

The background of the entire page is a vibrant, green aurora borealis (Northern Lights) over a dark landscape. In the lower-left foreground, the silhouettes of two people are standing on a dark ridge, looking up at the sky. The overall color palette is dominated by various shades of green and teal, with a dark blue/black sky at the top and bottom.

Physical SCIENCE

SAMPLE

by Bradley Hudson

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This Guide at a Glance

Dear Student,

Welcome to your Physical Science course! This program is written to guide you, the student, through this course. Here is a quick look at what you will find inside.

1. Textbook Assignments

Know what to read in the free, digital textbook, *CK-12 Physical Science*. Download the version used in the guide:

<https://elementalscience.com/blogs/resources/ps>

2. Experiment Information

If you choose the hands-on option, your weekly experiment directions will be found in this section. If you choose the digital option, the online lab information directly follows the experiment.

3. Events in Science

Learn about current events in science and build your internet research skills with these assignments.

4. Hands-on Activity

Have some extra science fun with these optional weekly hands-on STEAM activities.

5. & 6. Course Options

Choose from a hands-on option (5) or a digital option (6) for completing this course. Either way, these scheduling grids will make planning your weekly science adventure a snap! These schedule sheets lay out your textbook, experiment, and writing assignments for the week. Plus, each one shares the main objective for the week along with any supplies you may need.

Week 5 Notes - States of Matter 31

Textbook Assignments

Reading

- Read *CK-12 Physical Science* Sections 4.1, 4.2, 4.3

Written

After you finish reading, answer questions #1, 3, 5 in section 4.2, and questions #1, 3, 5, 7 in section 4.3. Fill in the reading section of your science notebook. Then, define the following terms in the glossary section of your science notebook:

- Amontons' Law
- Boyle's Law
- Charles's Law
- Condensation
- Energy
- Evaporation
- Kinetic Energy
- Kinetic Theory of Matter
- Plasma
- States of Matter
- Sublimation
- Vaporization

Experiment - When does water change state?

Materials

- Cup
- Ice cubes
- Pot
- Thermometer

Pre-Reading

There are three states of matter that are easily observed every day: solid, liquid and gas. Solids have tightly packed molecules with fixed shape and volume, liquids have widely spaced molecules with a fixed volume and gases have widely spaced moving molecules with no fixed shape or volume. There is also a fourth state called plasma, which is rarely seen on Earth. Plasma is created when a gas is heated to very high temperatures. In this experiment, you are going to look at the changes water undergoes.

Procedure

1. Fill a small pot halfway with ice cubes. Place the pot on a burner and turn the burner onto medium heat. *(CAUTION - Do not touch the burner. Be sure to use protective gear when working near the burner.)*
2. Observe the thermometer as the ice begins to melt and record the temperature once all of the ice melts.
3. Continue to heat the water, observing the temperature on the thermometer as it heats up.
4. Once you begin to see the water boiling and observe the process of steam, record your last temperature measurement.
5. Turn the burner off and remove the pot from the burner before you draw conclusions.

Troubleshooting Tips

If the temperature goes way up, but your water is not boiling, make sure that your thermometer is not touching the bottom of the pan. If it is, you will get a false reading. Also,

Physical Science Unit 1 - Week 5

The melting point and boiling point of water are given below sea level. If you live above or below sea level, this will affect the melting and your water boils. The effect will depend on how sea level. Generally, the higher your elevation, the lower the boiling point of water is. This is the reason that you begin to see steam rising from the pot.

Record what you did for the experiment and add a chart with the temperature changes you observed from the experiment.

During Melting

Record how temperature changes as ice is heated.

Go to the online lab for the "Temperature During Melting" online lab.

Procedure

- Do the lab entitled "Temperature During Melting" and answer the questions as you work through the online lab.

Science Notebook

- Add the completed workbook pages that were printed to the science notebook.

Events in Science

Current Events

- Find a current events article relating to the field of chemistry and complete the necessary sheet found on p. 187 of the Appendix. Once you are done, add the current events section of your science notebook.

Hands-on Activity

Optional Hands-on

- Dry ice is the solid form of carbon dioxide. It's a fun chemical to play around with because it reacts with atmospheric pressure. Check out the following article for activity suggestions: <https://www.ck12.org/physics/dry-ice-exploration/>

Physical Science Unit 1 - Week 5

Week 5 Unit 1 (Hands-on Course) 4-Day 33

Weekly Topic

→ This week will look at states of matter.

	Day 1	Day 2	Day 3	Day 4
Textbook and Equipment	Read <i>CK-12 Physical Science</i> Sections 4.1 and 4.2.	Read <i>CK-12 Physical Science</i> Sections 4.3.	Do the experiment "When does water change state?"	Do the optional hands-on science activity.
Writing	Add the vocabulary to the glossary section of your science notebook.	Answer the assigned questions in the reading section of your science notebook.	Record what you have done in the lab section of your science notebook.	Complete the Current Events in Science assignment.
Supplies Needed				
<ul style="list-style-type: none"> Experiment - Cup, Ice cubes, Pot, Thermometer (Optional) - Dry ice, Plastic cups, Water, Dish soap 				
Other Notes				

Physical Science Unit 1 - Week 5

Online Course 3-Day 34

Weekly Topic

Day 2	Day 3
Read <i>CK-12 Physical Science</i> Sections 4.3.	Do the online lab "Temperature During Melting."
Answer the assigned questions in the reading section of your science notebook.	(Optional) Do the hands-on science activity.
Record what you have done in the lab section of your science notebook.	Complete the Current Events in Science assignment.
Other Notes	

Physical Science Unit 1 - Week 5

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Introduction for the Student

Welcome to *Physical Science*! This year, you will learn about matter, chemical reactions, motion, forces, thermal energy, and much more. In this guide, you will find two types of schedules and notes with the assignments for each week. To get links to the textbook and quick-links for the activities in this guide, please visit the resource page for this program:

 <https://elementalscience.com/blogs/resources/ps>

Two Courses in One

This guide contains the plans for two courses in one book.

- ☞ **Hands-on** – The plans in this option are for a standard lab science, one-credit *Physical Science* course. There are textbook assignments, hands-on experiments, and written work with these plans. Expect to take about four to five hours a week to complete these plans.
- ☞ **Digital** – The plans in this option are for an online lab science, one-credit *Physical Science* course. There are textbook assignments, online labs, and written work with these plans. Expect to take about four to five hours a week to complete these plans.

Each of the scheduling pages will note at the top which course the plans are for. These schedules for these courses are suggestions; please check with your local oversight contact to make sure that you are meeting your state's graduation requirements. Please feel free to tailor this program to your needs.

An Explanation of the Sections

After the scheduling pages, you will find the notes sheets. These sheets are divided into four sections: textbook, experiments, events in science, and hands-on activities.

Textbook

For this study, we have chosen to use a widely available, standard textbook, *CK-12 Physical Science*. You can download this text as a PDF from the resource page above. You will complete the reading assignment and then answer several of the questions from the text. These answers should be added to the reading section of the science notebook. You will also define several of the key terms from the chapter. The definitions should be added to the glossary section of the science notebook.


Experiment

All the hands-on experiments are in this guide. You will need to have a composition book to record what you do, see, and discover in these experiments. With each of these experiments, you will find the materials, a bit of pre-reading, the procedure, an explanation with the results, and

science notebook assignments. If needed, the answers to these assignments will be at the end of the unit materials.

Online Lab

We have also incorporated an optional online lab into the online course. These digital labs are available through Beyond Labz. You can visit the resource page for this program for directions on how to sign up and use these labs or visit their website directly at:

 <https://www.beyondlabz.com/>

Events in Science





This section is designed to familiarize you with current events in science as you research on the internet for the various topics. We have included an article on p. 9 to explain this option in more depth.

Hands-on Activities

We have also included optional hands-on activities for each week.

The Science Notebook

This year, you will create a science notebook. Each notebook should contain the following sections:

-  **Reading** – This section of the notebook will contain any notes you have taken along with the answers to the questions that were assigned each week.
-  **Lab** – This section of the notebook will house the notes from the experiments you have done along with any other materials relating to the labs.
-  **Events** – This section of the notebook will include the current events article summaries you have done.
-  **Glossary** – This section of the notebook will have the definitions for the assigned vocabulary words.

This notebook can be a composition book divided into the required sections or a three-ring binder with dividers for each section.

Final Thoughts

As the authors and publishers of this curriculum, we encourage you to contact us with any questions or problems that you might have concerning *Physical Science* at support@elementalscience.com. We will be more than happy to answer you as soon as we are able. We trust that you and your facilitator will enjoy *Physical Science*.

Adding Current Events into Your Science Studies

Step 1 - Choose the article.

The first step is to choose an appropriate article. Usually, I try to pick one from the field of science that we are studying. You can subscribe to a science magazine, do a Google search, or check out Science News for Students to find possible articles. Once you have collected a list of options, peruse through them, and pick one that you find interesting.

Step 2 - Read the article.

The next step is to read the actual article.

Step 3 - Discuss the article.

The third step is to discuss the article you read. Ideally, your facilitator would ask you the following questions:

- ☛ What was the article about?
- ☛ What do you think about [a piece of research or an experiment that the article pointed out]?
- ☛ How does the article relate to [something that we have studied on the subject]?
- ☛ Did you find the article to be interesting?
- ☛ Do you agree with the opinion(s) stated in the article?

If your facilitator is not free to discuss the article, answer the above questions on paper.

Step 4 - Write a summary.


The final step to adding current events to your science studies is to write a summary. Once you finish the discussion, write three to five sentences on the article, including your opinion on it. You can use the template on p. 187 as a guide.

A Note to the Facilitator

This guide is written to your students. The idea is that they will work through the materials largely on their own with you being there to help facilitate the class and help them with any questions they may have.

Teacher Edition



There is not a separate teacher guide for *Physical Science*, but you can download a “teacher edition” of the textbook from the resource page for this program:

 <https://elementalscience.com/blogs/resources/ps>

Grading and Credits

The two options in this guide meet the requirements for a full credit of middle school physical science. (**Note**—*You might be able to use this course for high school, but please check with your local oversight group to determine how to award credit.*)

Each week, the students will answer lab and textbook questions, write about events in science, and define vocabulary that can count toward a classwork grade for the course. For the exam grade, the CK-12 textbook for this course has unit tests available for free in the quizzes and tests packet. We suggest you use the following percentages to come up with a final grade for the course:

-  Class work: 70%
-  Exam: 30%

We have scheduled the unit tests in the guide. You can use the quizzes at the end of each section as review, or you can count these toward the exam grade as well. A grading rubric for the Scientist Biography Report, which is assigned in Unit 1, can be found on p. 185 in the Appendix.

Physical Science

Unit 1 - Matter

Unit 1 - Overview of Study

Topics Covered

- ‡ Week 1: What Is Science?
- ‡ Week 2: Scientific Research, Part 1
- ‡ Week 3: Scientific Research, Part 2
- ‡ Week 4: Matter
- ‡ Week 5: States of Matter
- ‡ Week 6: Atoms
- ‡ Week 7: The Periodic Table

Supplies Needed (for the Hands-on Course)

Week	Experiment	Optional Activity
1	<i>Scientist Study – no supplies needed</i>	Heavy cream, Milk, Sugar, Vanilla, Crushed ice, 1 Small & 1 Large zip-locking, plastic bag, Dish towel or Oven mitt, Rock salt
2	<i>Scientist Study – no supplies needed</i>	<i>No supplies needed</i>
3	<i>Scientist Study – no supplies needed</i>	Box of toothpicks, Plate, Bowl, Gum-drops
4	4 clear cups, Eye dropper, Table salt, Food coloring, Water	Tall glass, Honey, Corn syrup, Dish soap, Water, Vegetable oil, Rubbing alcohol, Lamp oil
5	Cup, Ice cubes, Pot, Thermometer	Dry ice, Plastic cups, Water, Dish soap
6	<i>Elemental Profile – no supplies needed</i>	Pipe cleaners, Pom-pom balls, Glue
7	Periodic Table Match-up Game Templates (<i>Free download from Elemental Science.</i>)	<i>No supplies needed</i>

Week 1 Notes - What Is Science?

Textbook Assignments

Reading

 *CK-12 Physical Science* Sections 1.1, 1.2

Written

After you finish reading, answer questions #1–3, 5, 7 in section 1.1 and questions #1, 3, 5 in section 1.2. File your work in the reading section of your science notebook. Then define the following terms in the glossary section of your science notebook:


- | | |
|-------------------------------------------|--------------------------------------------|
| <input type="checkbox"/> Chemistry | <input type="checkbox"/> Science |
| <input type="checkbox"/> Induction | <input type="checkbox"/> Scientific law |
| <input type="checkbox"/> Physical science | <input type="checkbox"/> Scientific theory |
| <input type="checkbox"/> Physics | |

Scientist Study

Purpose


The purpose of the scientist study is to learn more about the people who have shaped the field of science. This project will be completed over the next three weeks. For this week, you will complete steps one and two.

Step 1: Choose a Scientist

 This week, you need to begin your scientist biography project by choosing which scientist you will research. You can choose one of the scientists mentioned in the textbook or you can choose one that has interested you. Here is a list of famous chemists for more options:

 <http://chemistry.about.com/od/historyofchemistry/a/famouschemists.htm>

Step 2: Research the Scientist

 Once you have chosen the scientist you would like to study, you can begin your research. Begin by looking for a biography on your chosen scientist at the library. Then look for articles on the scientist in magazines, newspapers, encyclopedias, or on the internet. You will need to know the following about your scientist to write your report:

- Biographical information on the scientist (e.g., where they were born, their parents, siblings, how they grew up);
- The scientist's education (e.g., where they went to school, what kind of student they were, what they studied);
- Their scientific contributions (e.g., research that they participated in, any significant discoveries they made, the state of the world at the time of their contributions).

As you read over the material you have gathered, be sure to write down any facts you glean in your own words. You can do this on the sheet below or on separate index cards. You will have two weeks to complete your research, so plan accordingly. You

can read more about this method by clicking on the link below:

 <http://elementalblogging.com/the-index-card-system/>

Online Lab

☞ There is no online lab scheduled for this week.

Events in Science

Current Events

- 🕒 Find a current events article related to the field of chemistry, and complete the article summary sheet found on p. 187 of the Appendix. Once you are done, add the sheet to the events section of your science notebook.

Hands-on Activity

Optional Hands-on

- ✂ Use a bit of chemistry to make ice cream! You will need heavy cream, milk, sugar, vanilla, crushed ice, one small and one large zip-locking, plastic bag, a dish towel or oven mitt, and rock salt. Mix together the $\frac{1}{2}$ cup cream (120 mL), 1 cup milk (240 mL), $\frac{1}{2}$ cup sugar (225 g) and 1 tsp vanilla (5 mL) in the small zip-locking plastic bag. Then add the crushed ice and rock salt to the large zip-locking plastic bag. (**Note**—*Make sure that the air is removed from both bags and they are sealed tightly.*) Place the smaller bag with the cream mixture inside the larger bag with the ice. Cover the outside of the bag with the dish towel (or put on the oven mitt) and massage or shake the bag until the cream mixture has frozen. It should take about five to ten minutes. Take the smaller bag out of the larger bag, wipe off the salt water, open, eat and enjoy!
 - **Troubleshooting Tips:** Use thick plastic bags so that there is less risk of one of the bags being punctured by the ice or salt. If you can't find rock salt, you can use regular table salt instead, but be aware that it may take longer for the cream mixture to freeze.

Week 1		Unit 1 (Hands-on Course)			4-Day
Weekly Topic					
→ This week will be an introduction to science.					
	Day 1	Day 2	Day 3	Day 4	
Textbook and Experiment	<input type="checkbox"/> Read <i>CK-12 Physical Science</i> Section 1.1.	<input type="checkbox"/> Read <i>CK-12 Physical Science</i> Section 1.2.	<input type="checkbox"/> Do the optional hands-on science activity.		
Writing	<input type="checkbox"/> Add the vocabulary to the glossary section of your science notebook.	<input type="checkbox"/> Answer the assigned questions in the reading section of your science notebook.	<input type="checkbox"/> Complete Step 1 of the Scientist Study.	<input type="checkbox"/> Start Step 2 of the Scientist Study. <input type="checkbox"/> Complete the Events in Science assignment.	
Supplies Needed					
<input checked="" type="checkbox"/> (<i>Optional</i>) Heavy cream, Milk, Sugar, Vanilla, Crushed ice, 1 Small & 1 Large zip-locking, plastic bag, Dish towel or oven mitt, Rock salt					
Other Notes					

Week 1	Unit 1 (Digital Course)			3-Day
Weekly Topic				
→ This week will be an introduction to science.				
	Day 1	Day 2	Day 3	
Textbook and Experiment	<input type="checkbox"/> Read <i>CK-12 Physical Science</i> Section 1.1.	<input type="checkbox"/> Read <i>CK-12 Physical Science</i> Section 1.2.	<input type="checkbox"/> (<i>Optional</i>) Do the hands-on science activity.	
Writing	<input type="checkbox"/> Add the vocabulary to the glossary section of your science notebook.	<input type="checkbox"/> Answer the assigned questions in the reading section of your science notebook.	<input type="checkbox"/> Complete Step 1 and start Step 2 of the Scientist Study. <input type="checkbox"/> Complete the Events in Science assignment.	
Other Notes				

Week 2 Notes - Scientific Research, Part 1

Textbook Assignments

Reading

 CK-12 *Physical Science* Sections 2.1, 2.2


Written

After you finish reading, answer questions #1–4 in section 2.1 and questions #1–5 in section 2.2. File your work in the reading section of your science notebook. Then define the following terms in the glossary section of your science notebook:

- | | |
|-----------------------------------------------|----------------------------------------------|
| <input type="checkbox"/> Accuracy | <input type="checkbox"/> Observation |
| <input type="checkbox"/> Control | <input type="checkbox"/> Precision |
| <input type="checkbox"/> Ethics | <input type="checkbox"/> Range |
| <input type="checkbox"/> Hypothesis | <input type="checkbox"/> Replication |
| <input type="checkbox"/> Kelvin Scale | <input type="checkbox"/> Responding Variable |
| <input type="checkbox"/> Manipulated Variable | <input type="checkbox"/> Scientific Notation |
| <input type="checkbox"/> Mean | <input type="checkbox"/> SI |
| <input type="checkbox"/> Model | <input type="checkbox"/> Significant Figures |

Scientist Study


Step 2: Research the Scientist

 This week, you need to wrap up the research you have done on your scientist. Read over your notes and make sure that you have at least five pieces of information for each of the categories below:

- Biographical information on the scientist (e.g., where they were born, their parents, siblings, how they grew up);
- The scientist's education (e.g., where they went to school, what kind of student they were, what they studied);
- Their scientific contributions (e.g., research that they participated in, any significant discoveries they made, the state of the world at the time of their contributions).

Also, make sure that the recorded list of the resources you have used is complete.

Step 3: Create an Outline

 Now that your research is completed, you are ready to begin the process of writing a report on your chosen scientist. This week, you are going to organize the notes you took during step two into a formal outline that you will use next week to write the rough draft of your report. Use the outline template provided on the student sheets as a guide. You should include information on why you chose the particular scientist in your introduction section. For the conclusion section of the outline, you need to include why you believe someone else should learn about your chosen scientist and your impression of the scientist (e.g., Did you like the scientist? Do you feel that they made a significant impact on the field of chemistry?).

Online Lab

☞ There is no online lab scheduled for this week.

Events in Science

Current Events

🕒 Find a current events article related to the field of chemistry, and complete the article summary sheet found on p. 187 of the Appendix. Once you are done, add the sheet to the events section of your science notebook.

Hands-on Activity

Optional Hands-on

✂ There is no optional hands-on activity for this week.

Week 2		Unit 1 (Hands-on Course)			4-Day
Weekly Topic					
→ This week will be an introduction to scientific research.					
	Day 1	Day 2	Day 3	Day 4	
Textbook and Experiment	<input type="checkbox"/> Read <i>CK-12 Physical Science</i> Section 2.1.	<input type="checkbox"/> Read <i>CK-12 Physical Science</i> Section 2.2.			
Writing	<input type="checkbox"/> Add the vocabulary to the glossary section of your science notebook.	<input type="checkbox"/> Answer the assigned questions in the reading section of your science notebook.	<input type="checkbox"/> Complete Step 2 of the Scientist Study.	<input type="checkbox"/> Complete Step 3 of the Scientist Study. <input type="checkbox"/> Complete the Events in Science assignment.	
Supplies Needed					
Other Notes					

Week 2	Unit 1 (Digital Course)		3-Day
Weekly Topic			
→ This week will be an introduction to scientific research.			
	Day 1	Day 2	Day 3
Textbook and Experiment	<input type="checkbox"/> Read <i>CK-12 Physical Science</i> Section 2.1.	<input type="checkbox"/> Read <i>CK-12 Physical Science</i> Section 2.2.	
Writing	<input type="checkbox"/> Add the vocabulary to the glossary section of your science notebook.	<input type="checkbox"/> Answer the assigned questions in the reading section of your science notebook.	<input type="checkbox"/> Complete Steps 2 and 3 of the Scientist Study. <input type="checkbox"/> Complete the Events in Science assignment.
Other Notes			

Week 3 Notes - Scientific Research, Part 2

Textbook Assignments

Reading

 *CK-12 Physical Science* Section 2.3

Written

After you finish reading, answer questions #1–4 in section 2.3 and file your work in the reading section of your science notebook. Then define the following terms in the glossary section of your science notebook:


Engineer

Technology

Technological Design

Scientist Study

Step 4: Write a Rough Draft

 Last week, you created a formal outline for your scientist biography report; now, it is time to take that outline and turn it into a rough draft. Simply take the points on your outline and combine and add in sentence openers to create a cohesive paragraph. Here's what your rough draft should look like:

Paragraph 1 (from outline point I): introduce the scientist;

Paragraph 2 (from outline point II): tell about the scientist's education;


Paragraph 3–5 (from outline point III): share the scientist's contributions (one paragraph for each contribution); and

Paragraph 6 (from outline point IV): share your thoughts on the scientist and why someone should learn about them.

You can choose to hand write or type up your rough draft on a separate sheet of paper.

However, keep in mind that you will need a typed version for step five.

Step 5: Revise to Create a Final Draft


 Now that you have a typed, double-spaced rough draft, look over it one more time to make any changes you would like. Then have your teacher or one of your peers look over the paper for you to correct any errors and bring clarity to any of the unclear sections. Once this is complete, make the necessary changes to your paper to create your final draft. Print out your final paper, and add it to your science notebook.

Online Lab - Introduction to Scientific Inquiry

Purpose

The purpose of this online lab is to learn about the process of scientific inquiry.

Pre-Reading

 Print and read the section of the workbook for the "Introduction to Scientific Inquiry" online lab.

Procedure

- ✓ Do the lab entitled “Introduction to Scientific Inquiry,” and answer the questions as you work through the online lab.

Science Notebook

- ☞ Add the completed workbook pages that you printed to the science notebook.

Events in Science

Current Events

- 🕒 Find a current events article related to the field of chemistry, and complete the article summary sheet found on p. 187 of the Appendix. Once you are done, add the sheet to the events section of your science notebook.

Hands-on Activity

Optional Hands-on

- ✂ Engineer a gumdrop tower! You will need a box of toothpicks, a plate, a bowl, and gumdrops. Set out the gumdrops in a bowl, the box of toothpicks on the table, and a plate to build on. Then design, test, and build whatever gumdrop tree you can dream up.


Week 3					Unit 1 (Hands-on Course)					4-Day				
Weekly Topic														
→ This week will continue the introduction to scientific research.														
			Day 1			Day 2			Day 3			Day 4		
Textbook and Experiment			<input type="checkbox"/> Read <i>CK-12 Physical Science</i> Section 2.3.						<input type="checkbox"/> Do the optional hands-on science activity.					
Writing			<input type="checkbox"/> Add the vocabulary to the glossary section of your science notebook.			<input type="checkbox"/> Answer the assigned questions in the reading section of your science notebook.			<input type="checkbox"/> Complete Step 4 of the Scientist Study.			<input type="checkbox"/> Complete Step 5 of the Scientist Study. <input type="checkbox"/> Complete the Events in Science assignment.		
Supplies Needed														
✓ <i>(Optional)</i> Box of toothpicks, Plate, Bowl, Gumdrops														
Other Notes														

Week 3	Unit 1 (Digital Course)		3-Day
Weekly Topic			
→ This week will continue the introduction to scientific research.			
	Day 1	Day 2	Day 3
Textbook and Experiment	<ul style="list-style-type: none"> <input type="checkbox"/> Read <i>CK-12 Physical Science</i> Section 2.3. 	<ul style="list-style-type: none"> <input type="checkbox"/> Do the online lab “Introduction to Scientific Inquiry.” 	<ul style="list-style-type: none"> <input type="checkbox"/> (<i>Optional</i>) Do the hands-on science activity.
Writing	<ul style="list-style-type: none"> <input type="checkbox"/> Add the vocabulary to the glossary section of your science notebook. 	<ul style="list-style-type: none"> <input type="checkbox"/> Answer the assigned questions in the reading section of your science notebook. 	<ul style="list-style-type: none"> <input type="checkbox"/> Complete Steps 4 and 5 of the Scientist Study. <input type="checkbox"/> Complete the Events in Science assignment.
Other Notes			

Week 4 Notes - Matter

Textbook Assignments

Reading

 CK-12 *Physical Science* Sections 3.1, 3.2, 3.3

Written

After you finish reading, answer questions #1–5 in section 3.1, questions #2–6 in section 3.2, and questions #2–6 in section 3.3. File your work in the reading section of your science notebook. Then define the following terms in the glossary section of your science notebook:


- | | |
|------------------------------------------------------|------------------------------------------|
| <input type="checkbox"/> Chemical Change | <input type="checkbox"/> Mixture |
| <input type="checkbox"/> Chemical Property | <input type="checkbox"/> Physical Change |
| <input type="checkbox"/> Colloid | <input type="checkbox"/> Reactivity |
| <input type="checkbox"/> Crystal | <input type="checkbox"/> Suspension |
| <input type="checkbox"/> Density | <input type="checkbox"/> Volume |
| <input type="checkbox"/> Law of Conservation of Mass | |

Experiment - How does the addition of salt affect the density of water?

Materials

- | | |
|----------------|-----------------|
| ✓ 4 clear cups | ✓ Food coloring |
| ✓ Eye dropper | ✓ Water |
| ✓ Table salt | |

Pre-Reading

 Density is a property of matter that relates mass and volume. Mass tells you how much matter is in something, whereas volume tells you how much space something occupies. In other words, density measures how much matter of a particular substance will occupy a given space. When comparing two different solutions, a denser solution will sink to the bottom while a less dense solution will float to the top. In this week's experiment, you are going to use the principle of density to see how salt affects the density of water.

Procedure

1. Read the introduction to this experiment and make a hypothesis. Then prepare your solutions according to the directions below.
 - ↳ Begin by putting 1 cup (240 mL) of room temperature water into each of the 4 bowls.
 - ↳ For the yellow solution, add 10 drops of yellow food coloring to one of the bowls.
 - ↳ For the red solution, add 10 drops of red food coloring and 2 tbsp (34.2 g) of salt to another bowl.
 - ↳ For the blue solution, add 10 drops of blue food coloring and $\frac{1}{4}$ cup (68.4 g) of salt to another bowl.
 - ↳ For the green solution, add 10 drops of green food coloring and 6 tbsp (102.6 g) of salt to the last bowl.

1. Stir each one to make sure that the salt is thoroughly dissolved.
2. Label each of your cups #1–4. Fill cup #1 with 1 cup (240 mL) of the yellow solution, cup #2 with 1 cup (240 mL) of the red solution, cup #3 with 1 cup (240 mL) of the blue solution, and cup #4 with 1 cup (240 mL) of the green solution.
3. Using an eye dropper, draw up about 1–2 tsp (5–10 mL) of the yellow solution and **very slowly** add it to the cup #2. (**Note**—*When you add the yellow solution, you need to make sure the tip of your eyedropper is just below the surface of the solution in the cup.*) Wait 1 minute and record your observations.
4. Next, using an eye dropper, draw up about 1–2 tsp (5–10 mL) of the yellow solution and **very slowly** add it to the cup #3. Wait 1 minute, and record your observations.
5. Then, using an eye dropper, draw up about 1–2 tsp (5–10 mL) of the yellow solution and **very slowly** add it to the cup #4. Wait 1 minute, and record your observations.
6. Pour out the solutions from each of the used cups and refill them with 1 cup of each of the colors as before. Repeat steps 3–6 with the red, blue, and green solutions.

Explanation

The addition of salt to the water increases the overall mass of the solution but minimally affects the volume. This means that the density will increase. The more salt you add to the water, the denser the solution will become. This is the reason why you saw that the yellow liquid always floated to the top of each cup, whereas the green liquid always sank to the bottom.

Science Notebook

- ☞ Write down a short description of what you did for the experiment and add a chart with results. After that, calculate the density of the four solutions you made. (See Appendix pp. 188–189 for more information about calculating density.) Finally, add what you have learned from the experiment.

Online Lab - Rutherford's Experiment and the Nucleus

Purpose

The purpose of this online lab is to learn how Rutherford found evidence for the nucleus of the atom.

Pre-Reading

- ☞ Print and read the section of the workbook for the “Rutherford’s Experiment and the Nucleus” online lab.

Procedure

- ✓ Do the lab entitled “Rutherford’s Experiment and the Nucleus,” and answer the questions as you work through the online lab.

Science Notebook

- ☞ Add the completed workbook pages that you printed to the science notebook.

Events in Science

Current Events

- ⊕ Find a current events article related to the field of chemistry, and complete the article summary sheet found on p. 187 of the Appendix. Once you are done, add the sheet to the events section of your science notebook.

Hands-on Activity

Optional Hands-on

- ✂ Make a density column. You will need $\frac{1}{2}$ cup (240 mL) of honey, corn syrup, dish soap, water, vegetable oil, rubbing alcohol, and lamp oil. Add a different shade of food coloring to each of the liquids except the honey and vegetable oil. (**Note**—*If your dish soap is already colored, you do not need to add a color to that.*) Next, pour the honey into a cylindrical container. Then slowly add the corn syrup on top. You want to pour the liquid slowly down the side of the container to minimize the bubbles and give you the best results. Follow with the dish soap, water, vegetable oil, alcohol, and finally the lamp oil. You should have seven separate liquid layers on top of each other. Each layer has the same volume but different densities.

Week 4		Unit 1 (Hands-on Course)			4-Day
Weekly Topic					
→ This week will begin a look at matter.					
	Day 1	Day 2	Day 3	Day 4	
Textbook and Experiment	<input type="checkbox"/> Read <i>CK-12 Physical Science</i> Section 3.1 and 3.2.	<input type="checkbox"/> Read <i>CK-12 Physical Science</i> Section 3.3.	<input type="checkbox"/> Do the experiment "How does the addition of salt affect the density of water?"	<input type="checkbox"/> Do the optional hands-on science activity.	
Writing	<input type="checkbox"/> Add the vocabulary to the glossary section of your science notebook.	<input type="checkbox"/> Answer the assigned questions in the reading section of your science notebook.	<input type="checkbox"/> Record what you have done in the lab section of your science notebook.	<input type="checkbox"/> Complete the Events in Science assignment.	
Supplies Needed					
<input checked="" type="checkbox"/> Experiment – 4 clear cups, Eye dropper, Table salt, Food coloring, Water <input checked="" type="checkbox"/> (<i>Optional</i>) Tall glass, Honey, Corn syrup, Dish soap, Water, Vegetable oil, Rubbing alcohol, Lamp oil					
Other Notes					

Week 4	Unit 1 (Digital Course)		3-Day
Weekly Topic			
→ This week will begin a look at matter.			
	Day 1	Day 2	Day 3
Textbook and Experiment	<input type="checkbox"/> Read <i>CK-12 Physical Science</i> Section 3.1 and 3.2.	<input type="checkbox"/> Read <i>CK-12 Physical Science</i> Section 3.3.	<input type="checkbox"/> Do the online lab “Rutherford’s Experiment and the Nucleus.” <input type="checkbox"/> (<i>Optional</i>) Do the hands-on science activity.
Writing	<input type="checkbox"/> Add the vocabulary to the glossary section of your science notebook.	<input type="checkbox"/> Answer the assigned questions in the reading section of your science notebook.	<input type="checkbox"/> Record what you have done in the lab section of your science notebook. <input type="checkbox"/> Complete the Events in Science assignment.
Other Notes			