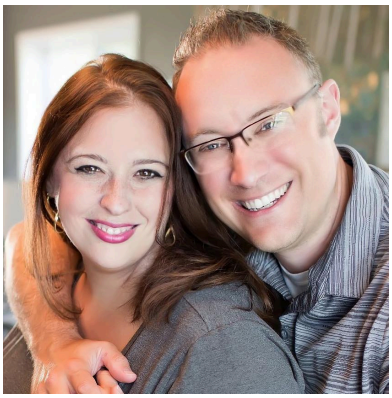
PHYSICAL SCIENCE EXPLORED

CURRICULUM GUIDE

BY TRISHA GILKERSON

Welcome to Physical Science Explored



Physical science is the study of physical reality at a fundamental level—a basic introduction to *chemistry* and *physics*. In this course, students will establish an understanding of the building blocks of matter and the most basic laws that govern the physical world. Students will learn about the God-created laws of motion that govern everything from falling skydivers to colliding cars to launching rockets.

As students embark on this introductory course in physical science, they will build a basic foundation of understanding of many important topics, equipping them to move on to more advanced courses like high school physics and chemistry.

Physical Science Explored is a full-school-year lab science course. We have both a middle and high school track. If your student is in the Level B (middle school) track, you can expect them to spend about 2-3 hours per week on the course. If your student is in the Level C (high school track) you can expect them to spend about 4-5 hours per week on the course. We recommend dividing up the assignments and study periods over 4-5 days per week to help with the retention of the material.

Every part of this course is designed to help your student master an introduction to this fascinating science. Your students will dissect the concepts, theories, and laws that dynamically govern the interactions of matter, force, and energy throughout the universe and learn how to apply them.

See you in the course!
Luke & Trisha Gilkerson

Getting Started

Where to begin: add your student(s) to the course

Log in to JourneyHomeschoolAcademy.com. From the parent dashboard...

1. Click on "Student Management."
2. You will see how many licenses (students) you have available. For each student, enter their first name, last name, and email address, and then click the "Add" button.
3. A temporary password will be sent to the email address you assign to each student. Using their email and password, each student will be able to log into their *own* course dashboard. You, the parent, will be able to follow their progress through the parent dashboard.
4. After registering all of your students, click the button that says, "Click here once you've added all your students below."

FAQ: Does my student need their own email address?

The student login must use a unique email address. However, if you'd prefer for your student not to have an email address, there are a few alternatives.

1) If you have a gmail address, you can add a qualifier to your email address. For instance, if your email address is parent@gmail.com you can place a plus sign (+) after the first part of your email address like this: parent+PhysicsStudent@gmail.com (you can use whatever you'd like after the +). Our system will view this as a *unique* email address, however all emails will still go to *your* inbox. It's a pretty handy feature gmail has.

2) If you do not have a gmail account, another option you have is to open a new free email address but have all emails *forwarded* to your inbox so you and your student do not have to maintain another email account.

How to begin your students' course access

You have the flexibility to begin this course whenever you're ready. Simply follow the steps below...

1. After you've completed the steps above, navigate back to the Student Management page for the course and click the button that says, "Click Here to Start the Course."
2. After clicking this button, the first lesson should show up in the student account within an hour (don't forget to log out of the parent account and log in to the student account).

Course Schedule

The first time your child logs in to their course, they should **watch the short "Welcome" video** so they can orient themselves to the course.

Once you click the button to begin the course, the first lesson will be released. Each new lesson is released after your student has finished checking *all* the boxes in the "assignments" box of their current lesson.

If your child completes one lesson per week, they should be able to complete the course in 35 weeks. However, if they get a little behind, don't worry; they will have access to the course for a full calendar year (52 weeks).

Need more time? You'll be able to purchase extensions on a month-to-month basis past your one-year access date if your student didn't have quite enough time to finish up.

Study Skills Training

One of the deficiencies we've seen in students is truly understanding how to study. We don't want to see students continue to make the same study mistakes over and over; but we want them to learn strong study habits. We developed training available to all of our Level B and C students. They will learn to apply the research-backed, time-tested study and notetaking techniques that will guide them toward becoming lifelong learners.

Students can access *Lesson 0: The Secrets to Student Success* anytime before or after they begin the course by logging into their student account now. They'll have access to two videos along with accompanying notetaking pages:

- **Study Smarter, Not Harder!**
- **Notetaking Crash Course**

The Student Guidebook

From the parent or student dashboard under “Resources” you can **download the Student Guidebook**. This is their guide for all their activities and lab assignments along with note-taking pages for each of the lectures. The note-taking pages include fill-in-the-blank outlines so the student can follow along with the lecture, along with spaces to take extra notes. Note-taking is a skill that will help your students remember what they’re listening to. If it’s not a skill they have yet learned, be sure to take some time before class begins to talk with them about the importance and find some practice opportunities.

We’ve worked hard to help even the newest note-takers be successful.

- These outlines can be used to follow along with the lectures, fill in the blanks, and label appropriate diagrams.
- Use the extra space on the pages so they can take more notes too.

- Your student will also find new words they should familiarize themselves with because they may encounter a number of unfamiliar words throughout this course.

If these note-taking pages don't work for your student, it's completely alright to skip them. While they are helpful to the majority of our students, each student is different and your student may have a note-taking strategy that works better for them.

The Lab Book

From the parent or student dashboard, under "Resources," you can **download the Student Lab Guide**. This is their guide for all of the labs and activities they'll be completing throughout the year.

Most weeks, your student will have a lab assignment. They'll have written directions in their lab and activity book they can download and print off, and some weeks they'll also have a lab video that will provide instructions. Some lab videos will demonstrate how to complete the assignment or offer suggestions for lab setup. Some weeks, students will be asked to consider what they've learned and answer questions. We have an answer key for you in the resources section of your parent dashboard.

You can see a **list of lab supplies** you'll need for this year, along with links to any specialty lab supplies you might need to help you better prepare.

Students in the Level C track of the course will have additional teaching, labs, and activities throughout the year. The Level C guide with notes and instructions can also be found in the dashboard under "Resources."

How the Course Works

What Each Lesson Is Like

Most weeks, students should complete the following...

1. Have student lesson outlines and lab assignments on hand.
2. Watch the lesson video (average 25 minutes).
3. Read the assigned pages from their textbook, *Novare Physical Science*
4. Answer homework questions.
5. Complete the comprehension quiz.
6. Watch the lab video (when there is one) and complete the assignment.

There are four quarterly exams. These weeks, students will be provided with a study guide they can use to help them study for the exam. There will not be lab assignments, homework questions, or lectures to watch for these weeks. Students should use the extra time to review and study for their exams.

FAQ: Is *Novare Physical Science* required?

We highly recommend the Novare *Physical Science* textbook. It is an excellent textbook that will reinforce what students are learning in the lecture material. Any time a student can use multiple modes of learning, it helps them retain the information better. However, as a homeschool class you're free to omit the textbook reading altogether or assign reading from a different textbook as you see fit. You can find reading plans for various other popular textbooks in the resource section of you parent dashboard.

Important Note: Students must have *all* the boxes checked in the "Assignments" box of their current lesson before the next lesson will be released to them.

Physical Science Explored PLUS (Level C)

Students in Physical Science Explored PLUS (for high school credit) will have access to additional assignments each week of the course, excluding exam weeks.

These assignments differ from week to week, but they are all designed to help students gain a deeper understanding of the concepts taught in Physical Science and give them more opportunities to develop their lab skills. Students will learn to write lab reports and be given opportunities throughout the year to hone this skill. You can also expect to see extra training videos, lab assignments, and other activities.

Homework Questions

Students will be assigned homework questions each week. These questions are designed to reinforce the lecture material and help practice equations introduced in the lesson.

You, the parent, are responsible for helping your student keep up with the homework questions, as well as grading these assignments. You can download the answer key in your parent dashboard which will help you with grading.

We recommend keeping grading simple. For each question, assign a grade between 0-3. Give your student 3 points if the answer looks accurate, 2 points if the work lacks important details, 1 point if it looks largely inaccurate, and 0 points if the work was incomplete or was hastily completed.

Homework Help Videos

In the parent resources, you'll also find homework help videos. You may share these videos with your student if they are having a hard time figuring out how to answer any of the homework questions involving math equations. These videos walk students through how to answer the problems step by step.

Quizzes & Exams

Every weekly quiz and quarterly exam is automatically graded as soon as the student finishes taking it.

The quizzes are designed to help the student test their knowledge of the material. If students do not receive at least 70% on their quiz, they will need to reset the quiz and retake it. Students should use quizzes as a self-assessment tool to determine where they need to go back and study more.

As a parent, you can log in to your parent dashboard and click on "Student Management" to see the grades for each quiz.

There will be four quarterly exams. These will be longer and more comprehensive tests, but the course contains study guides to help students remember all the important material. The exam grades are final—**exam grades can only be reset through special parent requests on the parent resources page**.

Laboratory Assignments

Students have access to lab assignments that accompany most lessons. We include lab videos when more instruction is needed or when reinforcement of more complex concepts from the lesson is necessary. When there are lab videos, they will provide instruction, give demonstrations on how to complete labs, and give your students ongoing learning opportunities in the field of Physical Science.

We encourage you to have your student complete as many lab assignments as is feasible. The labs and activities are a fantastic way for students to get hands-on learning experiences they'll likely remember far longer than anything they read in a textbook.

Many supplies for this course are household objects or easy to find at your local store. However, look ahead at upcoming labs in case there are any supplies you might need to order ahead of time.

Physical Science Lab Supplies

Overview of Assignments

The textbook we recommend for the course is *Novare Physical Science*. While none of the quizzes or exams will be based on material exclusively in the textbook, the book will help reinforce what is learned in the lectures.

Below are the assigned readings and labs listed in order of lesson, along with the Level C assignments (not applicable to students completing the level B version of the course). The online classroom also informs students about each of these assignments each week, but the assignments are listed for you as a handy reference.

Lesson	Textbook	Lab & Activities	Level C Assignments
Lesson 1: Introduction to Physical Science & The Scientific Method	Sections 7.1 & 7.4-7.6	Freezing Liquids & Exploring the Scientific Method	Introduction to Lab Reports **1.** Watch the level C assignment video. **2.** Download and read the physical science lab report guide. **3.** Write a lab report for "Freezing Liquids & Exploring the Scientific Method."
Lesson 2: Investigating Measurements & Unit Conversions	Sections 8.1 - 8.4	Scientific Measurements	Understanding the Metric System **1.** Memorize the units for measurement along with their symbols. **2.** Memorize the metric system prefix meanings. **3.** Use the worksheet to quiz yourself.

Lesson 3: Tools for Scientific Study	Section 1.1	Bullseye! Activities to Explore Accuracy & Precision	Accuracy & Precision in Science **1.** Write a "Mars Climate Orbiter" summary paragraph. **2.** Write a "Chernobyl Accident" summary paragraph. **3.** Write a "Consequence of Errors: Memory Molecules" summary paragraph. **4.** Write a "Consequence of Errors: Chromosome Abnormalities" summary paragraph.
Lesson 4: Classification & Properties of Matter	Sections 6.2-6.5 9.1, & 9.5	Physical vs. Chemical Changes	Memorizing Common Elements **1.** Watch the level C assignment video. **2.** Download the element fact file and use the periodic table to write the element symbol on the worksheets. **3.** Use the quizlet cards or create your own flashcards to quiz yourself on element names and symbols. **4.** Use the missing elements worksheet to help you practice element symbols.
Lesson 5: Density & States of Matter	Sections 9.3 - 9.4	Calculating & Comparing Density	Exploring Gas Laws **1.** Download the level C outline and take notes as you watch the assignment video. **2.** Complete the lab: "Exploring Gas Laws." **3.** Write a lab report for “Exploring Gas Laws.”
Lesson 6: Structure of the Atom	Chapter 1	Building Bohr Models	Atomic Theory Research Project - Part I **1.** Begin research for your atomic theory project and consider how best to present the information. **2.** On each of your element fact files, fill in the following information: atomic number, average atomic mass, mass number, protons, neutrons, electrons, and Bohr Model (where indicated).

Lesson 7: Introducing the Periodic Table	Section 6.3	Research Your Favorite Element	Atomic Theory Research Project - Part II **1.** Finish your atomic theory project research being sure you included the scientists and information outlined in the lesson. **2.** Present your atomic theory project to your family. **3.** On each of your element fact files, fill in the following information: period number, group number, valence electrons, ion charge, hyphen notation, nuclear notation, type of element.
Lesson 8: Stability & Types of Bonding	Sections 6.1 & 11.2	Exploring Properties of Ionic & Molecular Compounds	Excited Electrons Flame Test **1.** Add electron dot diagrams to each element fact files where indicated. **2.** Watch the level C assignment video. **3.** Complete the lab: "Excited Electrons Flame Test." **4.** Write a lab report for "Excited Electrons Flame Test."
Lesson 9: Exam 1			
Lesson 10: Reading & Writing Chemical Formulas	Sections 6.4	Growing Ionic Crystals	Calculating Percent Composition **1.** Download the Level C outline and take notes as you watch the assignment video. **2.** Continue memorizing the names and symbols for the 35 elements in your element fact files. **3.** Complete the percent composition homework questions.
Lesson 11: Naming Ionic Compounds	Section 11.1 (stop at *Acids & Bases*)	Ionic Compounds Dice Lab	Ionic Compound Scavenger Hunt **1.** Download directions for the ionic compound scavenger hunt and fill in the chart. **2.** Continue memorizing the elements and symbols in your element fact files.

Lesson 12: Naming & Writing Formulas for Molecular Compounds		Exploring Covalent Compounds	Organic Compounds & Properties of Polymers **1.** Download the level C outline and take notes as you watch the assignment video. **2.** Continue memorizing the names and symbols for the 35 elements in your element fact files. **3.** Complete the lab: “Properties of Polymers.”
Lesson 13: Balancing Chemical Equations		Balancing Chemical Equations & Exploring Conservation of Mass	Conservation of Mass 1. Continue memorizing the 35 elements and their symbols in your element fact files. Next week you will be quizzed on these. 2. Write a lab report for “Conservation of Mass with Alka-Seltzer.” 3. Write a 1-paragraph summary of the linked article on the conservation of mass.
Lesson 14: Types of Chemical Reactions	Section 11.3	Types of Reactions Lab	Element Quiz 1. On each of your element fact files, fill in: element at room temperature, year of discovery, who discovered the element, and interesting fact. 2. Take the first element quiz. 3. On another day, take the second element quiz.
Lesson 15: Solutions	Section 6.5	Solubility of Epsom Salts & Sodium Carbonate	Creating Precipitates 1. Watch the level C assignment video. 2. Complete the lab: “Creating Precipitates.” 3. Write a lab report for “Creating Precipitates.”

Lesson 16: Acids & Bases	Section 11.1	Acids & Bases in Your Home	Acids & Bases Lab Report 1. Write a lab report for: "Acids and Bases in Your Home."
Lesson 17: Nuclear Changes	Section 5.1	The Half-life of Radioactive Pennies	Nuclear Decay Reactions 1. Download the level C outline and take notes as you watch the assignment video. 2. Complete the nuclear decay homework questions.
Lesson 18: Exam 2			
Lesson 19: Describing Motion	Sections 10.1-10.2	Calculating Velocity	Creating & Interpreting Graphs in Physical Science 1. Watch the level C assignment video. 2. Download "Graphing Guidelines" to use as a reference throughout the remainder of this course. 3. Complete the velocity & graphing homework questions.
Lesson 20: Acceleration	Section 10.3	Exploring Acceleration	Continued Exploration of Velocity & Acceleration 1. After completing the main lab for the lesson, complete “Exploring Acceleration Lab Extension.” 2. Complete the velocity and acceleration graphs as indicated in the lab instructions. 3. Write a combined lab report for the labs: “Exploring Acceleration” and “Exploring Acceleration Lab Extension.”

Lesson 21: Newton's 1st & 2nd Laws	Section 10.4 through Newton's Second Law of Motion	Exploring Inertia	Bridge Project: Research Phase 1. Watch the level C assignment video. 2. Research different types of bridge designs and the types of loads bridges must withstand. 3. Write a 1-2 page summary of your findings. 4. Sketch design ideas for your bridge.
Lesson 22: Gravity & Projectile Motion	Section 5.1 *The Gravitational Force section* & 5.2 *The Gravitational Field section*	Explorations in Gravity & Air Resistance	Bridge Project: Building Phase 1. Finalize your bridge project plan and design your bridge. 2. Build your bridge using wooden craft sticks and glue. 3. Write a lab report for "The Dynamics of Falling Objects: Understanding Gravity & Air Resistance."
Lesson 23: Newton's 3rd Law	Section 10.4 *Newton's Third Law of Motion section*	Building a Slingshot	Bridge Project: Testing Phase 1. Download the "Bridge Project Test Instructions." 2. Test your bridge design and answer the questions found in the instructions.
Lesson 24: Work & Power	Section 3.4	Investigating Human Work & Power	Mousetrap Car: Research Phase 1. Watch the level C assignment video. 2. Write a lab report for "Investigating Human Work & Power." 3. Begin research on how mousetrap cars work and how to build one. 4. Consider factors that will impact how far your mousetrap car can travel and start designing your mousetrap car. Consider what materials you'd like to use to build your mousetrap car and begin gathering them.

Lesson 25: Exploring Energy, Heat, & Temperature	Sections 2.3 (*starting at Kinetic Energy*), 3.1, 3.3, & 3.5	Exploring Conduction	Mousetrap Car: Building Phase 1. Build your mousetrap car. 2. Complete pre-tests on your car and make modifications to your design as necessary. 3. Write a lab report for "Conduction Contest- Comparing Wire Conductivity."
Lesson 26: Simple Machines		Simple Machines Challenge: Rescuing the Circus Elephant	Mousetrap Car: Testing Phase 1. Follow the instructions in the download for testing your mousetrap car. 2. Answer the question demonstrating your understanding of how this project connects to physics concepts.
Lesson 27: Exam 3			
Lesson 28: Introduction to Waves	Sections 12.1-12.2	Hands-On Wave Dynamics with a Slinky	Mapping Wave Motion with a Simple Pendulum 1. Watch the level C assignment video. 2. Complete the lab: "Mapping Wave Motion with a Simple Pendulum."
Lesson 29: Properties of Sound Waves	Section 12.4	Frequency of sounds	Wave Math 1. Watch the level C assignment video. 2. Complete the wave math homework questions.
Lesson 30: Light & Color	Section 2.3 (*stop at kinetic energy*)	Light & Color Dynamics	Light & Color Dynamics Extension 1. Complete the lab: "Light & Color Dynamics extension". 2. Write a combined lab report for the labs "Light & Color Dynamics" and "Light & Color Dynamics extension."

Lesson 31: Behaviors of Light	Section 12.3	Bending Light: Reflection & Refraction Diagrams	Concave & Convex Mirrors and Lenses 1. Download the level C outline and take notes as you watch the assignment video. 2. Write a 2-paragraph paper on Galilean vs. Keplearian telescopes.
Lesson 32: Exploring Electrical Charge	Sections 13.1-13.2	Conductivity in Action	Energy Origins & Applications 1. Research one energy source of your choice. 2. Create a 3-5 minute presentation including the information outlined below.
Lesson 33: Electric Circuits	Sections 13.3-13.5	Circuit Discovery: Building and Understanding Connections	Math of Power & Consumption 1. Present your research from last week on your chosen energy source to your family. 2. Download the level C outline and take notes as you watch the assignment video. 3. Complete the homework questions.
Lesson 34: Magnetism	Section 14.1	The Science of Compass-Making	Electromagnet Exploration: Coils & Cores 1. Watch the level C assignment video. 2. Read Novare Sections 14.2 and 14.3 (optional). 3. Complete the lab: “Electromagnet Exploration: Coils & Cores.” 4. Write a lab report for “Electromagnet Exploration: Coils & Cores.”
Lesson 35: Exam 4			

Scope & Sequence

This Physical Science course introduces students to the fundamentals of chemistry and physics through engaging lessons and hands-on activities. Students will explore the structure of matter, chemical reactions, solutions, and nuclear changes before diving into motion, forces, energy, waves, electricity, and magnetism. They will develop problem-solving skills while learning how scientific principles apply to the world around them. By the end of the course, students will have a strong foundation in physical science, preparing them for further studies in chemistry and physics.

Lesson 1: Introduction to Physical Science

- What is Physical Science?
- Scientific Method

Lesson 2: Measurements and Unit Conversions

- SI vs. English Unit Systems
- Unit Conversions Using the Factor-Label Method

Lesson 3: Tools for Scientific Study

- Accuracy and Precision
- Scientific Notation

Lesson 4: Classification and Properties of Matter

- Matter, Mass, and Weight
- Pure Substances and Mixtures
- Physical and Chemical Properties and Changes

Lesson 5: Density & States of Matter

- Calculating Density
- States of Matter and their Properties
- Phase Changes

Lesson 6: Structure of the Atom

- Subatomic Particles
- Bohr Models

Lesson 7: Introducing the Periodic Table

Reading the Periodic Table
Identifying Periods, Groups, and Types of Elements

Lesson 8: Stability and Types of Bonding

Valence Electrons and Dot Diagrams
Ionic, Covalent, and Metallic Bonding

Lesson 9: Exam 1

Lesson 10: Reading and Writing Chemical Formulas

Understanding Chemical Formulas
Writing Chemical Formulas from Names

Lesson 11: Naming Ionic Compounds

Fixed and Variable Charged Ions
Naming Ionic Compounds

Lesson 12: Names and Formulas for Molecular Compounds

Why Do Nonmetals Have Different Charges?
Naming and Writing Formulas for Molecular Compounds

Lesson 13: Balancing Chemical Equations

Law of Conservation of Mass
Reading & Balancing Chemical Equations

Lesson 14: Types of Chemical Reactions

Identifying Types of Reactions: Synthesis, Decomposition, Single Replacement, Double Replacement, and Combustion

Lesson 15: Solutions

Categories of Matter
Solubility and Types of Solutions
Calculating Molarity

Lesson 16: Acids and Bases

- Properties of Acids and Bases
- Strength of Acids and Bases
- Neutralization Reactions

Lesson 17: Nuclear Changes

- Radioactivity
- Types of Nuclear Decay
- Introduction to Half-Life

Lesson 18: Exam 2

Lesson 19: Describing Motion

- Velocity and Motion
- Speed Calculations
- Velocity Graphs

Lesson 20: Acceleration

- What is Acceleration?
- Acceleration Calculations
- Acceleration Graphs

Lesson 21: Newton's 1st and 2nd Laws

- Inertia (Newton's 1st Law)
- Net Force (Newton's 2nd Law)
- Force Diagrams

Lesson 22: Gravity and Projectile Motion

- Calculating Force of Gravity
- Force Diagrams
- Projectile Motion

Lesson 23: Newton's 3rd Law

- Action and Reaction Forces
- Momentum & Change in Momentum
- Momentum Calculations

Lesson 24: Work and Power

- Mechanical Work
- Calculating Power

Lesson 25: Exploring Energy, Heat, and Temperature

- Introduction to Mechanical Energy
- Potential & Kinetic Energy
- Heat & Temperature

Lesson 26: Simple Machines

- What is a Simple Machine?
- Types of Simple Machines

Lesson 27: Exam 3

Lesson 28: Introduction to Waves

- Transverse vs. Longitudinal Waves
- Parts of a Wave
- Graphing Waves

Lesson 29: Properties of Sound Wave

- Speed of Sound
- Loudness & Intensity
- Frequency & Pitch
- Human Hearing

Lesson 30: Light and Color

- Properties of Light Waves
- The Electromagnetic Spectrum
- How We See Color

Lesson 31: Wave Behaviors

- Reflection, Refraction, and Diffraction
- Reflection & Refraction Diagrams

Lesson 32: Exploring Electrical Charge

- Electrical Charge
- Movement of Electrons: friction, conduction, & induction
- Electric Force
- Electric Field Line

Lesson 33: Electric Circuits

- How do Circuits Work?
- Circuit Diagrams
- Series vs Parallel Circuits

Lesson 34: Magnetism

- Properties of Magnets
- Permanent vs Temporary Magnets
- Magnetic Field Diagrams
- Earth's Magnetic Field

Lesson 35: Exam 4

Grading

Homework Question Recordkeeping

Physical Science Explored requires students to answer homework questions throughout the school year. Each question is worth up to 3 points. Below are suggested point values.

- 3 points: Answers that are accurate and thorough.
- 2 points: Answers that may be missing important details, but effort was made to find the correct answer.
- 1 point: Answers that look largely inaccurate or incomplete.
- 0 points: Answers that are hastily completed and incorrect.

Question Number	2.1	2.2	2.3	2.4	2.5	3.1	3.2	3.3
Total Score								

Question Number	4.1a	4.1b	4.1c	4.1d	4.1e	4.1f	4.1g	4.2a
Total Score								

Question Number	4.2b	4.2c	4.2d	4.2e	4.2f	5.1	5.2	5.3
Total Score								

Question Number	5.4	5.5	5.6	5.7	6.1.1	6.1.2	6.1.3	6.2a
Total Score								

Question Number	6.2b	6.2c	7.1	7.2	7.3	8.1	8.2	8.3
Total Score								

Question Number	8.4	10.1a	10.1b	10.1c	10.2a	10.2b	10.2c	10.3a
Total Score								

Question Number	10.3b	10.3c	10.3d	10.3e	10.3f	10.3g	10.3h	11.1
Total Score								

Question Number	11.2	11.3	11.4	11.5	11.6	11.7	11.8	12.1
Total Score								

Question Number	12.2	12.3	12.4	12.5	12.6	12.7	12.8	13.1
Total Score								

Question Number	13.2	13.3	13.4	13.5	14.1	14.2	14.3	14.4
Total Score								

Question Number	14.5	15.1	15.2	15.3	16.1	16.2	16.3	16.4
Total Score								

Question Number	16.5	16.6	19.1	19.2	19.3	19.4	19.5	20.1
Total Score								

Question Number	20.2	20.3	20.4	21.1a	21.1b	21.2a	21.2b	21.3
Total Score								

Question Number	21.4	22.1a	22.1b	22.1c	22.1d	22.1e	22.1f	23.1
Total Score								

Question Number	23.2	23.3	23.4	24.1	24.2	24.3	24.4	25.1
Total Score								

Question Number	25.2	25.3a	25.3b	25.3c	25.3d	26.1a	26.1b	26.1c
Total Score								

Question Number	26.1d	26.1e	26.1f	26.2	26.3	28.1	28.2	28.3
Total Score								

Question Number	33.1	33.2	33.3	33.4	33.5
Total Score					

Quiz & Exam Grading

Quarterly exams and lesson quizzes are graded automatically in the online classroom. You can keep a record of the grades below.

Quiz	1	2	3	4	5	6	7	8	End Q1
Score									

Quiz	10	11	12	13	14	15	16	17	End Q2
Score									

Quiz	19	20	21	22	23	24	25	End Q3
Score								

Quiz	26	28	29	30	31	32	33	34	End Q4
Score									

Exam	Q1 Exam	Q2 Exam	Q3 Exam	Q4 Exam
Score				

Lab Assignments

Record your student's primary lab scores in the table below (this does not include Level C lab reports). Assign your student 1-10 points for each lab completed. A student should receive a 10 for exceptional work that shows mastery of the concepts.

Lab Number	1	2	3	4	5	6
Score						

Lab Number	7	9	10	11	12	13
Score						

Lab Number	14	15	16	17	19	20
Score						

Lab Number	21	22	23	24	25	27
Score						

Lab Number	28	29	30	31	22	33	34
Score							

Level C: PLUS Grading Rubric

Below is a detailed grading rubric for the Level C assignments in Physical Science. In addition, you'll find the lab report grading rubric and the accompanying tables below to help with grading each of these assignments.

Lesson	Graded assignments	Grading Rubric	Points Possible	Student Grade
1: Introduction to Lab Reports	Write a lab report for *Freezing Liquids & Exploring the Scientific Method*.	Use lab report grading rubric.	100	
2: Understanding the Metric System	Measurements & Unit Conversion Worksheet	Give students 1 point for each blank answered correctly.	36	
3: Accuracy & Precision in Science	**1.** Write a *Mars Climate Orbiter* summary paragraph. **2.** Write a *Chernobyl Accident* summary paragraph. **3.** Write a *Consequence of Errors: Memory Molecules* summary paragraph. **4.** Write a *Consequence of Errors: Chromosome Abnormalities* summary paragraph.	Assign 25 points for each paragraph that's thoughtfully written and includes the information outlined in the answer key. Deduct points for key ideas that are missed.	100	
4: Memorizing Common Elements	Element Fact Files: Use the periodic table to write the element symbol on the element fact files.	Assign ¼ point for each element symbol correctly written on the element fact files.	8.75	

5: Exploring Gas Laws	Write a lab report for *Exploring Gas Laws*.	Use lab report grading rubric.	100	
6: Atomic Theory Research Project - Part I	Element Fact Files: fill in the following information: atomic number, average atomic mass, mass number, protons, neutrons, electrons, Bohr Model (where indicated).	Assign ¼ point for each item correctly written on the element fact file.	57.5	
7: Atomic Theory Research Project	1. Atomic Theory Research Project Presentation 2. Element Fact Files: fill in the following information: period number, group number, valence electrons, ion charge, hyphen notation, nuclear notation, type of element.	**1.** Students should, at minimum, include the 12 scientists and the contributions outlined in the answer key. For each of the scientists they correctly identify key ideas found in the answer key, assign 7 points. Deduct points when ideas are left out. Assign up to 16 points for creativity and presentation style. 2. Element Fact File: assign ¼ point for each item correctly written on the element fact file.	Atomic Theory Project 100 Element Fact File 61.25	

8: Excited Electrons Flame Test	**1.** Write a lab report for *Excited Electrons Flame Test*. 2. Element Fact Files: add electron dot diagrams where indicated	**1.** Use lab report grading rubric. 2. Element Fact File: assign ¼ point for each item correctly written on the element fact file.	Lab Report 100 Element Fact File 6.25	
10: Calculating Percent Composition	Complete the percent composition homework questions.	Assign 15 points for each homework question correctly completed. Deduct points for incorrect calculations and/or not showing work.	60	
11: Ionic Compound Scavenger Hunt	Ionic Compound Scavenger Hunt	Assign 2 points for each box correctly filled out.	40	
12: Organic Compounds & Properties of Polymers	Complete the lab: *Properties of Polymers" and answer the discussion questions*.	For each discussion question correctly and thoughtfully answered, assign up to 5 points.	20	

13: Conservation of Mass	1. Write a lab report for *Conservation of Mass with Alka-Seltzer*. 2. Write a 1-paragraph summary of the linked article on the conservation of mass.	**1.** Use lab report grading rubric. **2.** Assign 25 points for a paragraph that's thoughtfully written and includes the information outlined in the answer key. Deduct points for key ideas that are missed.	Lab Report 100 Paragraph 25	
14: Element Quiz	1. Element Quiz (2 parts) 2. Element Fact File: fill in the following information: element at room temperature, year of discovery, who discovered the element, interesting fact	1. Assign 1 point for each element and element abbreviations correctly identified. 2. Element Fact File: assign ¼ point for each item correctly written on the element fact file.	Quiz 70 Element Fact File 35	
15: Creating Precipitates	Write a lab report for *Creating Precipitates*.	Use lab report grading rubric.	100	
16: Acids & Bases Lab Report	Write a lab report for *Acids and Bases in Your Home*.	Use lab report grading rubric.	100	

17: Nuclear Decay Reactions	Nuclear decay homework questions	Assign 5 points for each homework question correctly completed. Deduct points for incorrectly completed questions.	35	
19: Creating & Interpreting Graphs in Physical Science	Complete the velocity & graphing homework questions.	Assign 5 points for each homework question correctly completed. Deduct points for incorrectly completed questions.	25	
20: Continued Exploration of Velocity & Acceleration	Write one combined lab report for the labs: *Exploring Acceleration* and *Exploring Acceleration Lab Extension*.	Use lab report grading rubric.	100	
21: Bridge Project: Research Phase	Write a 1-2 page summary of your findings on types of bridge designs and loads a bridge must withstand.	Assign up to 100 points for a paper that is thoughtfully written and includes all the key ideas as indicated in the answer key. Deduct points for missing or sloppy work.	100	
22: Bridge Project: Building Phase	Write a lab report for *The Dynamics of Falling Objects: Understanding Gravity & Air Resistance*.	Use lab report grading rubric.	100	

23: Bridge Project: Testing Phase	1. Completed bridge design. 2. Test your bridge design and answer the questions found in the instructions.	1. Assign up to 75 points for a thoughtfully and carefully designed bridge. 2. Assign 5 points for each question that's correctly completed.	Bridge Design 75 Questions 25	
24: Mousetrap Car: Research Phase	Write a lab report for *Investigating Human Work & Power*.	Use lab report grading rubric.	100	
25: Mousetrap Car: Building Phase	Write a lab report for *Conduction Contest- Comparing Wire Conductivity*.	Use lab report grading rubric.	100	
26: Mousetrap Car: Testing Phase	1. Completed Mousetrap Car 2. Answer questions demonstrating your understanding of how this project connects to physics concepts.	**1.** Assign up to 70 points for a thoughtfully and carefully designed mousetrap car. 2. Assign 5 points for each question that's correctly completed.	Mousetrap Car Design 70 Questions 30	

28: Mapping Wave Motion with a Simple Pendulum	1. Complete the lab: *Mapping Wave Motion with a Simple Pendulum* and collect data. 2. Answer questions and complete calculations from the lab.	1. Assign up to 50 points for correctly completing the lab and collecting data. 2. Assign 5 points for the questions and calculations that are correctly completed.	Lab 50 Questions 15	
29: Wave Math	Complete the wave math homework questions.	Assign 5 points for each question that's correctly completed (count 6a as one question and 6b as another question).	35	
30: Light & Color Dynamics Extension	Write one combined lab report for the labs *Light & Color Dynamic*s and *Light & Color Dynamics extension*.	Use lab report grading rubric.	100	
31: Concave & Convex Mirrors and Lenses	Write a 2-paragraph paper on Galilean vs. Keplearian telescopes.	Assign up to 50 points for paragraphs that are thoughtfully written and include all the key ideas indicated in the answer key. Deduct points for missing or sloppy work.	50	
32: Energy Origins & Applications	Create a 3-5 minute presentation including the information outlined below.	The assignment will be presented and graded next week.		

33: Math of Power & Consumption	1. Present your research from last week on your chosen energy source to your family. 2. Complete the homework questions.	**1.** Students should, at minimum, include the information outlined in the answer key for the energy source they have chosen. Assign 12 points each for defining their energy source, explaining its origin, and describing its conversion. Deduct points when key ideas or points are left out of their presentation. Assign up to 14 points for creativity and presentation style. 2. Assign 5 points for the questions and calculations that are correctly completed.	Energy Project 50 Homework 20	
34: Electromagnet Exploration: Coils & Cores	Write a lab report for *Electromagnet Exploration: Coils & Cores*.	Use lab report grading rubric.	100	
Total Points Possible			**2491.75**	

Level C: PLUS Lab Report Grading Rubric

Below are the sections that should be included in your student's lab reports. Each lab report is worth up to 100 points with each section being worth the assigned number of points. Read the descriptions of what is expected to be included in each section and determine how many points your student will receive for that section.

Title (5 points)
Each lab report should have a descriptive title. The title should clearly explain what you're studying. Also, include your name and the date of the laboratory experiment or observation.

A poor title choice might be, "Pool Water." A much better title choice would be, "Comparing the number of bacteria found in chlorinated and salt-treated pool water."

Introduction (15 points)
The introduction should describe the problem. This is also where you explain what the investigation is about—why you are doing the lab. You should give some background information, explaining what is already known about this problem.

If your lab is to simply complete observations, which is often the case in science, it's okay to write a problem statement like this, "I intend to make observations about chemicals commonly found around the home and how they interact with each other." It is not acceptable to write, "I'm doing lab #1."

Don't forget to do some reading in your textbook or other resources. The research step is very important. Consult some resources to help you explain some of what is already known about the problem. What have you learned in your lectures or textbook reading? For instance, if you're doing a lab observing plant cells, you could discuss specific structures found in plant cells, noting unique plant cell structures as part of your background information.

Hypothesis (10 points)
Your hypothesis is a statement that tells what you expect to happen *and* why. It's important to explain your reasoning; otherwise, your hypothesis is just a random guess. Scientific

hypotheses are based on the knowledge you have. Your hypothesis should be written as a statement.

If your lab assignment is just observation, you do not need to make an educated guess about what will happen—no hypothesis is needed.

Materials (5 points)
In a neat column, list *all* the materials that are necessary to carry out the investigation. In the labs for this course, this should be easy because the materials list will be given in your directions. However, if you vary the materials used from the instructions, be sure to change that in your lab report.

Procedure (10 points)
In the procedure section, you'll discuss what you did and how you did it. Using a numbering system, give all the steps in the procedure you used. This should be so complete that someone else could follow your instructions to do the same lab. If needed, you can also draw pictures to help with this step. For instance, if you have an elaborate equipment set-up, a picture may be helpful to someone trying to recreate your experiment.

This part should be fairly easy since you'll have procedures listed in your instructions for completing each lab report. You may use the instructions as a guide; however, an important part of this process is putting into your own words what you did. If you varied the procedures in any way, be sure to indicate this in your lab report. Accuracy is extremely important!

Results (30 points)
Your results should include information in any and all formats you've collected. Be sure to include a written description of your results. In addition, if you collected any numerical data, present this in a neat, easy-to-read data chart or graph. Observations, in the form of drawings, should also be recorded in this section. You're not interpreting your data in this section, just recording what you observed and the data you collected.

Conclusion & Discussion (25 points)
The conclusion is a very important step and should not be skipped. This is the step where you're interpreting the data you collected. In your analysis, you should state whether your hypothesis was supported by the data or not and explain the evidence for your conclusion.

Explain why you think it happened, trying to evaluate the data from an unbiased point of view. Give reasons for why you believe the outcome is or is not consistent with your hypothesis. Were there errors or potential errors that impacted your results? Be sure to discuss those.

This is also where you answer any questions that have been presented in the discussion section of your lab instructions. In your conclusion, you should also record what you learned and any questions this research brought up for you. Give suggestions for more investigation on this topic.

Level C: PLUS Lab Report Grading

Record student's lab scores in the table below. Copy the table below and assign your student points for each section out of the given number possible next to the section.

Lab Number							
Title (5)							
Introduction (15)							
Hypothesis (10)							
Materials (5)							
Procedure (10)							
Results (30)							
Conclusion (25)							
Total Score							

Lab Number							
Title (5)							
Introduction (15)							
Hypothesis (10)							
Materials (5)							
Procedure (10)							
Results (30)							
Conclusion (25)							
Total Score							

Final Grade

Below is a suggested way to compute your student's final grade at the end of the school year.

For Level B students, take the average of the first four values (homework, quiz, exam, and lab grades).

For Level C students, take the average of all five values (homework, quiz, exam, lab grades, PLUS assignment grades).

Average homework question grade	
Average quiz grade	
Average exam grade	
Average lab grade	
Average level C assignment grade x 2 (Level C only) Give these assignments twice the weight of the above assignments	
Add scores together	
Final grade Level B: divide by 4 for final grade Level C: divide by 6 for final grade	