Junior Chemistry and Physics Notebooking Journal for Exploring Creation with Chemistry and Physics by Jeannie Fulbright
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Note from the Author

Welcome to the wonderful learning adventure of notebooking. This notebooking journal correlates with the Apologia textbook, *Exploring Creation with Chemistry and Physics*. It provides a place for students to complete the assignments in the text, as well as many optional activities, and will serve as their individual notebook. You only need to provide scissors, glue, colored pencils, a stapler, and a few brass fasteners.

Notebooking is not new. In fact, keeping notebooks was the primary way the learned men of our past educated themselves, from Leonardo da Vinci and Christopher Columbus to George Washington, John Quincy Adams, and Meriwether Lewis. These men and many others of their time were avid journal keepers or notebookers. They were also comparatively much more advanced in their knowledge—even as teens—than we are today. George Washington was a licensed surveyor during his teenage years, and John Quincy Adams graduated from law school at age seventeen.

It makes sense to emulate the methods of education of these great men rather than to use failing modern methods such as fill-in-the-blank and matching worksheets that do not fully engage students’ minds. Studies show that individuals remember only 5 percent of what they hear, 50 percent of what they see and hear, and 90 percent of what they see, hear, and do. When students participate in activities that correspond with learning, retention increases exponentially. This is exactly what the *Chemistry and Physics Notebooking Journal* is designed to do—offer engaging learning activities to increase your students’ learning and retention.

In addition to academic achievement, notebooking offers many benefits to students, parents, and teachers. It provides students an opportunity to express themselves uniquely as they learn and becomes a treasured keepsake of everything they have learned about chemistry and physics. For parents and teachers, it becomes a record of the year’s studies that can easily be transferred to a portfolio if needed.

This journal will make notebooking easier for both you and your students by supplying an abundance of templates, hands-on craft suggestions, projects, additional experiment ideas, and many activities that will engage students in learning. Remember that *everything in this notebooking journal is optional*. Every child is different, learns differently, and responds differently to the array of activities provided here. Your goal is not to complete every activity but to make learning a joy. Use discernment to decide what activities and assignments will truly enhance your students’ learning experience, encourage a love for learning, and build their confidence in science. If something is a drudgery, it will not increase your students’ retention; it will only discourage their enjoyment of science and may also result in unmotivated learners. Because this notebooking journal will serve as a student’s own unique record, you may customize it by simply tearing out the activity pages that you choose not to use.

It is my hope and prayer that you and your students will benefit from your studies this year, grow closer to God as you learn about His creation, and find joy in the learning process.

Warmly,
How to Use This Book

Suggested Schedule
This notebooking journal provides a suggested schedule for reading the *Exploring Creation with Chemistry and Physics* text and completing the activities in the text and this journal. Please do not feel the need to assign every activity. Though not everyone will choose to use the schedule, those who do may find it very beneficial. The suggested schedule provides for the course to be completed in twenty-eight weeks, two days per week, but it can be adapted to fit your goals. You can expedite the course by studying science three or four days per week or lengthen it by studying science only one day per week. If you wish to do the extra activities in the “Test It Out” pages (which are not included in the schedule), still another day of science can be added. Use the schedule as a guide in a way that best suits your family.

Coloring Pages, Notebooking Assignments, Activities, and Projects
Every lesson in this journal begins with coloring pages. Your students may wish to color these pages while you read the lesson aloud. After each reading session, encourage students to use the boxes and lines on the “Fascinating Facts” pages to record information they found interesting in the reading. They can create illustrations, diagrams, or short narrations of what they learned, which will help them retain the information better. Following this opportunity for creative expression is another template for completing the notebooking assignment from the text. Colored pencils can be used to encourage creative, high-quality work. Vocabulary activities are also provided for each lesson to help students learn important chemistry and physics terms.

Scripture Copywork
Incorporating the Word of God in your science studies through Scripture copywork will provide many benefits to your students. It will encourage stronger faith and memorization of Scripture, as well as better writing, spelling, and grammar skills. Each lesson has a corresponding verse for students to copy; they may print or write in cursive.

Cut-and-Fold Miniature Books
At the back of this journal, you will find optional cut-and-fold miniature book craft activities to review the concepts learned in each lesson. Paste pages throughout the journal provide a place for students to preserve and display their minibooks.

Test It Out
The “Test It Out” suggestions are designed to give students additional ideas and activities that might enhance their studies, such as experiments, hands-on activities, recommended research and living books, and audio and video resources. Please be aware that some books may contain evolutionary content. Be sure to provide adult supervision for all “Test It Out” activities, projects, and experiments.

Project Pages
Many of the projects and experiments in *Exploring Creation with Chemistry and Physics* are hands-on and therefore cannot be preserved in a notebook. Each lesson in this notebooking journal provides project pages where students can write about what they did and learned from the various projects and experiments. Be sure to take pictures of the finished products and glue them onto the project pages. Students will enjoy looking back and remembering the fun they had learning chemistry and physics!

Field Trip Sheets
Your family may wish to further enhance your studies by visiting a science museum. Field trip sheets are provided at the back of this notebooking journal to record your visits. You can make a pocket on the back of these sheets to hold any brochures or additional information you receive. Simply glue three edges (sides and bottom) of a half-sheet of construction paper to the bottom of the field trip sheet.
<table>
<thead>
<tr>
<th>Week</th>
<th>Day 1</th>
<th>Day 2</th>
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<tbody>
<tr>
<td>1</td>
<td><strong>Lesson 1  Chemistry and Physics Matter</strong>&lt;br&gt;Read text pp. 15–17 &amp; narrate&lt;br&gt;Begin working on Coloring Pages, NJ pp. 11–12&lt;br&gt;Begin working on Fascinating Facts about Chemistry and Physics, NJ pp. 13–14&lt;br&gt;Try This! text p. 17&lt;br&gt;Read text pp. 18–20 &amp; narrate&lt;br&gt;Try This! text p. 19</td>
<td>Read text pp. 20–23 &amp; narrate&lt;br&gt;Try This! text pp. 20, 22, 23&lt;br&gt;Read text pp. 24–27 &amp; narrate&lt;br&gt;Try This! text pp. 25, 26, 27</td>
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<td>3</td>
<td><strong>Lesson 2  Moving Matter</strong>&lt;br&gt;Read text pp. 30–32 &amp; narrate&lt;br&gt;Begin working on Coloring Pages, NJ pp. 24–25&lt;br&gt;Begin working on Fascinating Facts about Moving Matter, NJ pp. 26–27&lt;br&gt;Try This! text p. 32&lt;br&gt;Read text pp. 33–35 &amp; narrate&lt;br&gt;Try This! text pp. 33, 34, 35</td>
<td>Read text pp. 36–37 &amp; narrate&lt;br&gt;Try This! text p. 37&lt;br&gt;Read text pp. 38–41 &amp; narrate&lt;br&gt;Try This! text pp. 38, 41</td>
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<td>5</td>
<td><strong>Lesson 2  Moving Matter</strong>&lt;br&gt;Notebooking Activity: Matter Pockets, text p. 41, NJ pp. 28–30&lt;br&gt;Vocabulary Lift-the-Flap, NJ pp. 31–33</td>
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<td>6</td>
<td><strong>Lesson 2  Moving Matter</strong>&lt;br&gt;Notebooking Activity: Matter Pockets, text p. 41, NJ pp. 28–30&lt;br&gt;Vocabulary Lift-the-Flap, NJ pp. 31–33</td>
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<td>7</td>
<td><strong>Lesson 2  Moving Matter</strong>&lt;br&gt;Notebooking Activity: Matter Pockets, text p. 41, NJ pp. 28–30&lt;br&gt;Vocabulary Lift-the-Flap, NJ pp. 31–33</td>
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*Page numbers for the text are indicated by *text*. Page numbers for the notebooking journal are indicated by *NJ*.  

vii
It is I who made the earth and created mankind on it. My own hands stretched out the heavens; I marshaled their starry hosts.

Isaiah 45:12
The fear of the LORD is pure, enduring forever. The decrees of the LORD are firm, and all of them are righteous. They are more precious than gold, than much pure gold; they are sweeter than honey, than honey from the honeycomb. 

Psalm 19:9-10
Fascinating Facts about Matter
Lesson 1
**VOCABULARY CROSSWORD**

**LESSON 1**

Across

3. The amount of shine something has
5. The amount of space something takes up
7. How much mass is in a certain volume of matter

Down

1. What we call something that’s bendable
2. Tells us how much matter is inside something
4. The ability of something to float
6. Anything that has volume and mass
He is before all things, and in him all things hold together.

Colossians 1:17
He is before all things, and in him all things hold together.

Colossians 1:17
Paste your Matter Flap Book onto this page.
Coke Float

We talked a lot about density. Which do you think is more dense: Coke or Diet Coke? For this activity, you’ll need an adult’s supervision and a can of each type of soda. Fill an aquarium, a large bucket, or even the kitchen sink with water. Now place both cans in the water. What happens? Why do you think that is?

Overflow Beans

Here’s an activity on water displacement. You’ll need an adult’s supervision, a bowl of water, a small cup, a tablespoon, and some beans. Using a tablespoon, count how many tablespoons of water it takes to fill the cup. Now remove several tablespoons of water to make room for some beans. How many beans do you think you can place in the cup before the water overflows? Make a guess! Now put the beans in the water to see if you are correct. You have just estimated water displacement based on volume!

Boating Basics

Let’s experiment with buoyancy. You’ll need an adult's supervision, a piece of clay, a sink, and water. Fill your sink with water. Now split a piece of clay into two equal-sized pieces. Shape one piece into a ball and the other into a boat. Place the clay pieces into the water. See if you can explain what happens. (If the area of the object that makes contact with the water is large enough, the object floats. The object must make room for its own volume by pushing aside, or displacing, an equivalent volume of liquid.)

A Gallon a Day

This experiment will help you appreciate how much water you use everyday and understand how vital water is to your daily existence. Fill a 1-gallon container with water and try to get through the entire day using water only from the container. Use the water for hand washing, tooth brushing, face washing, dish rinsing, and drinking. Remember to use the water sparingly. See if you can make it last the whole day! Hint: Some of the water you can recycle, and some you can’t. You wouldn’t want to drink the water you used to wash your hands (or anything else, for that matter) or brush your teeth. But you could wash your hands with the water you used to wash your face.

Book Suggestions

What’s the Matter in Mr. Whiskers’ Room? by Michael Elsohn Ross. Mr. Whiskers encourages his students to use all their senses to discover matter. K–3rd.
How to Think Like a Scientist: Answering Questions by the Scientific Method by Stephen P. Kramer. Humorous and appealing pictures help teach students to use the scientific method and think like a scientist. 3rd–6th.
My Matter Projects
Lesson 1

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"But whoever drinks the water I give them will never thirst. Indeed, the water I give them will become in them a spring of water welling up to eternal life."  

John 4:14
And God said, “Let the water under the sky be gathered to one place, and let dry ground appear.” And it was so.

Genesis 1:9
Fascinating Facts
about
Moving Matter
Lesson 2
Fascinating Facts
about
Moving Matter
Lesson 2
Cut out the rectangles on this page. Place glue along the bottom and sides of each rectangle. Glue them onto the States of Matter paste page (p. 28) to make pockets.
Tear out this page. Cut out each word and match it to the correct definition on the following page. Then, place glue along the top edge of the back of each word and glue above the line on each definition. Once the glue is dry, fold back the word to reveal the definition.

<table>
<thead>
<tr>
<th>non-Newtonian liquid</th>
<th>solid</th>
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<tr>
<td>gas</td>
<td>surface tension</td>
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<td>condensation point</td>
<td>viscosity</td>
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<td>boiling liquid</td>
<td>liquid</td>
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<tr>
<td>Term</td>
<td>Definition</td>
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<td>An invisible skin that forms when molecules on the surface of the water stick together</td>
<td>The thickness or resistance to flow in a liquid</td>
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<tr>
<td>Anything that has a specific shape and size</td>
<td>A substance that is both a solid and a liquid</td>
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<tr>
<td>When heated molecules begin to move with a lot of energy</td>
<td>The temperature at which a gas becomes a liquid</td>
</tr>
<tr>
<td>A substance that is free to flow, with no particular shape</td>
<td>A state of matter with particles that don't have a specific volume or shape</td>
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To Him who laid out the earth
above the waters, For His mercy
endures forever.

Psalm 136:6 (NKJV)
To Him who laid out the earth above the waters, For His mercy endures forever.

Psalm 136:6 (NKJV)
Paste your States of Matter Wheel onto this page.
Matter Demonstration

A great way to demonstrate the three states of matter is by using balloons! You'll need an adult's supervision and three identical balloons. First, fill one balloon with air. Now fill the other two balloons with water. Place one of the water balloons in the freezer. When it's frozen, observe the three states of matter demonstrated by the three balloons.

Cheerios Atoms Demonstration

A fun way to remember the arrangement of atoms in the three states of matter is to use Cheerios and a little glue. This will really help the concept stick! You'll need an adult's supervision, a bowl of Cheerios, a large piece of paper, and glue. On a large piece of paper, draw three boxes. Label one solids, one liquids, and one gases. Your Cheerios will represent the atoms/molecules in each of the three substances. Now glue Cheerios into the boxes to show how the atoms might appear in each state. For example, the Cheerios in the solid state would be lined up close together. How would the atoms appear in the solid and gas states?

Under Pressure

Sometimes pressure changes a substance from a liquid to a solid. Let's see this in action! You'll need an adult's supervision, cornstarch, and water. Place a teaspoon of cornstarch in your hand. Add a few drops of water to the cornstarch and mix it well. Keep adding water, a little at a time, until the mixture is slightly watery. Now add pressure to the cornstarch mixture by squeezing it in your hand. What happens? Release your hand. What happens to the mixture?

Book Suggestions

*Berenstain Bears’ Science Fair* by Stan and Jan Berenstain. Presented in simple terms and with lively pictures, this book shows how things work. K–3rd.

*The Solid Truth about States of Matter with Max Axiom, Super Scientist* by Agnieszka Biskup. Informative and easy to understand, this book reads like a comic. Vocabulary words are included. 3rd–6th.

*A Drop around the World* by Barbara Shaw McKinney. A favorite among teachers, this book engagingly shows the importance of the water cycle as readers follow a drop of water around the world. 3rd–6th.

*A Drop of Water: A Book of Science and Wonder* by Walter Wick. Up-close photography accompanies introductions to science concepts such as evaporation and condensation. 3rd–6th.

*Chemistry: Getting a Big Reaction* by Dan Green. Readers discover the secrets of chemistry and the properties of matter in this compelling guide. 3rd–6th.
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My Moving Matter Projects
Lesson 2

What I did:

What I learned:

What I did:

What I learned:
“Whoever believes in me, as Scripture has said, rivers of living water will flow from within them.”  

John 7:38
"You are worthy, our Lord and God, to receive glory and honor and power, for you created all things, and by your will they were created and have their being."  
Revelation 4:11
Answers to the Vocabulary Activities
surface tension
an invisible skin that forms when molecules on the surface of the water stick together

viscosity
the thickness or resistance to flow in a liquid

solid
anything that has a specific shape and size

non-Newtonian liquid
a substance that is both a solid and a liquid

boiling
when heated water molecules begin to move with a lot of energy

condensation point
the temperature at which a gas becomes a liquid

liquid
a substance that is free to flow, with no particular shape

gas
a state of matter with particles that don’t have a specific volume or shape
Instructions:

1. Cut out the large rectangle on this page along the dotted lines.
2. Cut between the rectangles along the four dotted lines that divide the rectangles. Do not cut into the orange fold lines!
3. Fold the colored rectangles away from you along the orange fold lines.
4. Turn over your Matter Flap Book and lift the flaps.
5. Write the information requested about the topics on the flaps.
6. Paste this side of your Matter Flap Book (with these words) onto the paste page (p. 19).
Instructions:

1. Cut out the states of matter circle and the fact circle. Be sure to cut out the white empty spaces in the states of matter circle.
2. Place the states of matter circle on top of the fact circle, and insert a brass fastener in the center (on the gold spot) to secure the two circles.
3. In the triangular space opposite each topic, write what you’ve learned about that topic.
4. Dab paste on the bottom of the fact circle and paste your States of Matter Wheel onto the paste page (p. 37).
States of Matter Wheel: Lesson 2