

# Lighten Up!

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**OVERVIEW:** Did you know that the sun is not the center of the universe? Did you know that it works really well to let people choose their religion and rulers? Of course you know that! Those are facts that we take for granted in the 21<sup>st</sup> century. Only a few hundred years ago, though, those were controversial statements. In this lesson students will discover the important people of the Enlightenment and Scientific Revolution who forged the way to acceptance of those ideas in western society through the use of video segments and Web sites.

**GRADE LEVELS:** 10<sup>th</sup> grade

**TIME ALLOTMENT:** 2, 90-minute class periods

**SUBJECT MATTER:** Social Studies, Technology, Science, and Politics

## **LEARNING OBJECTIVES:**

- Students will demonstrate knowledge of scientific, political, economic, and religious change during the 16<sup>th</sup>, 17<sup>th</sup>, and 18<sup>th</sup> centuries.
- Students will describe the Scientific Revolution and its effects.
- Students will explain the political, religious, and social ideas of the Enlightenment.

## **STANDARDS**

Virginia Standards for History/Social Studies secondary courses

<http://www.pen.k12.va.us/VDOE/Superintendent/Sols/historysecondary.pdf>

WHII.6 a and d, the Scientific Revolution and Enlightenment

Virginia Standards for Technology by the end of grade twelve

<http://www.pen.k12.va.us/VDOE/Superintendent/Sols/comptec12.pdf>

C/T 12.1, 2, and 4, basic understanding of computer operations, software application, and gathering, processing, and analyzing information

## **MEDIA COMPONENTS**

Video:

- United Streaming <http://www.unitedstreaming.com> video, “The Age of Reason: Europe after the Renaissance” segments titled, “Isaac Newton and the Scientific Revolution” and “Science and the Age of Reason.”

Internet:

- Biography

<http://www.biography.com>

The Biography Channel's site is an excellent source of biographical information on personalities famous in numerous fields.

- A Million Lives

<http://www.amillionlives.com>

This excellent site provides biographical information, organizing people by category.

- New Geneva Center <http://www.newgenevacenter.org/reference/enlightenment.htm>

This history-centered site organizes biographies by time period.

Software:

- Microsoft PowerPoint,
- Windows Media Player

Hardware: desktop computer or laptop computer with Windows 98 or better connected to an LCD projector or television equipped with a presentation device in order to show the United Streaming video.

## **MATERIALS**

For each student:

- one copy of the data gathering sheet for scientists
- one copy of the data gathering sheet for philosophers

For each pair:

- one disk on which to save research materials/notes/pictures
- one computer with PowerPoint and Internet access.

## **PREP FOR TEACHERS**

1. Download the United Streaming <http://www.unitedstreaming.com> video "The Age of Reason: Europe after the Renaissance" to the desktop of the computer or burned onto a disk. Cue the clip, "Isaac Newton and the Scientific Revolution" to 7:33.
2. Connect computer to presentation device.
3. Bookmark Web sites on student computers.
4. Schedule library time for print material research or have the library pull appropriate print materials for classroom/computer lab use.
5. Assign partners for culminating activity.
6. Duplicate handouts.

When using media, provide students with a Focus for Media Interaction, a specific task to complete and/or information to identify during or after viewing segments, Web sites or other multimedia elements.

## INTRODUCTORY ACTIVITY

1. Have the following list on the board or overhead projector when students enter the room:  
A cure to a disease  
Space shuttle mission  
NASCAR race  
The Constitution  
Having your blood pressure taken  
Practicing the Religion of your choice  
Democracy
2. Ask students, “What do the things on the list have in common? Can you see a connection?” Take all suggestions, but tell students “These would not be possible in our lives today without the contributions of the Age of Reason, which includes the scientific advancements of the Scientific Revolution, and the ideological changes of the Enlightenment thinkers.”
3. Tell students, “Today we will look at the new advancements of the Scientific Revolution and how controversial and surprising their discoveries were. One individual who accomplished a great deal was Isaac Newton.” Provide students with a Focus for Media Interaction. “As we view the video clip about him, think about what you have accomplished in the last 18 months, and then jot down as many things as you can about Isaac Newton that he accomplished in an 18 month period.”
4. **Play** (07:33) Audio: “Newton experienced a burst of scientific insight...”  
Visual: Isaac is standing.  
  
**Stop** (09:40) Audio: “...the Age of Reason.”  
Visual: Isaac is standing.

Ask students, “What did you learn? What were some of his accomplishments in that 18 month period?” Generate a discussion of the accomplishments. Correct responses include: working out the basics of a new of a new branch of math called calculus, wrote out a mathematical explanation for all colors of the rainbow being visible in light, a mathematical formula for gravity, describing the physical laws that govern the motion of objects, calculated the mass of sun and planets, predicted the path of comets, developed the scientific method based on observation, generalization, and experimentation.

5. Tell students, “Newton is just one of many scientists who contributed to this period of scientific discovery. We will now use the Internet and library print material to research their lives and contributions to science.”

## LEARNING ACTIVITIES

1. Give each student a data gathering sheet for scientists. Provide students with a Focus for Media Interaction by saying, “Go to one or more of the following Web sites to find out the nation, years of life span, and important scientific achievement/contribution, for the following scientists: Nicholas Copernicus, Johannes Kepler, Galileo Galilei, Isaac Newton, and William Harvey. Use the information you find to fill in your data gathering sheet.” Tell students, “You may use print materials from the library to supplement what you find.”
2. Give students about 30 minutes to complete the task, then ask students to come back together and compare their answers with partners for about five minutes. Then say, “Let’s find out if you found the right information about each scientist.” Go over the answers with students in class as a group. Correct answers include, but are not limited to:
  - Nicolaus Copernicus: (Poland, 1473-1543) Developed heliocentric theory.
  - Johannes Kepler: (Germany, 1571-1630) Discovered planetary motion, that the planets ellipse the sun. He is known as the father of modern astronomy.
  - Galileo Galilei: (Italy, 1564-1642) Used a telescope to support the heliocentric theory.
  - Isaac Newton: (England, 1643-1727) discovered the Laws of Gravity.
  - William Harvey: (England, 1578-1657) Discovered the circulation of blood in humans and animals.
3. Tell students, “As you have learned, the ideas of the scientists changed the way people looked at the world. Not only did people reexamine what they thought they believed about the natural world, but the social world as well. People began to question the right of kings to rule with absolute power and governments to require adherence to certain religious beliefs. Focus for Media Interaction: “As we view this next clip, listen for what people began to question about their governments as faith in the power of reason and science grew.

**Play** (00:18) Audio: “The Age of Reason...”  
Visual: the castle

**Stop** (02:49) Audio: “...made to our civilization.”  
Visual: picture of city

Elicit student responses. Students’ should say that people began to question dogmatic beliefs and authoritarian political systems.

4. Give each student a data gathering sheet for philosophers. Provide students with a Focus for Media Interaction by saying, “Go to one or more of the following Web sites to find out the nation, years of life span, name of book or pamphlet written, and important ideas/contributions for the following philosophers of the Enlightenment: Thomas Hobbes, John Locke, Montesquieu, Jean-Jacques Rousseau, Voltaire and Thomas Jefferson. Use the information you find to fill in your data gathering sheet.” Tell students, “You may use print materials from the library to supplement what you find.”
5. Give students about 30 minutes to complete the task, then ask students to come back together and compare their answers with partners for about five minutes. Then say, “Let’s see if you found the right information about the philosophers.” Go over the answers with students in class as a group. Correct answers include, but are not limited to:
  - Thomas Hobbes: (England, 1588-1679) Wrote *Leviathan* and stated that the state must have central authority to manage behavior.
  - John Locke: (England, 1632-1704) Wrote *Two Treatises on Government* and believed that people are sovereign and that monarchs are not chosen by God.
  - Montesquieu: (France, 1689-1755) Wrote *The Spirit of the Laws*, stating that the best form of government includes separation of powers.
  - Jean-Jacques Rousseau: (Switzerland, 1712-1778) Wrote *The Social Contract*, stating that government is a contract between rulers and the people, that people give up some of their freedom and submit to a government in exchange for order.
  - Voltaire: (France, 1694-1778) Wrote *Candide*. He believed that religious toleration should triumph over religious fanaticism and called for separation of church and state.
  - Thomas Jefferson: (United States, 1743-1826) Wrote *Declaration of Independence* in which he borrowed heavily from John Locke’s writings, and was an one of America’s founding fathers and statesmen.

## **CULMINATING ACTIVITY**

1. Students will create a PowerPoint Presentation to demonstrate what they have learned about the important people of the Scientific Revolution and Enlightenment. Assign each pair an individual we studied for which they will create a presentation. If there are more groups than scientists and philosophers, assignments may be repeated.
2. Each pair should create a PowerPoint with at least 5 slides using the information gathered from the charts. Each presentation should include the following:
  - Include some basic biographical information about the person the group is working with.
  - Include relevant pictures found from the Internet and saved on the disks or scanned from books if your media center has the equipment to help students with this.
  - How has this person’s contributions made our lives today better or worse? This is an important part of the presentation because it is the most important reason for studying the individuals.

3. When students have completed their work, they should make their presentations using the equipment set up to show the video.

### **CROSS-CURRICULAR EXTENSIONS**

1. **English/Writing:** Students will write a newspaper article from the time period that we are studying reporting on one individual's achievements. Articles should elaborate on any controversies and events directly or indirectly related to the person's actions.
2. **Science:** Collaborate with a science teacher to have a lesson in which the science teacher does a demonstration to illustrate one of the scientific principles studied or leads student groups through an experiment.

### **COMMUNITY CONNECTIONS**

1. Take students to an interactive science museum that features exhibits that illustrate the principles we have studied.
2. Invite a science or history/political science professor from a local college to come in as a guest speaker to further elaborate on the contributions of the individuals studied to science and society.

### Data Gathering Sheet: Scientific Revolution

<b>Nicholas Copernicus</b>	<b>Nation</b>	Accomplishments/Contributions
	<b>Life Span</b>	
<b>Johannes Kepler</b>	<b>Nation</b>	
	Life Span	
<b>Galileo Galilei</b>	Nation	
	Life Span	
<b>Isaac Newton</b>	Nation	
	Life Span	
<b>William Harvey</b>	Nation	
	Life Span	

Data Gathering Sheet: Enlightenment

<b>Thomas Hobbes</b>	Nation	<b>Writing</b>	<b>Major Ideas/Contributions</b>
	Life Span		
<b>John Locke</b>	Nation		
	Life Span		
<b>Montesquieu</b>	Nation		
	Life Span		
<b>Jean-Jacques Rousseau</b>	Nation		
	Life Span		
<b>Voltaire</b>	Nation		
	Life Span		
<b>Thomas Jefferson</b>	Nation		
	Life Span		

