – Weather				
Clouds				
	Day 1	Day 2	Day 3	Day 4
<i>Weather Clues in the Sky: Clouds</i>	Pgs. 4-11	Pgs. 12-19		Experiment, pg. 22: Make a Cloud
<i>Experiments in Earth Science and Weather</i>	Page 8-9			
<i>My First Book About the Weather</i>			Pages 8-9 (clouds)	
<i>Ready-to-Read: Clouds</i>			Read the whole book	

Supply List:

- | | |
|-----------------------------|--|
| 3 identical washcloths | Matches |
| A large, clean jar | A gallon-sized zip-top bag filled with ice |
| A grown-up to light a match | |

Assignments:

Day 1 – Read the assigned pages and describe and/or sketch what you learned in your science notebook. Make sure you define (or can explain) these words: **The Water Cycle**

Do the “Water Cycle” experiment as explained in the book. Carefully follow the steps, then answer the questions in step 3. Use your experiment worksheet to record your results.

Day 2 – Read the assigned pages and describe and/or sketch what you learned in your science notebook. Make sure you define (or explain) the different types of clouds: **cirrus, cumulus, cumulonimbus & stratus**.

Day 3 – Read the assigned pages, then color the pages of the book the way you know that they are supposed to look.

Day 4 – Set up the experiment and record your daily observations in your lab notebook. Have fun and be careful!