Lapbooking Guide At-A-Glance

Overview

1. Lapbook Overview

See how to put together the location lapbook on the lapbook overview sheet, plus the supplies needed for the demonstrations.

Chapter Lessons

2. Read

Know what to read each week in the corresponding Sassafras Science novel. Plus, get options for additional encyclopedia pages to read and for books to check out from the library. The novel contains the essential information for each week, but if you want to dig deeper, we've got you covered!

3. Write

Build your students' science vocabulary with words relevant to the topics the students are studying. Plus, get the directions for the mini-books that your students will be making to correspond to each location.

4. Do

Know what materials you will need to do a weekly hands-on science activity that coordinates with the topic. This section lists the supplies you will need, provides easy-to-follow steps, and explanations to make it a snap to complete the scientific demonstration.

5. Two Lessons Per Location

Find two lessons per location, each following the same format of read, write, and do.

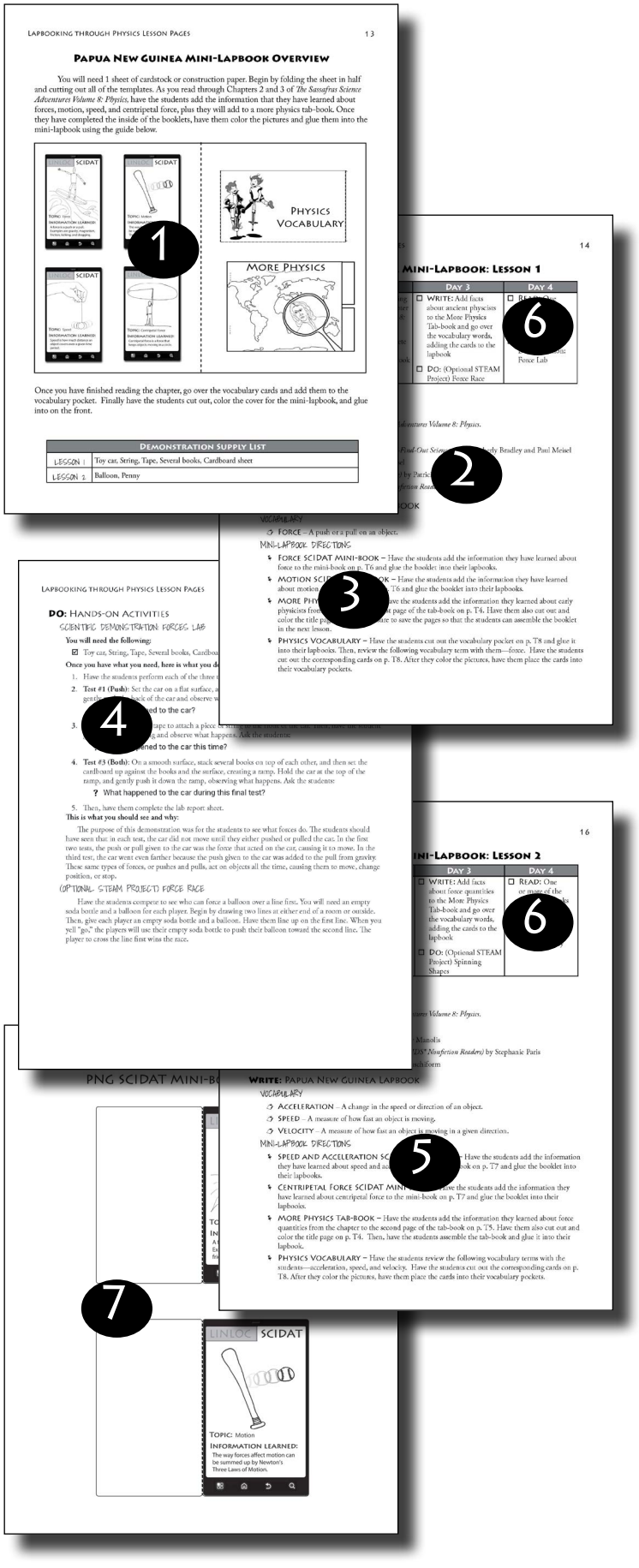
6. Optional Schedule

See how you could plan out each lesson over a week with the 4-day grid schedule. These schedules will make planning your weekly science adventure a snap!

The Rest

7. Templates and More

In the appendix, you will find project templates and a full glossary. At the back of this guide, you will find all of the mini-book templates for the lapbooks.



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Lapbooking through Physics

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Quick Start Guide

Welcome to your super, scientific journey with the Sassafras Twins!! The information and activities in this guide will help you turn a simple adventure novel into a simple science program for your early elementary students. Let's start by answering three pressing questions!

What will we learn?

Students will learn about physics through a study of the forces, motion, and more. See p. 9 for a list of the topics explored in this program.

What do I need?

In addition to this lapbooking guide, you will need the following materials:

1. **Novel –** All the main reading assignments are from *The Sassafras Science Adventures Volume 8: Physics*. You can get the paperback novel, the Kindle version, or the audiobook.
2. **Demonstration Supplies –** See a full list on p. 10, or save yourself time and purchase the *Sassafras Science Year 4 Experiment Kit*, which includes the materials for both volume 7 and volume 8.

What will a week look like?

Each week you and your students will do the following activities:

- **Read** scientific information from an adventure-filled novel, also known as a living book, and discuss what you read.
- **Write** down what the students have learned on the journey in the coordinating mini-book.
- **Do** hands-on science through demonstrations using the directions found in this guide.

For a more detailed explanation of the components in each lesson, we highly recommend checking out the peek inside this guide on p. 6 and reading the introduction on pp. 7-9. The chapter lessons begin on p. 11.

THE SASSAFRAS SCIENCE ADVENTURES

As the author and publisher of *Lapbooking through the Physics 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, or a member of our team, will be more than happy to assist you. I hope that you will enjoy creating memories using *Lapbooking through the Physics with the Sassafras Twins*!

~ Paige Hudson

Lapbooking through PHYSICS
Table of Contents

Introduction

Lapbooking through Physics with the Sassafras Twins is a unique and versatile program that leads you through a survey of forces, motion, and more using a series of eight mini-lapbooks to document the journey. The program is centered around the living book, *The Sassafras Science Adventures Volume 8: Physics*. 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 students. 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. To learn more about lapbooking, you can read the following articles:

- **What are lapbooks? –** This article shares what lapbooks are and how you can use them.
  - https://elementalscience.com/blogs/news/what-are-lapbooks
- **3 Common Misconceptions about Lapbooks –** This article looks at three of the most common mistaken beliefs about lapbooks.
  - https://elementalscience.com/blogs/news/3-misconceptions-about-lapbooks

What is included in this program?

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

1. **{Read}** Science 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 8: Physics.* I have also included a list of additional books from the library.
2. **{Write}** Lapbooks – The purpose of the written 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. **{Do}** Hands-on Activities – Scientific demonstrations, observations, and STEAM* projects are meant to spark the students' enthusiasm for learning science, to work on their observation skills and to demonstration the principles of science for them. This component of elementary science education can contain scientific demonstrations, hands-on projects and/or nature studies.

*STEAM: Science, Technology, Engineering, Art, and Math

Each lesson in this guide includes suggested hands-on science activities 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.
  - https://elementalscience.com/blogs/news/10-posts-you-must-read-about-living-books
- **The Basics of Notebooking –** This article details the basic components of notebooking along with how a few suggestions on what notebooking can look like.
  - https://elementalscience.com/blogs/news/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

HOW TO USE THIS PROGRAM

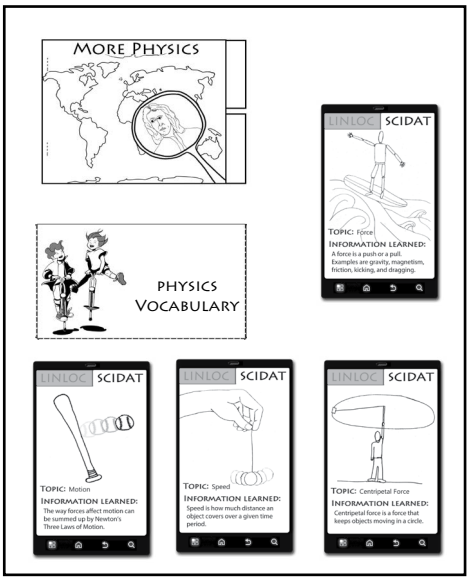
Each lesson is designed to be completed over several days or up to one week. The lesson contains reading assignments from *The Sassafras Science Adventures Volume 8: Physics*. You can choose to break each chapter up over two days or read it all at once. If you are using this program with younger students, 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 8: Physics* 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. Once the students have finished writing, have them color the related pictures. When the mini-book is complete, glue it into the 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 in the Appendix on pp. 59-63. 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. 64-66.

Finally, you can finish the lesson by doing the related scientific demonstration. If you would like to have your students write a lab report, I have included a template for you in the Appendix on pp. 55-56. 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 p. 57.



How long it should take

I have included possible schedules for completed each mini-lapbook. These schedules spread the work for each lesson out over 4 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 semesters worth of material.

Options - 8 mini-lapbooks or 1 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. We have included a cover for a full lapbook in the Appendix on p. 54. See a sample of a full lapbook in the following video:

https://www.youtube.com/watch?v=4LMhkVcXYfk&t=3s

Topics Covered

The Sassafras Science Adventures Volume 8: Physics covers a variety of aspects of physics, such as:

- Motion
- Forces
- Energy
- Light
- Sound
- Electricity
- Engineering
- Robotics
- Coding

In the process, you will learn about the following specific topics:

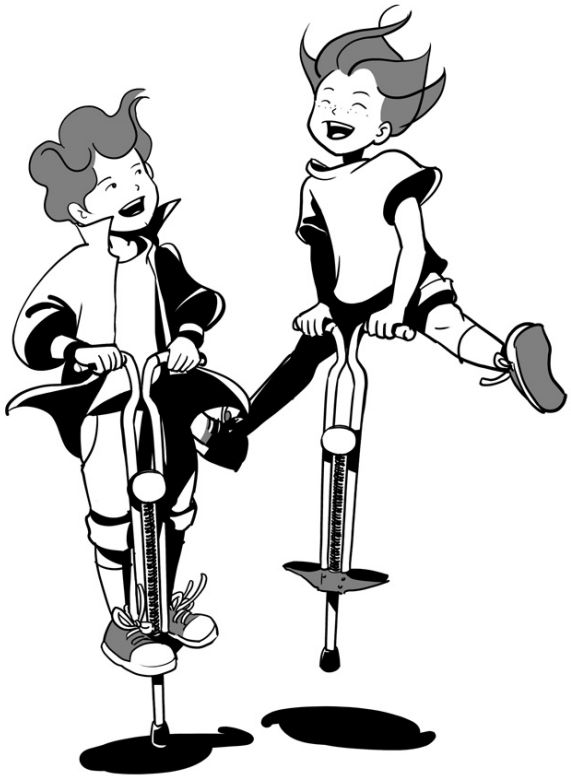
- Three Laws of Motion
- Speed
- Velocity
- Acceleration
- Circular motion
- Forces
- Balance
- Gravity
- Friction
- Floating
- Potential energy
- Kinetic energy
- Heat
- Changes in states of matter
- Light
- Colors
- Refraction
- Reflection
- Lenses
- Mirrors
- Sound
- Waves
- Wave behavior
- Musical instruments
- Electricity
- Circuits
- Batteries
- Electronics
- Simple machines
- Engineering design
- Bridges
- Arches
- Computers
- Coding
- Artificial Intelligence (AI)
- Robots

Supply List

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

Chapter	Supplies Needed
2: Forces Lab	Toy car, String, Tape, Several books, Cardboard sheet
3: Circular Penny	Balloon, Penny
4: Friction Roll	Marble, Cookie sheet (or smooth cutting board), Paper, Felt, Book
5: Floating Ship	Balloon, Old CD, 2-L soda bottlecap, Thin nail, Glue
6: Energy Relocation	String (3 ft.), Tape, 2 Small bouncy balls
7: Hot or Cold	3 Bowls, Hot-to-the-touch (but not scalding) water, Ice-cold water, Room-temperature water
8: Whirling Colors	Poster board or thin cardboard, Red and blue paint (or markers), Pencil, Scissors
9: Refraction Action	Straw, Clear glass, Water
10: Sound Energy	Tuning fork, Water, Bowl
11: Hearing Interference	Tuning fork, Thick cardboard, Styrofoam (or plastic) cup, Scissors (or knife)
12: Invisible Current	Tissue paper, Balloon, Scissors
13: Simple Circuit	Watch battery, Thin cardboard, Tape, LED light bulb
14: Straw Bridge	10 Straws, Tape, 2 Cups or plastic bins, Small paper cup, Pennies
15: Nails Versus Screw	Thick cardboard, Nail, Screw, String
16: Penny Boat	Aluminum foil, Pennies, Plastic tub
17: ArtBot	Cup, Electrical tape, 3 Markers, AA battery, 1.5-V to 3-V DC motor with wires, Clothespin, Paper

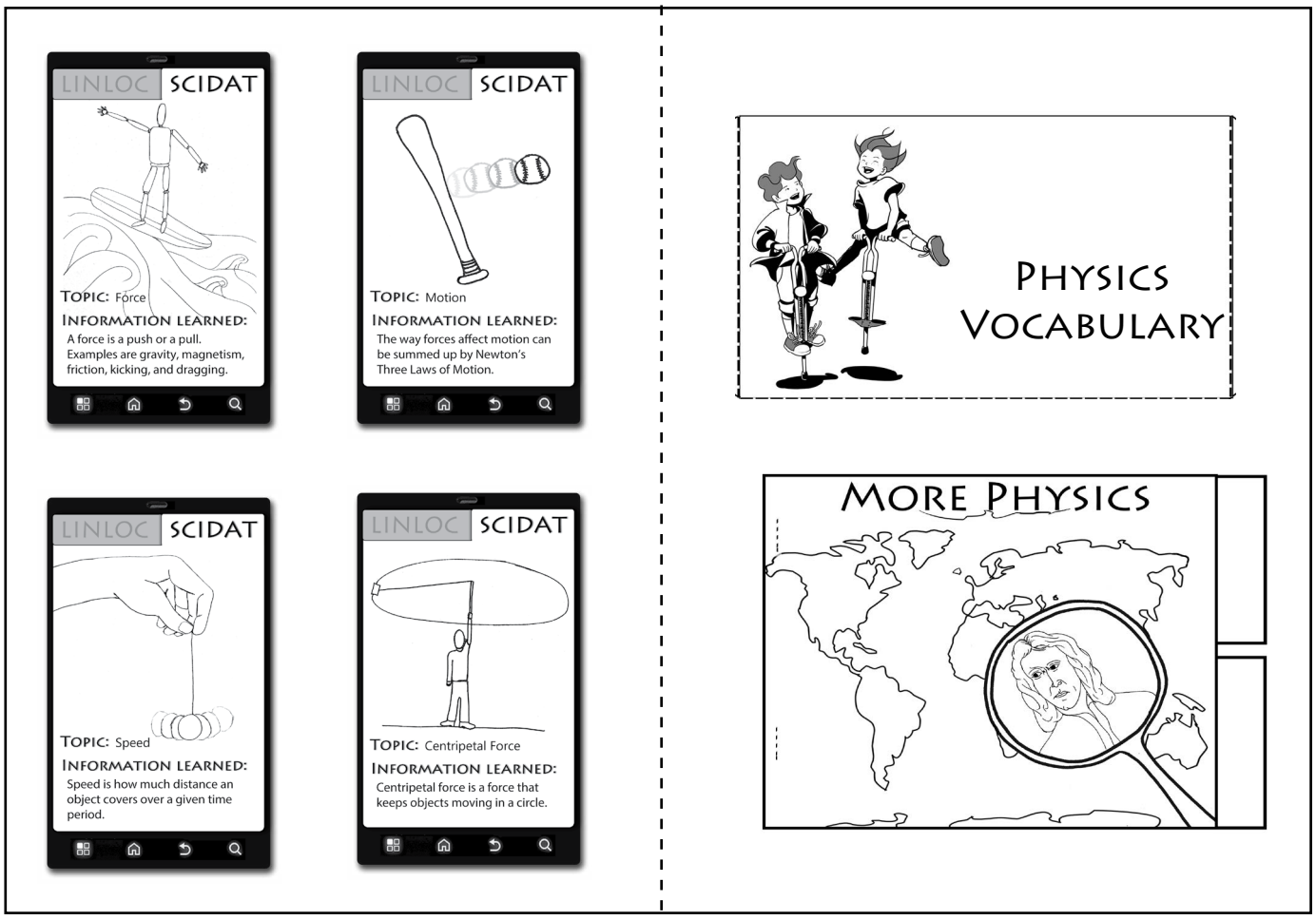
*Note—There are no suggested activities for chapters 1 and 18 in the lapbooking guide.



Lesson Pages

Papua New Guinea 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 8: Physics,* have the students add the information that they have learned about forces, motion, speed, and centripetal force, plus they will add to a more physics tab-book. Once they have completed the inside of the booklets, have them 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.

Demonstration Supply List	
LESSON 1	Toy car, String, Tape, Several books, Cardboard sheet
LESSON 2	Balloon, Penny

Papua New Guinea Mini-Lapbook: Lesson 1

Day 1	Day 2	Day 3	Day 4
☐ Read: "Force Falls" of Chapter 2 in *SSA Volume 8: Physics* ☐ Write: Complete the Force SCIDAT Mini-book	☐ Read: "Streaming Motion" of Chapter 2 in *SSA Volume 8: Physics* ☐ Write: Complete the Motion SCIDAT Mini-book	☐ Write: Add facts about ancient physcists to the More Physics Tab-book and go over the vocabulary words, adding the cards to the lapbook ☐ Do: (Optional STEAM Project) Force Race	☐ Read: One or more of the additional books to read ☐ Do: Scientific Demonstration: Force Lab

Read: Science Books

Reading Assignments

- 🕮 Read Chapter 2 of *The Sassafras Science Adventures Volume 8: Physics*.

Additional Books from the Library

- 🕮 *Forces Make Things Move (Let's-Read-and-Find-Out Science 2)* by Kimberly Bradley and Paul Meisel
- 🕮 *Forces (Science Readers)* by Debra J. Housel
- 🕮 *Push and Pull (Rookie Read-About Science)* by Patricia J. Murphy
- 🕮 *Pushes and Pulls (TIME FOR KIDS® Nonfiction Readers)* by Sharon Coan

Write: Papua New Guinea Lapbook

Vocabulary

- Force – A push or a pull on an object.

Mini-Lapbook Directions

- Force SCIDAT Mini-book – Have the students add the information they have learned about force to the mini-book on p. T6 and glue the booklet into their lapbooks.
- Motion SCIDAT Mini-book – Have the students add the information they have learned about motion to the mini-book on p. T6 and glue the booklet into their lapbooks.
- More Physics Tab-book – Have the students add the information they learned about early physicists from the chapter to the first page of the tab-book on p. T4. Have them also cut out and color the title page on p. T4. Be sure to save the pages so that the students can assemble the booklet in the next lesson.
- Physics Vocabulary – Have the students cut out the vocabulary pocket on p. T8 and glue it into their lapbooks. Then, review the following vocabulary term with them—force. Have the students cut out the corresponding cards on p. T8. After they color the pictures, have them place the cards into their vocabulary pockets.

DO: Hands-on Activities

Scientific Demonstration: Forces Lab

You will need the following:

☑ Toy car, String, Tape, Several books, Cardboard sheet

Once you have what you need, here is what you do:

1. Have the students perform each of the three tests on the toy car:
2. **Test #1 (Push):** Set the car on a flat surface, and observe what happens. Then, have the student gently push the back of the car and observe what happens. Ask the students:

   ? What happened to the car?

3. **Test #2 (Pull):** Use the tape to attach a piece of string to the front of the car. Then, have the student gently pull on the string and observe what happens. Ask the students:

   ? What happened to the car this time?

4. **Test #3 (Both):** On a smooth surface, stack several books on top of each other, and then set the cardboard up against the books and the surface, creating a ramp. Hold the car at the top of the ramp, and gently push it down the ramp, observing what happens. Ask the students:

   ? What happened to the car during this final test?

5. Then, have them complete the lab report sheet.

This is what you should see and why:

The purpose of this demonstration was for the students to see what forces do. The students should have seen that in each test, the car did not move until they either pushed or pulled the car. In the first two tests, the push or pull given to the car was the force that acted on the car, causing it to move. In the third test, the car went even farther because the push given to the car was added to the pull from gravity. These same types of forces, or pushes and pulls, act on objects all the time, causing them to move, change position, or stop.

(Optional STEAM Project) Force Race

Have the students compete to see who can force a balloon over a line first. You will need an empty soda bottle and a balloon for each player. Begin by drawing two lines at either end of a room or outside. Then, give each player an empty soda bottle and a balloon. Have them line up on the first line. When you yell "go," the players will use their empty soda bottle to push their balloon toward the second line. The player to cross the line first wins the race.

Papua New Guinea Mini-Lapbook: Lesson 2

Day 1	Day 2	Day 3	Day 4
☐ Read: "Amusement Acceleration" of Chapter 3 in *SSA Volume 8: Physics* ☐ Write: Complete the Speed and Acceleration SCIDAT Mini-book	☐ Read: "Centripetal Center" of Chapter 3 in *SSA Volume 8: Physics* ☐ Write: Complete the Centripetal Force SCIDAT Mini-book	☐ Write: Add facts about force quantities to the More Physics Tab-book and go over the vocabulary words, adding the cards to the lapbook ☐ Do: (Optional STEAM Project) Spinning Shapes	☐ Read: One or more of the additional books to read ☐ Do: Scientific Demonstration: Circular Penny

Read: Science Books

Reading Assignment

- 🕮 Read Chapter 3 of *The Sassafras Science Adventures Volume 8: Physics*.

Additional Books from the Library

- 🕮 *Motion (Blastoff! Readers: First Science)* by Kay Manolis
- 🕮 *Vroom! Speed and Acceleration (TIME FOR KIDS® Nonfiction Readers)* by Stephanie Paris
- 🕮 *Full Speed Ahead!: How Fast Things Go* by Cruschiform

Write: Papua New Guinea Lapbook

Vocabulary

- Acceleration – A change in the speed or direction of an object.
- Speed – A measure of how fast an object is moving.
- Velocity – A measure of how fast an object is moving in a given direction.

Mini-Lapbook Directions

- Speed and Acceleration SCIDAT Mini-book – Have the students add the information they have learned about speed and acceleration to the mini-book on p. T7 and glue the booklet into their lapbooks.
- Centripetal Force SCIDAT Mini-book – Have the students add the information they have learned about centripetal force to the mini-book on p. T7 and glue the booklet into their lapbooks.
- More Physics Tab-book – Have the students add the information they learned about force quantities from the chapter to the second page of the tab-book on p. T5. Then, have the students assemble the tab-book and glue it into their lapbook.
- Physics Vocabulary – Have the students review the following vocabulary terms with the students—acceleration, speed, and velocity. Have the students cut out the corresponding cards on p. T8. After they color the pictures, have them place the cards into their vocabulary pockets.

- Papua New Guinea Mini-lapbook Cover – Have the students cut out the cover page on p. T3, color it, and glue it on the front of their mini-lapbooks.

DO: Hands-on Activities

Scientific Demonstration: Circular Penny

You will need the following:

☑ Balloon, Penny

Once you have what you need, here is what you do:

1. Have the students place the penny inside the balloon.
2. Then, blow the balloon up, and tie it off for the students so that the penny won't come out.
3. Now, have the students move the balloon side to side or back-and-forth to get the penny rolling along the outside of the balloon in a circular path.
4. Then, have them stop and observe what happens to the penny.

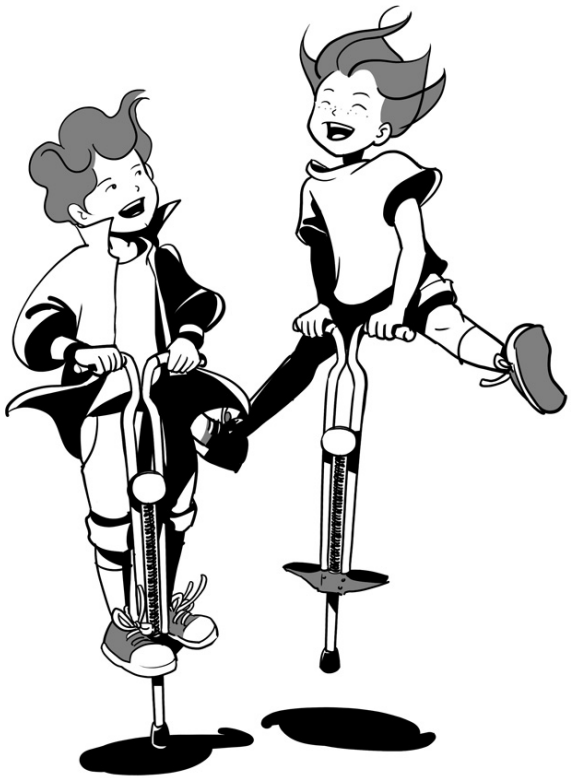
   ? What is the penny doing?

This is what you should see and why:

The purpose of this demonstration was for the students to see centripetal force. The students should have seen the penny continuously moving in a circle, even after they stopped moving it. The force that kept the penny in motion long after the student stopped moving the balloon is called centripetal force. This is a special type of force that keeps objects moving in a circle.

(Optional STEAM Project) Spinning Shapes

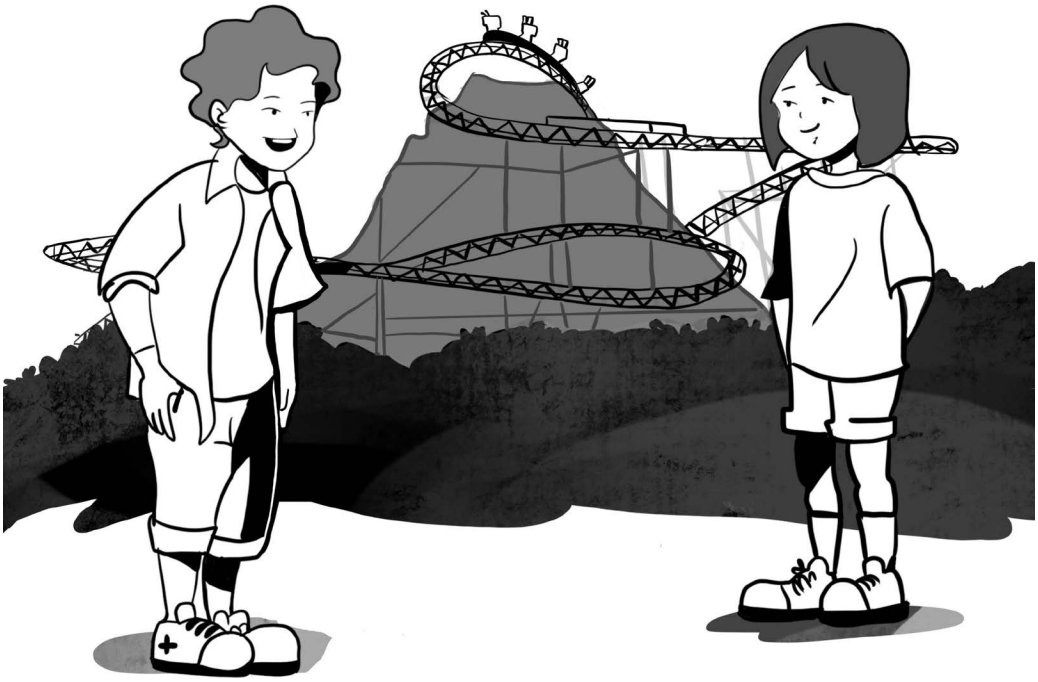
Have the students test different shapes to see how shape affects spin. You will need a sharpened pencil, thin cardboard, and scissors for this activity. Cut out several shapes from the cardboard, such as a circle, a square, and a triangle. Mark the center of each shape and use the pointed end of the scissors to poke a hole in the center of each shape big enough for the pencil to fit through. Then, let the students test the spinning capabilities of each shape by seeing which one stays up the longest.



Templates

Papua New Guinea (PNG) Mini-Lapbook Cover

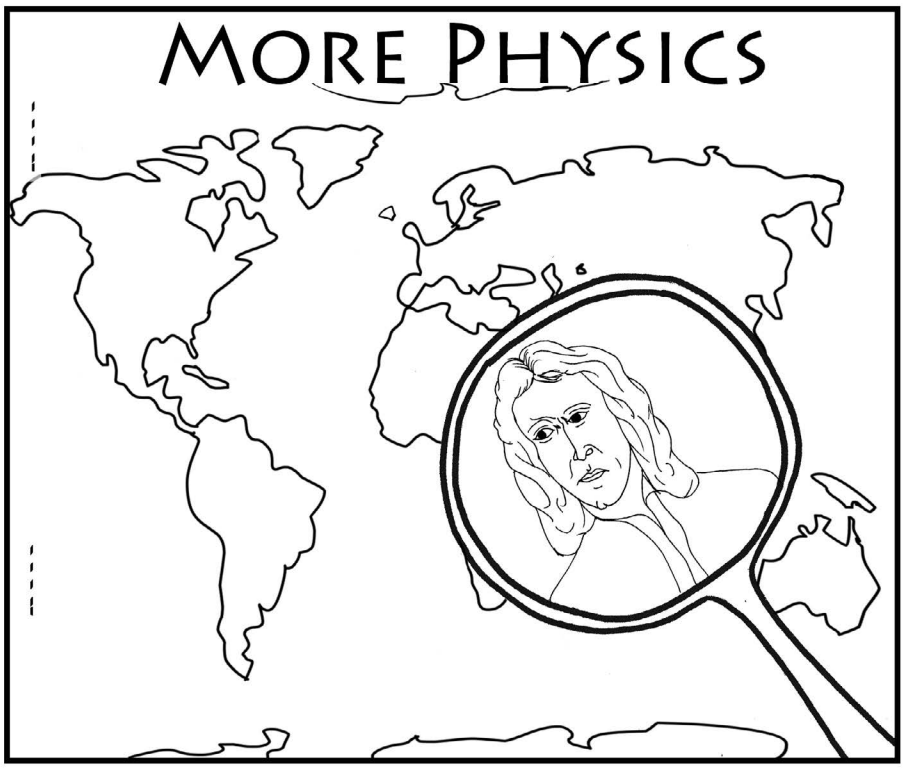
My Guide to Physics in Papua New Guinea

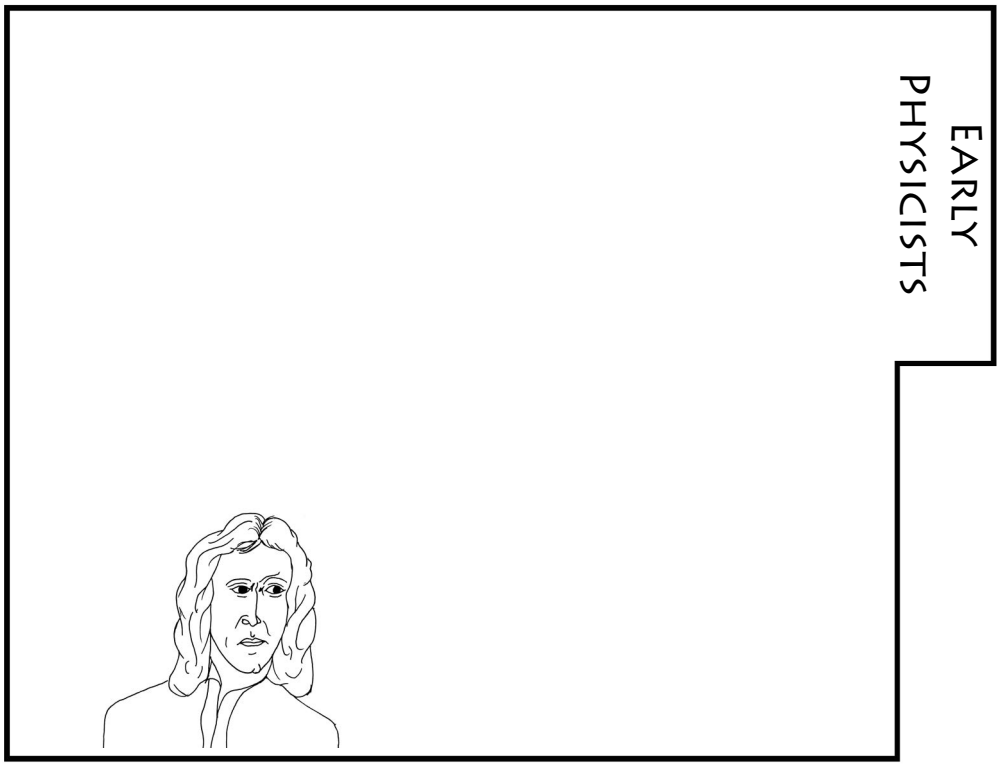


By: _____

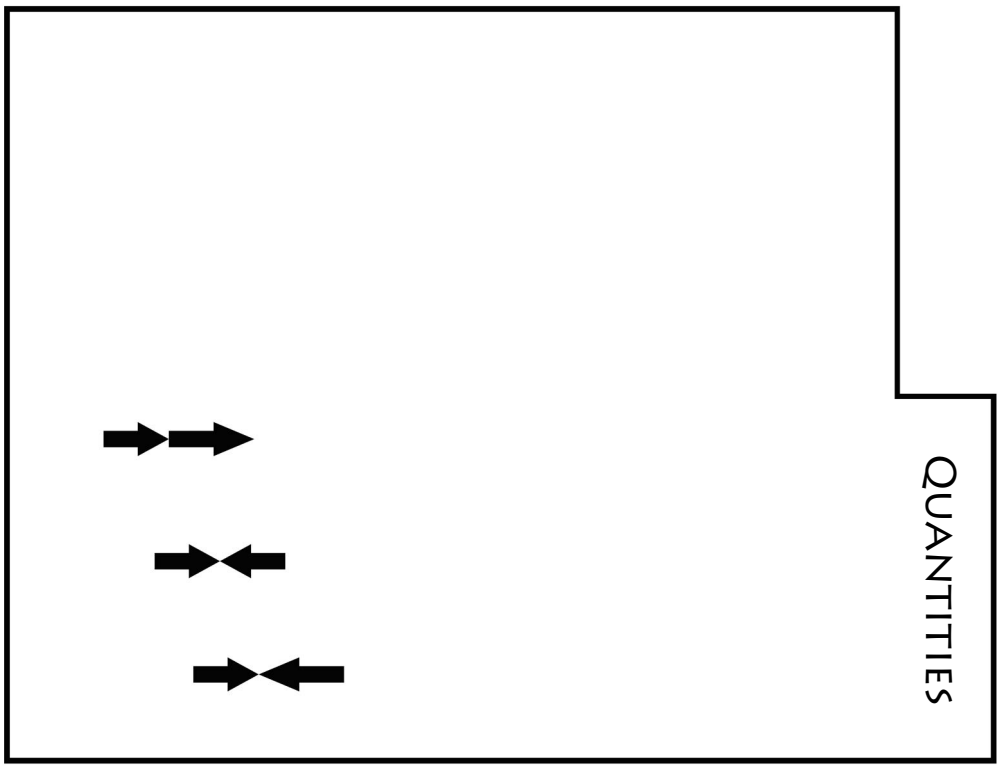
& The Sassafras Twins

PNG More Physics Tab-book Templates



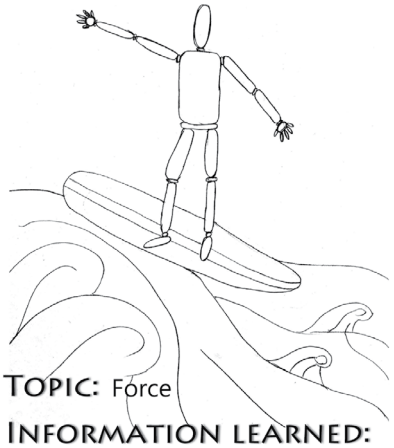


PNG More Physics Tab-book Templates



PNG SCIDAT Mini-book Templates

LINLOC SCIDAT

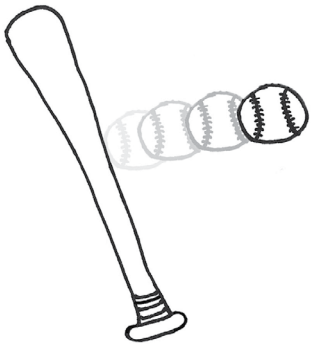


Topic: Force

Information learned:

A force is a push or a pull. Examples are gravity, magnetism, friction, kicking, and dragging.

LINLOC SCIDAT



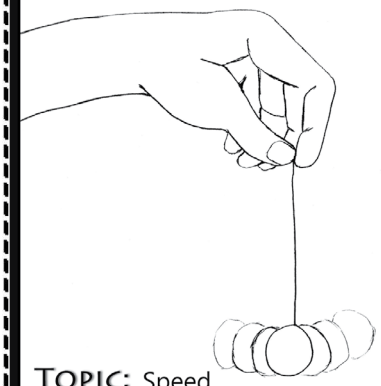
Topic: Motion

Information learned:

The way forces affect motion can be summed up by Newton's Three Laws of Motion.

PNG SCIDAT Mini-book Templates

LINLOC SCIDAT



Topic: Speed

Information learned:

Speed is how much distance an object covers over a given time period.

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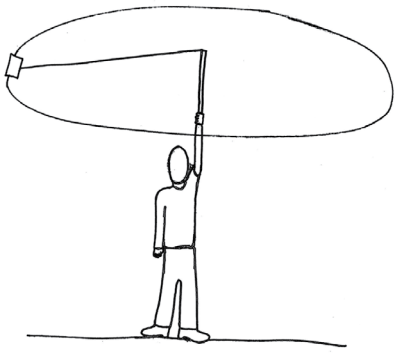


Topic: Centripetal Force

Information learned:

Centripetal force is a force that keeps objects moving in a circle.

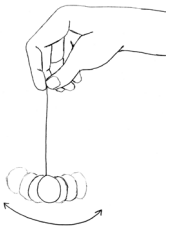
Physics Vocabulary

Glue this flap into your lapbook.

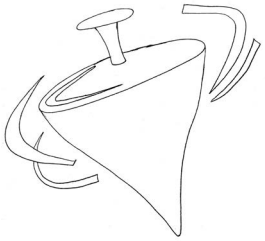
Glue this flap into your lapbook.

Glue this flap into your lapbook.

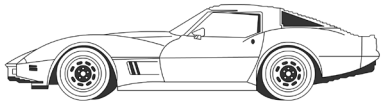
Force – A push or a pull on an object.



Acceleration – A change in the speed or direction of an object.



Speed – A measure of how fast an object is moving.



Velocity – A measure of how fast an object is moving in a given direction.