

MODULE 1

THE HISTORY OF SCIENCE— SEARCH FOR THE TRUTH

NOTETAKING

Remember, taking notes are a way to help you learn the new information you will read. There are no right answers; as you read each day, write your notes in your own words by responding to the prompts given.



WHAT TO DO

Week 1, Day 1

Read pages 1 to the top of page 5 in the text, *Exploring Creation with General Science 3rd Ed*. You will be reading section, The Earliest Science: Ancient Times–600 BC, and subsections, Egypt and Other Cultures. As you read, keep this notebook open to these pages and complete the tasks on the following checklist (check them off as you complete them).

- Write the definitions** to the vocabulary words you find to help you memorize them (they are in bold, blue font).
- Write a sentence or two** summarizing what you learned in each section under the appropriate section heading.
- Answer** the On Your Own question 1.1.
- Begin** your History of Science Timeline.
- Check off** Day 1 on your Daily Schedule in the front of this notebook.

THE EARLIEST SCIENCE: ANCIENT TIMES–600 BC, EGYPT, & OTHER CULTURES

VOCABULARY

Science—

Papyrus—



In the spaces provided, write a sentence or two summarizing what you learned as you read each of the sections. While you could copy the materials in the textbook, it is better if you put what you learned into your own words.

Introduction**The Earliest Science: Ancient Times–600 BC: Egypt**

(Make sure you include a couple sentences about Imhotep and what he is known for.)

The Earliest Science: Ancient Times–600 BC: Other Cultures

1.1 ON YOUR OWN

Although the ancient Egyptians had reasonably advanced medical practices for their times, and although there were many inventions that revolutionized life in the ancient world, most historians of science do not think of Egyptian doctors as scientists. Why? (Hint: Look at the entire definition of science.)

Check this box once you've checked your answer.



HISTORY OF SCIENCE TIMELINE INSTRUCTIONS

As you read through the rest of this module, you will be introduced to many important scientists and you will learn about what contributions they made to science. As you read about them, you'll make a timeline. Today you will get your timeline ready so it will be easy to use it during the rest of the module.

Remove the timeline pages (pages 51–56) in this notebook. Cut off the dashed line on page 51, cutting just to the right of it. Tape or paste it to the right side of page 49, hiding the dashed line. Next match the dotted line on the left side of page 53 with the dotted line on the right side of page 51 and cut and paste as before. Finally, match the wavy line on page 55 with the wavy line on page 53. Again, cut and paste as before. You now have a complete timeline that can be folded to fit into your notebook.

As you study the important people in the history of science over the next week or two, look up each of them on the Internet (a good place to start is the Book Extras website at apologia.com/bookextras) and learn 2 to 3 interesting facts about them that you didn't know before. Find, print, and paste a picture of the scientist on the timeline at the right year (or as close as you can get). Then write the three interesting facts underneath the picture. Imhotep, who you met in today's reading, has been done for you as an example.

Once you have completed preparing your timeline, you have finished for today. Don't forget to check off today on your daily schedule!



WHAT TO DO

Week 1, Day 2

Read pages 5–10 in the text. As you read, complete the tasks on the following checklist (check them off as you complete them).

- Use the graphic organizer** to take notes on the scientists you will learn about in the section, True Science Begins to Emerge: 600 BC–AD 500, and subsections: Three Greek Scientists, Two More Greek Scientists, and Hypothesis.
- Read** through Experiment 1.1 (you will conduct it tomorrow).
- Check off** this day on the Daily Schedule in the front of this notebook.

TRUE SCIENCE BEGINS TO EMERGE: 600 BC–AD 500, THREE GREEK SCIENTISTS, TWO MORE GREEK SCIENTISTS, & HYPOTHESIS



Use the graphic organizer to take notes on the scientists you will learn about on pages 5–10. As you read about each scientist, put his name on the line (their name will be in blue letters). Then in the space under the line, write a sentence or two about what made each scientist important. The first one has been done for you. Don't forget to add them to your timeline when you are finished. Also, in the space below, write down any questions or thoughts you have as you're reading. You might want to include a sentence or two on how to state a good hypothesis.

True Science
Begins to
Emerge: 600
BC—AD 500

Imhotep (c 2650 BC)

Imhotep was a well-known doctor in Egypt. He had a lot of medical knowledge and ability to heal. Many people traveled far distances to see him.



WHAT TO DO

Week 1, Day 3

Re-read pages 6–10 as they relate to Experiment 1.1 in the text. As you read, complete the tasks on the following checklist (check them off as you complete them).

- Gather your supplies** for Experiment 1.1.
- Complete Experiment 1.1** (turn to the lab report form in the lab section of this notebook).
- Investigate** the Explore More.
- Check off** this day on the Daily Schedule in the front of this notebook.



Turn to the lab report form for Experiment 1.1 on page 409 of this student notebook. Read through the whole experiment to see what you should do and gather your materials. Now read through the experiment again, completing each step as instructed. As you complete each step, record your information on your lab report form. Then complete the Explore More activity and record your data.



EXPLORE MORE

Draw what happened when you put food coloring into hot and cold water. Then write a sentence explaining why it happened.



Hot Water



Cold Water

Summary:



WHAT TO DO

Week 1, Day 4

Read pages 10–14 in the text. As you read, complete the tasks on the following checklist (check them off as you complete them).

- Write the definitions** to the vocabulary words you find to help you memorize them.
- Use the graphic organizers to **take notes** on the scientists you will learn about in the subsections: Even More Greek Scientists and the section: Science Progress Stalls and Then Gets Moving Again: AD 500–1500 with subsection, Alchemy.
- Answer** the On Your Own questions.
- Complete Experiment 1.2** (turn to the lab section of this notebook for a lab report).
- Check off** this day on the Daily Schedule in the front of this notebook.

EVEN MORE GREEK SCIENTISTS



As you read pages 10–12, the Even More Greek Scientists section, fill out the chart below with at least 2 things you learned about the scientists you meet. Add them to your timeline. Then summarize what the geocentric system is, and finally complete On Your Own questions 1.2 and 1.3.

VOCABULARY

Spontaneous generation—

More Scientists from 600 BC–AD 500		
Name	When did he live?	What did he do?
Aristotle	384–322 BC	1. Known as the father of life sciences because he studied living things. 2. He incorrectly believed in spontaneous generation.

More Scientists from 600 BC–AD 500		
Name	When did he live?	What did he do?
Archimedes		
Ptolemy		



Summarize the geocentric system by completing the following sentences.

The geocentric system is a view of the stars and planets in which _____ is at the center. This incorrect idea lasted so long, even though there was evidence against it, because _____ was such a great and respected scientist and because it fit many scientists' _____ notions of how things ought to be.

1.2 ON YOUR OWN

Based on your results in Experiment 1.1, what do you think about the density of popcorn kernels? Are they more or less dense than the lead sinker and the Ping-Pong ball?



1.3 ON YOUR OWN

Albert Einstein is one of the most well-known scientists in recent history (we'll talk more about him later in this module). Though he received the 1921 Nobel Prize for his contributions to theoretical physics, he also had some ideas that were incorrect. Einstein believed that nuclear power could never be a good source of usable energy. Yet his own groundbreaking equation, $E = mc^2$, is at the heart of over 400 nuclear power stations today, providing a major source of worldwide non-carbon-based energy. What do you think would have happened if scientists decided not to explore nuclear energy because Einstein, a brilliant scientist, said it wasn't worth exploring?

**SCIENCE PROGRESS STALLS AND THEN GETS MOVING AGAIN: AD 500–1500 & ALCHEMY**

Start this section by reading page 12 through the first 2 paragraphs of page 14 and conducting Experiment 1.2. Use the lab report form in the lab section of this notebook to record your data.

Summarize what you learn about alchemy while reading the rest of page 14 by filling in the blanks below.

Alchemists tried to find a way to transform _____ into _____.

They tried to do this because they saw that when two different substances were exposed to each other, they _____ into other substances.

We now know that what the alchemists tried to do will not work. But one thing they did was very good. What was that? _____

What are the two lessons we can learn from this time period?

Lesson 1: _____

Lesson 2: _____

Thoughts on my first week of General Science



WHAT TO DO

Week 2, Day 1

Read pages 14–16 in the text. As you read, complete the tasks on the following checklist (check them off as you complete them).

- Take notes** while reading subsections: Other Medieval Cultures & End of the Dark Ages.
- Use the graphic organizer to **take notes** on the scientists you will learn about.
- Answer** the On Your Own questions.
- Check off** this day on the Daily Schedule in the front of this notebook.

OTHER MEDIEVAL CULTURES & END OF THE DARK AGES



As you read pages 14–16, summarize the sections by answering the questions and filling out the chart with what you learned about the scientists you meet. Add them to your timeline. Finally, complete On Your Own questions 1.4–1.6.

Other Medieval Cultures

What were the Arabs and Chinese doing during the time period of AD 500–1000?

What did they do that allowed future scientists to use their work?

End of the Dark Ages: Scientists from AD 1000–1500		
Name	When did he live?	What did he do?
Robert Grosseteste		
Roger Bacon		
Thomas Bradwardine		
Nicolas of Cusa		

1.4 ON YOUR OWN

Explain why it is important to document scientific data.



1.5

ON YOUR OWN

Some people believe that science and Christianity are at odds with one another. That idea has developed because in recent years, many scientists are not Christian. Explain how a Christian worldview is, in fact, one of the reasons science got out of the Dark Ages.





WHAT TO DO

Week 2, Day 2

Read pages 17–18 in the text. As you read complete the tasks on the following checklist (check them off as you complete them).

- Use the graphic organizer to **take notes** on the scientists you will learn about in the section: The Renaissance: The “Golden Age” of Science: AD 1500–1660.
- Answer** the On Your Own question.
- Investigate** the Explore More activity.
- Check off** this day on the Daily Schedule in the front of this notebook.

THE RENAISSANCE: THE “GOLDEN AGE” OF SCIENCE: AD 1500–1660

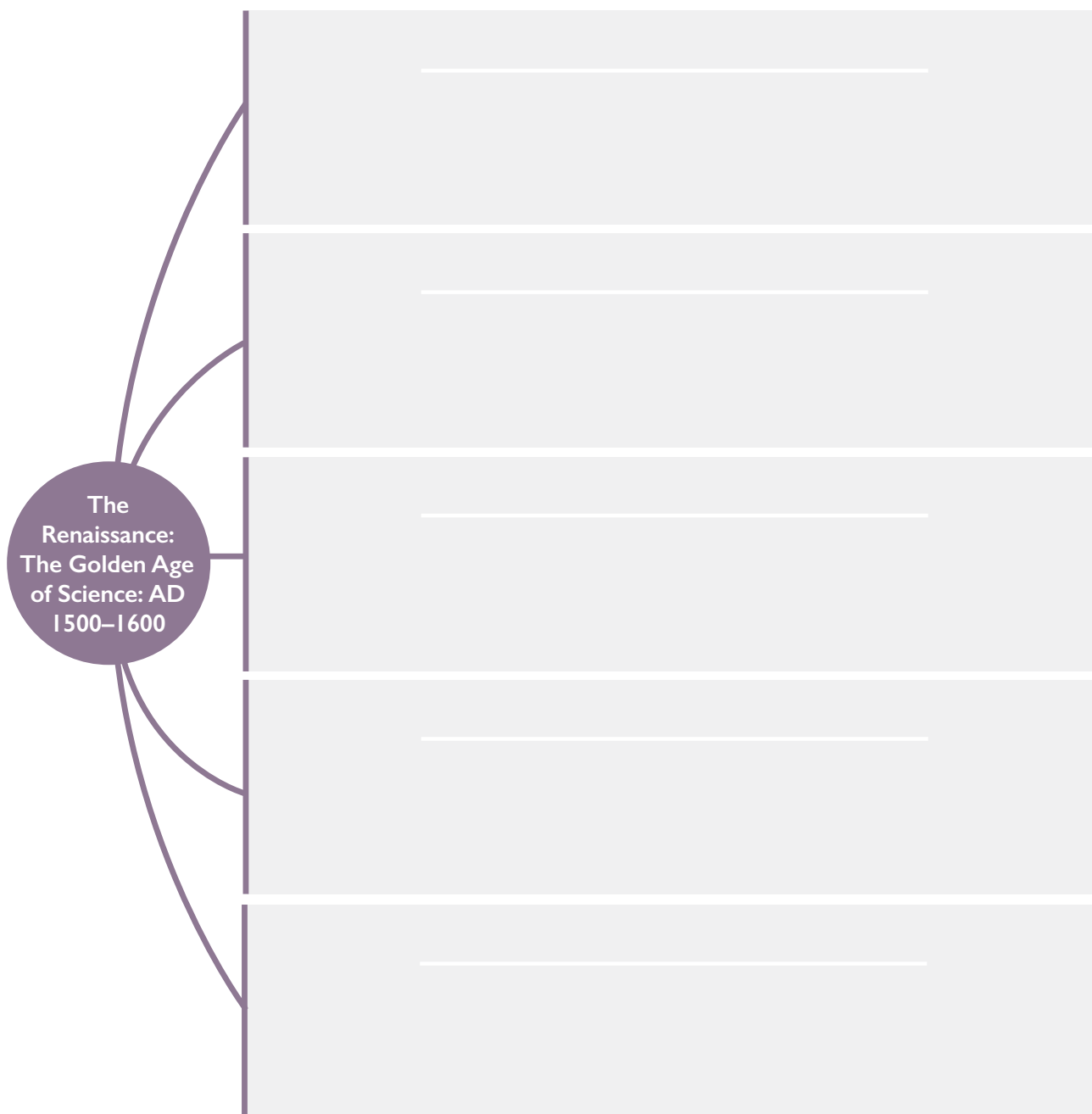


Use the graphic organizer on the next page to take notes on the scientists you will learn about on pages 17–18. As you read about each scientist, put his name on the line (their name will be in blue letters). Then in the space under the line, write a sentence or two about what made each scientist important. Don't forget to add them to your timeline when you are finished. Then answer On Your Own question 1.6. Finally complete the Explore More activity on page 19 of your text.

1.6 ON YOUR OWN

Galileo is often incorrectly credited with the invention of the telescope. Look back in this section to see exactly what his contribution to the telescope was. Explain how this is an example of the importance of documenting scientific data and sharing it with other scientists.



**EXPLORE MORE**

Write a sentence explaining what happened and how it relates to air pressure.

Summary:



WHAT TO DO

Week 2, Day 3

Read pages 19–22 in the text. As you read the sections: The Era of Newton: AD 1660–1735 & The “Enlightenment” and the Industrial Revolution: AD 1735–1820 complete the tasks on the following checklist (check them off as you complete them).

- Use the graphic organizers to **take notes** on the scientists you will learn about as you read.
- Answer** the On Your Own questions.
- Complete** the Explore More activity.
- Check off** this day on the Daily Schedule in the front of this notebook.

THE ERA OF NEWTON: AD 1660–1735



As you read pages 19–20, write two things you learn about each scientist on the chart. Add these men to your timeline. Then complete On Your Own questions 1.7.



Sir Isaac Newton

1.

2.

Robert Boyle

1.

2.



Antoni van Leeuwenhoek

1.

2.

1.7 ON YOUR OWN

Some students think learning mathematics is difficult. In order to teach science to such students, there are many science textbooks written today that do not use mathematics at all. What do you think Newton would say about such textbooks?

**THE “ENLIGHTENMENT” AND THE INDUSTRIAL REVOLUTION:
AD 1735–1820**

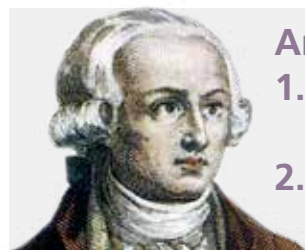
As you read pages 20–22, summarize what you learn about the terms “Enlightenment” and Industrial Revolution in the spaces indicated. Write two things you learn about each scientist you read about on the chart provided. Remember to add them to your timeline. Finally, complete the Explore More activity.

Summarize what the term “Enlightenment” describes. Why is it in quotation marks?

Carolus Linnaeus

1.

2.



Antoine-Laurent de Lavoisier

1.

2.

John Dalton

1.

2.



Summarize why this time period was also known as the Industrial Revolution.

Blank area for summarizing the Industrial Revolution.



EXPLORE MORE

Take a picture of your mechanical hand and print it out. Paste it here.



WHAT TO DO

Week 2, Day 4

Read pages 22–26 in the text. As you read, complete the tasks on the following checklist (check them off as you complete them).

- Use the graphic organizer to **take notes** on the scientists you will learn about as you read sections: The Rest of the 19th Century: AD 1820–1900 and Modern Science: AD 1900–Present.
- Answer** the On Your Own questions.
- Complete** the Explore More activity.
- Check off** this day on the Daily Schedule in the front of this notebook.

THE REST OF THE 19TH CENTURY: AD 1820–1900



As you read pages 22–24, write some facts you learn about each scientist on the chart. Don't forget to add them to your timeline. Then answer On Your Own question 1.8.



Charles Darwin

1.

2.

Louis Pasteur

1.

2.



Gregor Mendel

1.

2.

**Michael Faraday**

- 1.
- 2.

James Clerk Maxwell

- 1.
- 2.

**James Joule**

- 1.
- 2.

1.8 ON YOUR OWN

In this section, you learned about Louis Pasteur, whose experiments dealt a final blow to the idea of spontaneous generation. Today, all scientists agree that spontaneous generation cannot occur. Explain how that fact is a problem for Darwin's idea that life came to be on earth without God creating it.



MODERN SCIENCE: AD 1900–PRESENT



As you read pages 24–26, complete the chart with what you learn about each scientist. Don't forget to add them to your timeline. Then write down the major points you learned in this module (from the *Summing Up* section).

Modern Science: Scientists of AD 1900–Present		
Name	When did he live?	What did he do?
Max Planck		
Albert Einstein		
Neils Bohr		

Summarize the 3 major points you learned in this module.

1.

2.

3.



WHAT TO DO

Week 3, Day 1

Now that you've read the module, taken notes, and completed all the On Your Own questions, it's time to study! To do that, begin by completing the checklist below.

- Prepare for the exam** by reviewing your notebook pages. What does this mean? Well, take some time to look over all that you have learned so far.
- Answer** the Study Guide questions - it works best if you try to do this without "looking back" at your notes and textbook. When you are done, you can use your text and notes to fill in any answers you did not know.
- Check** your answers (or have your parent check your answers) with the *Solutions and Tests Manual*.
- Check off** this day on the Daily Schedule in the front of this notebook.
- Before you start the study process, you might want to take a moment and **think about** all that you've learned in this module. Do you view the world differently than you did before reading it? *If you like*, **write down** your thoughts and questions on the Creation Connections page.

CREATION CONNECTION

Write down any thoughts or questions that may be sparked after reading this section.

STUDY GUIDE FOR MODULE I

This guide will help you better understand the key information addressed in the module. It is also exactly what it is titled: A *guide* to help you *study*. Don't worry...it is not graded, but it IS a great way to see how much you remember and review more challenging information. To complete this study guide, first go through the questions and answer them as best you can. You can even make an educated guess. Then, go back through the module and your notes to find the answers to any questions you didn't remember. Once it is completed, check your answers with the answer key in the *Solutions Manual*. Now you have a great source from which to study!

1 Match the following words with their definitions by drawing a line to the correct definition.

Science

An ancient form of paper, made from a plant of the same name

Papyrus

The idea that living organisms can be spontaneously formed from nonliving substances

Spontaneous generation

The systematic study of the natural world through observation and experimentation in order to formulate general laws

2 The Egyptians were not considered scientists, even though they had incredibly advanced medical practices for their time. That is because they used the trial and error method of science. Which of these healing methods did they NOT use on patients?

- Egyptian doctors treated open wounds with moldy bread so the wounds would heal quickly (Penicillin created by the mold killed bacteria).
- Patients were painted with mud to heal them from the common cold (Mud kills bacteria).
- Patients that were experiencing pain would be given poppy seeds to eat (Poppy seeds have morphine and codeine which are pain-relieving drugs).

3 What invention helped Egyptian doctors easily document information, transport it to other scholars, and store it for future generations?

- Horse and carriage
- Clay tablets
- Papyrus

4 Scientists often build on one another's ideas. Anaximenes tried to explain all things in nature as being made of a single substance. Leucippus built on that idea and his student, Democritus, took that idea even further. What idea did Leucippus and Democritus propose (Hint: Think of Democritus on the beach!)?

- a. The beach is a relaxing place to do science.
- b. All matter is composed of atoms.
- c. Sand has a higher density than water.

5 True or False: Isaac Newton championed the idea of spontaneous generation and is responsible for it being believed for so long?

For Questions 6–9, complete the sentence in your own words:

6 The accounts of Aristotle and Ptolemy teach us that a scientist shouldn't hold onto an idea just because _____ or just because a brilliant scientist believes it.

7 The main goal of the alchemists was to turn lead into _____.

8 Science began to progress towards the end of the Dark Ages mainly because the _____ world view began to replace the Roman worldview.

9 During the Enlightenment, a major change in scientific approach took place. A good change was that science began to stop relying on the authority of _____. A bad change was that science began to move away from the authority of _____.

Short Answer:

10 Galileo built an instrument out of a tube with two lenses, based on descriptions he had heard of a military device. This allowed him to collect a lot more data about the heavens. What did he build? Was he the inventor of this device?

11 Charles Darwin had two major impacts on the progress of science when he published his ideas about the origin of species: one negative and one positive. What are they?

12 Louis Pasteur conducted experiments that dealt a final blow to the idea of spontaneous generation, the supposed production of living organisms from nonliving matter. Today, all scientists agree that spontaneous generation cannot occur. Explain how that fact is a problem for Darwin's idea that life came to be on earth without God creating it.

13 Yes or no: Does a scientist's beliefs affect the way he interprets data?



WHAT TO DO

Week 3, Day 2

Complete the following checklist.

- Choose** a general lab report form as a reference to use as you create one formal lab report.
- Take about 20 minutes to **review for the exam** (review your notes in this notebook, and the Study Guide questions).
- Take the exam** (it can be found in the *Solutions and Tests Manual*). Remember for this module you may use your text, notes, and Study Guide questions to help you take the test—if you need it.
- With a parent, **check your test answers** against the answers in the *Solutions and Tests Manual*.
- Go back in the text and **review anything you got wrong** on the test.
- Check off** this day on the Daily Schedule in the front of this notebook.

HISTORY OF SCIENCE TIMELINE

2650 BC



1. Imhotep was an architect who built Egypt's first step pyramid that is still located in Saqqara, Egypt.

2. He is also considered to be the first physician to have used plants for medicine and who was able to treat conditions like appendicitis and arthritis.

3. It is said that Imhotep created or improved the papyrus scroll.

1000 BC

800 BC

600 BC

400 BC

200 BC

c. 4 BC

BIRTH
OF
CHRIST

pre-AD 1100 AD 1100 AD 1200 AD 1300 AD 1400 AD 1500



