LAPBOOKING THROUGH GEOLOGY

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INTRODUCTION

*Lapbooking through the Geology with the Sassafras Twins* is a unique and versatile program that leads you through a survey of rocks and our planet using a series of eight mini-lapbooks to document the journey. The program is centered around the living book, *The Sassafras Science Adventures Volume 5: Geology*. It is designed to be a gentle approach to homeschool science education based on the Unit Study method suggested in *Success in Science: A Manual for Excellence in Science Education* by Bradley and Paige Hudson.

WHAT IS A LAPBOOK?

Lapbooks are educational scrapbooks that fit into the lap of a student. Typically they are a collection of related mini-books on a certain subject that have been glued into a file folder for easy viewing, but they can also include pictures or projects that the students have completed. In the same way that notebooking does not require regurgitation of facts; lapbooking causes the students to interact with the materials instead of just responding to comprehension questions.

Lapbooks are extremely versatile because they can be used in conjunction with any subject the students are learning about. They are excellent tools to use with elementary students as a way of reinforcing what they are learning because this age group tends to prefer a more creative format of notebooking.

The heartbeat of the lapbook is the mini-books that are placed inside. Each of these booklets contains information on topics related to the main subject of the lapbook. They can be in a variety of shapes and sizes, but the cover should have a picture related to the subject as well as a title. The interior of each booklet should contain several sentences detailing what the students have learned about the topic in their own words. The mini-books will each pertain to different sub-topics of the main topic. So for instance, for this lapbook your main topic is plants and your related mini-books are on the types of leaves, the kinds of flowers, the parts of a seed and more.

Lapbooks serve as beautiful scrapbooks that the students can continue to learn from for years to come, which makes them a beneficial addition to a students’ science education. A mini-lapbook is simply a smaller version of a full-sized lapbook.

WHAT IS INCLUDED IN THIS PROGRAM?

*Lapbooking through Geology with the Sassafras Twins* includes all of the basic components of elementary science education that are explained in *Success in Science*.

1. **Science-Oriented Books** — Elementary students are an empty bucket waiting to be filled with information and science-oriented books are a wonderful way to do that. These books can include appropriate children’s science encyclopedias, living books for science and/or children’s non-fiction science books. In this program, the reading assignments are from the living book, *The Sassafras Science Adventures Volume 5: Geology*. I have also included a list of additional books from the library.

2. **Notebooking** — The purpose of the notebooking component for elementary science education is to verify that the students have placed at least one piece of information into their knowledge bucket. You can use notebooking sheets, lapbooks, and/or vocabulary words to fulfill this
requirement. This unit includes all the templates and pictures you will need to complete a series of mini-lapbooks as well as vocabulary words to coordinate with each lesson.

3. **Scientific Demonstrations or Observations** — Scientific demonstrations and observations are meant to spark the students’ enthusiasm for learning science, to work on their observation skills and to demonstrate the principles of science for them. This component of elementary science education can contain scientific demonstrations, hands-on projects and/or nature studies. Each lesson in this guide includes a suggested scientific demonstration to fulfill this section of elementary science instruction.

These concepts are more fully developed in our book, or you can read the following articles from to learn more:

- **10 Posts you must read about living books** — This article shares links to 10 different articles that will help you to gain a clear picture of what living books are.
  

- **The Basics of Notebooking** — This article details the basic components of notebooking along with how a few suggestions on what notebooking can look like.
  
  ![http://sassafrasscience.com/what-is-notebooking/](http://sassafrasscience.com/what-is-notebooking/)

- **Scientific Demonstrations vs. Experiments** — This article explains the difference between scientific demonstrations and experiments along with when and how to employ these methods.
  
  ![http://elementalscience.com/blogs/news/89905795-scientific-demonstrations-or-experiments](http://elementalscience.com/blogs/news/89905795-scientific-demonstrations-or-experiments)

### How to Use This Program

Each lesson is designed to be completed over several days or up to one week. The lesson contains reading assignments from *The Sassafras Science Adventures Volume 5: Geology*. You can choose to break each chapter up over two days or read it all at once. If you are using this program with younger students, read the selected chapters to them. If you are using this program with older students, you can choose to have them read the assigned chapters on their own or you can read the selected pages to them. *(Note—Chapter 1 and 18 of The Sassafras Science Adventures Volume 5: Geology are not scheduled as a part of this program. You will need to read chapter 1 before beginning and chapter 18 after you finish.)*

After you complete the reading assignment, have the students tell you what they have learned about the topics and the continent from the selection. This can simply be what they found to be the most interesting or something new that they have learned from the reading. You can choose to write the sentences for them or have them copy the words into the mini-book. If you are using this program with older students, I recommend that you have them do all their own writing. Once the students have finished writing, have them color the related pictures. When the mini-book is complete, glue it into their lapbook using the overview sheet as a guide.

At another time during the week, review the vocabulary words with the students. You can have them memorize each one or just go over the words with the lesson. I have included a set of blank vocabulary cards to use with an older students in the Appendix on pp. 48-50. If you use the blank vocabulary cards, have the students look up the vocabulary words in the science encyclopedia of your choice or the glossary included in the Appendix on pp. 51-52. You can also dictate the provided
definition to them. I recommend that you print the vocabulary cards out on card stock for durability.

Finally, you can finish the lesson by doing the related scientific demonstration. If your students are older and you would like to have them write a lab report, I have included a template for you in the Appendix on pp. 45-46. After you finishing the demonstration, you can finish the week by reading to the students one of the related books from the additional book list. If you would like to record what they have learned from these books, I have included a book narration sheet in the Appendix on pg. 47.

I have included possible schedules for completed each mini-lapbook. These schedules spread the work for each lesson out over four days. If you choose to complete the program in this manner, each mini-lapbook will take you two weeks to complete, which means that this program will provide you about a semester's worth of material.

**Eight Mini-lapbooks or One Full Lapbook**

If you would like to create one full lapbook instead of a series of eight mini-lapbooks, simply arrange the interior components of each onto one full sheet of construction paper or one side of a file folder like below.

I have included a cover for a full lapbook in the Appendix on pg. 44.

**Final Thoughts**

As the author and publisher of *Lapbooking through the Geology with the Sassafras Twins* I encourage you to contact me with any questions or problems that you might have concerning this program at support@elementalscience.com. I will be more than happy to answer them as soon as I am able. I hope that you will enjoy creating memories using *Lapbooking through the Geology with the Sassafras Twins!*
Supply List

The following supplies will be needed to complete the scientific demonstrations suggested in this guide.

**ECUADOR MINI-LAPBOOK LESSON 1**
- Modeling clay (you will need yellow, orange, red, blue, and green)
- Ruler

**ECUADOR MINI-LAPBOOK LESSON 2**
- Aluminum pan
- Empty soda bottle with a small opening
- Air-dry clay or salt dough
- Baking soda
- Liquid dish soap
- Red and yellow food coloring
- White vinegar

**NORWAY MINI-LAPBOOK LESSON 1**
- Several different colors of crayon
- An old pot
- Wax paper (2 sheets)
- Straw

**NORWAY MINI-LAPBOOK LESSON 2**
- Clear jar
- Water
- Small piece of pumice

**ANTARCTICA MINI-LAPBOOK LESSON 1**
- Can of sweetened condensed milk
- Cornstarch
- Cereal box
- Chocolate chips or nuts
- Icing

**ANTARCTICA MINI-LAPBOOK LESSON 2**
- Six different colors of crayon
- Old grater
- Aluminum foil
- Bowl
- Hot water

**DEATH VALLEY MINI-LAPBOOK LESSON 1**
- Blue balloon (with the continents drawn or printed on it)
- Flat map
- Pin

**DEATH VALLEY MINI-LAPBOOK LESSON 2**
- Sandpaper
- Bar of soap
- Plate

**SRI LANKA MINI-LAPBOOK LESSON 1**
- Marshmallow creme (or whipping cream)
- Graham cracker
- Plate, Bowl with about an inch of water

**SRI LANKA MINI-LAPBOOK LESSON 2**
- Small Rock
- Jar with lid
- Bowl, Water
- Bonax
- Green food coloring
- Sandpaper (optional)

**AUSTRALIA MINI-LAPBOOK LESSON 1**
- Several different colors of crayons
- Old grater
- Butter knife
- Crayon or pencil sharpener
- Aluminum foil

**AUSTRALIA MINI-LAPBOOK LESSON 2**
- 2 Cups
- Warm water
- Yarn (1 and a half feet in length)
- Baking soda
- 2 Washers
- Paper clip
- Paper towel

**MADAGASCAR MINI-LAPBOOK LESSON 1**
- Soil from your backyard
- Magnifying glass
- Small trowel
- Bowl

**MADAGASCAR MINI-LAPBOOK LESSON 2**
- Jar
- Piece of limestone
- White vinegar

**CANADA MINI-LAPBOOK LESSON 1**
- Air dry clay
- Fern frond
- Rolling pin

**CANADA MINI-LAPBOOK LESSON 2**
- Cardboard
- Air-dry clay or salt dough
- Paint (white, grey, green, and blue)
**Ecuador Mini-Lapbook Overview**

You will need 1 sheet of cardstock or construction paper. Begin by folding the sheet in half and cutting out all of the templates. As you read through Chapters 2 and 3 of *The Sassafras Science Adventures Volume 5: Geology*, have the students add the information that they have learned about continents, layers of the Earth, volcanoes, geothermal features, and the continent of South America. Once they have completed the inside of the booklets, have the color the pictures and glue them into the mini-lapbook using the guide below.

Once you have finished reading the chapter, go over the vocabulary cards and add them to the vocabulary pocket. Finally have the students cut out, color the cover for the mini-lapbook and glue into on the front.
Ecuador Mini-Lapbook: Lesson 1

Science-Oriented Books

Reading Assignments

Read Chapter 2 of The Sassafras Science Adventures Volume 5: Geology.

Additional Books from the Library

- The Seven Continents (Rookie Read-About Geography) by Will Mara
- Continents in My World by Ella Cane and Gail Saunders-Smith
- Explore South America (Explore the Continents) by Molly Aloian and Bobbie Kalman
- Planet Earth/Inside Out by Gail Gibbons
- The Magic School Bus Inside the Earth (Magic School Bus) by Joanna Cole and Bruce Degen
- See Inside Planet Earth (Usborne Flap Book) by Katie Daynes and Peter Allen

Notebooking

Vocabulary

- CONTINENT – A large area of land on Earth.
- MAGMA – Molten rock found under earth’s surface.

Mini-Lapbook Directions

- CONTINENTS SCIDAT MINI-BOOK – Have the students add the information they have learned about the continents to the mini-book on pg. T6 and glue the booklet into their lapbooks.
- LAYERS OF THE EARTH SCIDAT MINI-BOOK – Have the students add the information they have learned about the layers of the Earth to the mini-book on pg. T6 and glue the booklet into their lapbooks.
- SOUTH AMERICA TAB-BOOK – Have the students add the information they have learned about the size and geological features of South America to the tab-book on pp. T4 - T5. Have them color South America on the map on the Location tab page. Be sure to save the tab-books so that the students can add information from the next chapter.
- GEOLOGY VOCABULARY – Have the students cut out the vocabulary pocket on pg. T8 and glue it into their lapbooks. Then, review the following vocabulary terms with them—continent and magma. Have the students cut out the corresponding cards on pg. T8. After they color the pictures, have them place the cards into their vocabulary pockets.

Scientific Demonstration: Model Earth

Materials

- Modeling clay (you will need yellow, orange, red, blue, and green), Ruler

Procedure

1. Have the students begin by making a ball about 1.2 cm across out of the yellow clay. This represents the earth's inner core.
2. Then, have them make another layer about 3 cm across out of the red clay around the ball. This layer represents the earth’s outer core.
3. After that, have them add another layer about 6 cm across out of the orange clay around the ball. This layer represents the earth's mantle.
4. Next, have the students make several flattened pieces of blue and green clay to represent the earth's crust and layer those pieces over the ball.
5. Finally, have the students cut the ball in half to observe the different layers of their model.

**Explanation**

The students should see the different layers in their model just as if we were to cut the earth in half to peek inside!

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**Ecuador Mini-Lapbook: Lesson 2**

**Science-Oriented Books**

**Reading Assignment**

Read Chapter 3 of *The Sassafras Science Adventures Volume 5: Geology*.

**Additional Books from the Library**

- *National Geographic Readers: Volcanoes* by Anne Schreiber
- *Volcanoes (Let’s-Read-and-Find... Science 2)* by Franklyn M. Branley and Megan Lloyd
- *The Magic School Bus Blows Its Top: A Book About Volcanoes* by Gail Herman and Bob Ostrom
- *Geyser (True Books: Earth Science)* by Larry Dane Brimner
- *Geyser: What They Are and How They Work* by Scott T. Bryan

**Notebooking**

**Vocabulary**

- **Geothermal Feature** – A feature that is related to or produced by the internal heat of the earth.
- **Lava** – Molten rock found on the earth’s surface.

**Mini-Lapbook Directions**

- **Volcanoes SCIDAT Mini-Book** – Have the students add the information they have learned about volcanoes to the mini-book on pg. T7 and glue the booklet into their lapbooks.
- **Geothermal Features SCIDAT Mini-Book** – Have the students add the information they have learned about geothermal features to the mini-book on pg. T7 and glue the booklet into their lapbooks.
- **South America Tab-Book** – Have the students add the information they have learned about the regions and geological features of South America to the tab-book on pp. T4 - T5. Then, staple the pages together and glue the tab-book into their mini-lapbooks.
- **Geology Vocabulary** – Review the following vocabulary terms with the students—geothermal feature and lava. Have the students cut out the corresponding cards on pg. T8. After they color the pictures, have them place the cards into their vocabulary pockets.
- **Ecuador Mini-Lapbook Cover** – Have the students cut out the cover page on pg. T3, color it, and glue it on the front of their mini-lapbooks.

**Scientific Demonstration: Volcanic Explosion**

**Materials**

- Aluminum pan, Empty soda bottle with a small opening, Air-dry clay or salt dough
- Baking soda, Liquid dish soap, Red and yellow food coloring, White vinegar

**Procedure**

1. Have the students begin by placing the soda bottle at the center of the aluminum pan.
2. Then, have them mold the clay or salt dough around the bottle in the shape of a volcano.
3. Once they are finished, set it aside to dry. This may take several hours or overnight, depending on how thick the clay is.
4. Next, have the students paint and decorate their volcano creations.
5. Once the paint dries, head outside or place the volcano in a location that you don't mind getting dirty, as the following part can be very messy.
6. Then, pour ¼ cup of baking soda into the bottle and add 2 Tbsp of liquid dish soap plus 4 drops of the red food coloring and 4 drops of yellow food coloring.
7. Finally, add about a ½ cup of vinegar into the container, step back, and watch what happens.

Explanation
The students should see a small eruption from their model volcano. The vinegar and the baking soda react to form carbon dioxide gas. The gas bubbles are trapped by the soap and forced up and out of the soda bottle opening.

Possible Schedule for the Ecuador Mini-Lapbook

Ecuador Lesson 1

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read the section entitled “Crushing Continents” of Chapter 2 in SSA Volume 5: Geology.</td>
<td>Read the section entitled “Leaping through Layers” of Chapter 2 in SSA Volume 5: Geology.</td>
<td>Add any information the students have learned to the South America Tab-book</td>
<td>Do the Scientific Demonstration: Model Earth</td>
</tr>
<tr>
<td>Complete the Continent SCIDAT Mini-book</td>
<td>Complete the Layers of the Earth SCIDAT Mini-book</td>
<td>Go over the vocabulary words and add them to the mini-lapbook</td>
<td>Choose one or more of the additional books to read</td>
</tr>
</tbody>
</table>

Ecuador Lesson 2

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read the section entitled “Vanishing Volcanoes” of Chapter 3 in SSA Volume 5: Geology.</td>
<td>Read the section entitled “Gushing Geysers” of Chapter 3 in SSA Volume 5: Geology.</td>
<td>Complete the South America Tab-book</td>
<td>Do the Scientific Demonstration: Volcanic Explosion</td>
</tr>
<tr>
<td>Complete the Volcano SCIDAT Mini-book</td>
<td>Complete the Geothermal Features SCIDAT Mini-book</td>
<td>Go over the vocabulary word and add it to the mini-lapbook</td>
<td>Choose one or more of the additional books to read</td>
</tr>
<tr>
<td>Add the cover to the mini-lapbook</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes
Ecuador Mini-Lapbook Cover Page

My Guide to Geology in Ecuador

By: _____________________

& The Sassafras Twins
South America is the _____ largest continent.
South America Tab-book Templates

Regions of South America

Geological Features in South America
NAME: Continents
INFORMATION LEARNED:
With the exception of a few islands here and there, all of the land on Earth can be divided into seven continents.

NAME: Layers of Earth
INFORMATION LEARNED:
The earth has three main layers—the crust, the mantle, and the core.
**Ecuador SCIDAT Mini-book Templates**

**NAME:** Volcano

**INFORMATION LEARNED:**
Active volcanoes erupt periodically or continuously.

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**NAME:** Geothermal Features

**INFORMATION LEARNED:**
Geothermal features, such as hot springs, geysers, hot rocks and others, are the result of heat from deep inside the earth.
CONTINENT – A large area of land on Earth.

MAGMA – Molten rock found under earth’s surface.

GEOTHERMAL FEATURE – A feature that is related to or produced by the internal heat of the earth.

LAVA – Molten rock found on the earth’s surface.