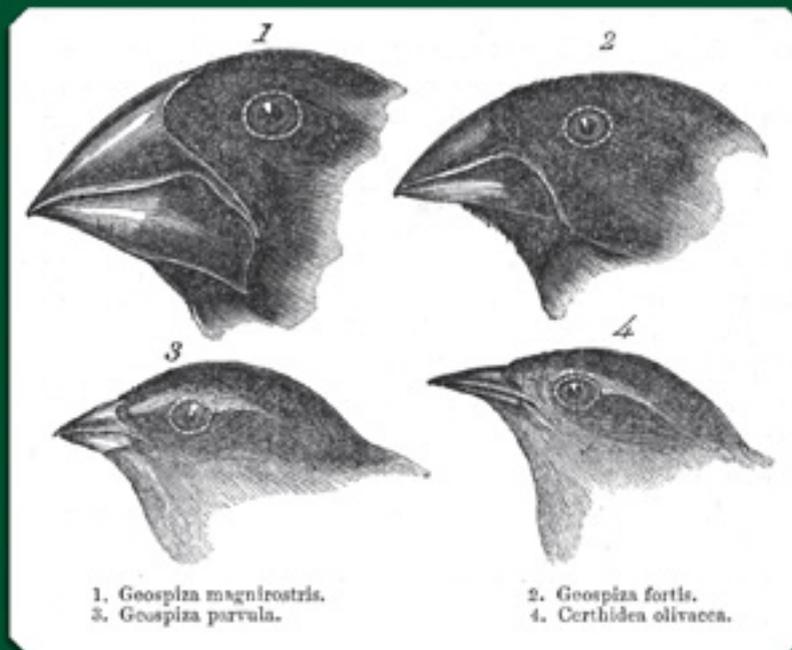


## DOCUMENTS

Interpreting Alternative Viewpoints  
in Primary Source Documents

# Science and Faith in the 19th Century

*How deeply in conflict were science and religious faith  
in this age of industry and scientific triumph?*



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## *Debating* the DOCUMENTS

Interpreting Alternative Viewpoints  
in Primary Source Documents

# Science and Faith in the 19th Century

The 2017 World History Course and Exam Description of the College Board Advanced Placement Program\* lists five themes that it urges teachers to use in organizing their teaching. Each World History *Debating the Documents* booklet focuses on one or two of these five themes.

### *The Five Themes*

- 1. Interaction between humans and the environment.** (demography and disease; migration; patterns of settlement; technology)
- 2. Development and interaction of cultures.** (religions; belief systems, philosophies, and ideologies; science and technology; the arts and architecture)
- 3. State-building, expansion, and conflict.** (political structures and forms of governance; empires; nations and nationalism; revolts and revolutions; regional, transregional, and global structures and organizations)
- 4. Creation, expansion, and interaction of economic systems.** (agricultural and pastoral production; trade and commerce; labor systems; industrialization; capitalism and socialism)
- 5. Development and transformation of social structures.** (gender roles and relations; family and kinship; racial and ethnic constructions; social and economic classes)

### *This Booklet's Main Theme:*

- 2** Development and interaction of cultures.

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# Teacher Introduction

## ★ Using Primary Sources

Primary sources are called “primary” because they are first-hand records of a past era or historical event. They are the raw materials, or the evidence, on which historians base their “secondary” accounts of the past.

A rapidly growing number of history teachers today are using primary sources. Why? Perhaps it's because primary sources give students a better sense of what history is and what historians do. Such sources also help students see the past from a variety of viewpoints. Moreover, primary sources make history vivid and bring it to life.

However, primary sources are not easy to use. They can be confusing. They can be biased. They rarely all agree. Primary sources must be interpreted and set in context. To do this, students need historical background knowledge. *Debating the Documents* helps students handle such challenges by giving them a useful framework for analyzing sources that conflict with one another.



*“Multiple,  
conflicting  
perspectives are  
among the truths  
of history.  
No single  
objective or  
universal account  
could ever put an  
end to this endless  
creative dialogue  
within and  
between the past  
and the present.”*

From the 2011 Statement on Standards of Professional Conduct of the Council of the American Historical Association.

## INTRODUCTION

### ★ *The Debating the Documents Series*

Each *Debating the Documents* booklet includes the same sequence of reproducible worksheets. If students use several booklets over time, they will get regular practice at interpreting and comparing conflicting sources. In this way, they can learn the skills and habits needed to get the most out of primary sources.

#### **Each *Debating the Documents* Booklet Includes**

- **Suggestions for the Student and an Introductory Essay.** The student gets instructions and a one-page essay providing background on the booklet's topic. A time line on the topic is also included.
- **Two Groups of Contrasting Primary Source Documents.** In most of the booklets, students get one pair of visual sources and one pair of written sources. In some cases, more than two are provided for each. Background is provided on each source. *Within each group, the sources clash in a very clear way.* (The sources are not always exact opposites, but they do always differ in some obvious way.)
- **Three Worksheets for Each Document Group.** Students use the first two worksheets to take notes on the sources. The third worksheet asks which source the student thinks would be most useful to a historian.
- **One DBQ.** On page 20, a document-based question (DBQ) asks students to write an effective essay using all of the booklet's primary sources.

### ★ *How to Use This Booklet*

#### **1. Have students read “Suggestions for the Student” and the Introductory Essay.**

Give them copies of pages 5–7. Ask them to read the instructions and then read the introductory essay on the topic. The time line gives them additional information on that topic. This reading could be done in class or as a homework assignment.

#### **2. Have students do the worksheets.**

Make copies of the worksheets and the pages with the sources. Ask students to study the background information on each source and the source itself. Then have them take notes on the sources using the worksheets. If students have access to a computer, have them review the primary sources digitally.

NOTE: If you are using these materials with an AP world history class, an honors class, or some other group of advanced and/or more knowledgeable students, you may want to make more written sources available to them on this topic. Do a basic Internet search for sources that provide additional perspectives and then add to the sources provided here.

### 3. “Debate the documents” as a class.

Have students use their worksheet notes to debate the primary source documents as a class. Urge students to follow these ground rules:

- Use your worksheets as a guide for the discussion or debate.
- Try to reach agreement about the main ideas and the significance of each primary source document.
- Look for points of agreement as well as disagreement between the primary sources.
- Listen closely to all points of view about each primary source.
- Focus on the usefulness of each source to the historian, not merely on whether you agree or disagree with that source’s point of view.

### 4. Have students do the final DBQ.

A DBQ is an essay question about a set of primary source documents. To answer the DBQ, students write essays using evidence from the sources and their own background knowledge of the historical era. (See the next page for a DBQ scoring guide to use in evaluating these essays.)

The DBQ assignment on page 20 includes guidelines for writing a DBQ essay. Here are some additional points to make with students about preparing to write this kind of essay.

#### **The DBQ for this Booklet (see page 20):**

Describe the conflict between science and faith in the 1800s, and explain why it became so intense during that century.

- Analyze the question carefully.
- Use your background knowledge to set sources in their historical context.
- Question and interpret sources actively. Do not accept them at face value.
- Use sources meaningfully to support your essay’s thesis.
- Pay attention to the overall organization of your essay.

## INTRODUCTION

### ★ *Complete DBQ Scoring Guide*

Use this guide in evaluating the DBQ for this booklet. Use this scoring guide with students who are already familiar with using primary sources and writing DBQ essays.

#### **Excellent Essay**

- Offers a clear answer or thesis explicitly addressing all aspects of the essay question.
- Does a careful job of interpreting many or most of the documents and relating them clearly to the thesis and the DBQ. Deals with conflicting documents effectively.
- Uses details and examples effectively to support the thesis and other main ideas. Explains the significance of those details and examples well.
- Uses background knowledge and the documents in a balanced way.
- Is well written; clear transitions make the essay easy to follow from point to point. Only a few minor writing errors or errors of fact.

#### **Good Essay**

- Offers a reasonable thesis addressing the essential points of the essay question.
- Adequately interprets at least some of the documents and relates them to the thesis and the DBQ.
- Usually relates details and examples meaningfully to the thesis or other main ideas.
- Includes some relevant background knowledge.
- May have some writing errors or errors of fact, as long as these do not invalidate the essay's overall argument or point of view.

#### **Fair Essay**

- Offers at least a partly developed thesis addressing the essay question.
- Adequately interprets at least a few of the documents.
- Relates only a few of the details and examples to the thesis or other main ideas.
- Includes some background knowledge.
- Has several writing errors or errors of fact that make it harder to understand the essay's overall argument or point of view.

#### **Poor Essay**

- Offers no clear thesis or answer addressing the DBQ.
- Uses few documents effectively other than referring to them in "laundry list" style, with no meaningful relationship to a thesis or any main point.
- Uses details and examples unrelated to the thesis or other main ideas. Does not explain the significance of these details and examples.
- Is not clearly written, with some major writing errors or errors of fact.

# Suggestions to the Student

## ★ *Using Primary Sources*

A primary source is any record of evidence from the past. Many things are primary sources: letters, diary entries, official documents, photos, cartoons, wills, maps, charts, etc. They are called “primary” because they are first-hand records of a past event or time period. This *Debating the Documents* lesson is based on two groups of primary source documents. Within each group, the sources conflict with one another. That is, they express different or even opposed points of view. You need to decide which source is more reliable, more useful, or more typical of the time period. This is what historians do all the time. Usually, you will be able to learn something about the past from each source, even when the sources clash with one another in dramatic ways.

## ★ *How to Use This Booklet*

### 1. **Read the one-page introductory essay.**

This gives you background information that will help you analyze the primary source documents and do the exercises for this *Debating the Documents* lesson. The time line gives you additional information you will find helpful.



### 2. **Study the primary source documents for this lesson.**

For this lesson, you get two groups of sources. The sources within each group conflict with one another. Some of these sources are visuals, others are written sources. With visual sources, pay attention not only to the image’s “content” (its subject matter) but also to its artistic style, shading, composition, camera angle, symbols, and other features that add to the image’s meaning. With written sources, notice the writing style, bias, even what the source leaves out or does not talk about. Think about each source’s author, that author’s reasons for writing, and the likely audience for the source. These considerations give you clues as to the source’s historical value.

### 3. **Use the worksheets to analyze each group of primary source documents.**

For each group of sources, you get three worksheets. Use the “Study the Document” worksheets to take notes on each source. Use the “Comparing the Documents” worksheet to decide which of the sources would be most useful to a historian.

### 4. **As a class, debate the documents.**

Use your worksheet notes to help you take part in this debate.

### 5. **Do the final DBQ.**

“DBQ” means “document-based question.” A DBQ is a question along with several primary source documents. To answer the DBQ, write an essay using evidence from the documents and your own background history knowledge.

## Science and Faith

Many people know Isaac Newton as one of the greatest scientists the world has ever produced. They know he developed calculus and used it to work out his theory of universal gravitation. They know that this theory united the ideas and discoveries of Nicolaus Copernicus, Galileo Galilei, Johannes Kepler, and others who helped launch the age of modern science.

What many do not know about Newton is that he was a deeply religious man whose interest in theology was as great as his interest in mathematics and physics. When science seemed to contradict Biblical teachings, Newton's view was that the interpretations by theologians were wrong, not the Bible itself.

Some seventeenth-century thinkers were anxious about the new scientific view of a vast universe not centered on the Earth. Blaise Pascal, for example, admitted that "the eternal silence of these infinite spaces terrifies me." However, for Newton and most other scientists of his day, the idea that science and religion could conflict in any sort of fundamental way was absurd.

If this seems surprising, it could be because Newton's views were later popularized by eighteenth-century Enlightenment thinkers who were hostile to religion. While the Enlightenment did set some of Europe's leading writers and philosophers firmly against organized religion, the real tensions between science and religion did not really arise until the nineteenth century.

In that century, science forged ahead rapidly. It also came to have much greater prestige than in the past. This was not only because of its many new discoveries, but also because science was increasingly put to immediate and practical use. The steam engine helped to produce goods and transport passengers in astounding numbers. Louis Pasteur's discoveries about bacteria immediately led to the "pasteurization" of milk and better rules for public health and sanitation. Michael Faraday's experiments with electromagnetism soon led to electric motors and many other technological wonders. These

triumphs of industry gave a boost to the idea that science could explain everything in terms of material forces.

Charles Darwin's theory of evolution claimed that random events and purely physical laws could explain the origins of human life. Darwin described a constant struggle for survival among species. Some applied this idea to industrial society, saying that the wealthy were proved "fit" for survival by their successes in a harsh, highly competitive environment. In other words, the successful needed no moral code to justify their actions. The bleakness of industrial life also led Karl Marx to a purely "materialist" explanation of human history as a bitter struggle between classes. For Marx, however, this struggle would ultimately be won by the workers, not the capitalists. Both forms of "social Darwinism" often led their backers (Marx included) to an atheistic outlook.

Religion, meanwhile, adapted to these challenges in many ways. The Catholic Church and other organized faiths often rejected "modern" ideas and practices outright. For many people though, religion took less-institutional forms. They sought a spirituality that could exist side by side with science in an industrial society. The Romantic movement reacted against the seemingly cold reason put forth by the Enlightenment. It led to a search for religious insights that could make sense of those aspects of human experience that science could not explain.

Actually, not all scientists accepted a purely materialist explanation of the universe. Not all of them rejected religion or became atheists. Likewise, deeply religious people could adapt their religious views to scientific progress. Yet as the sources for this lesson will help you see, science and religion challenged each other in new and troubling ways in the nineteenth century. In our own time, these challenges are still far from settled.

# Science and Faith Time Line

1770-1831

Lifetime of German philosopher Georg W. F. Hegel. His writings strongly influence philosophy and religion throughout the nineteenth century. He views spirit and ideas as the key moving forces in history, with one idea generating its opposite and the two then leading on to new ideas in an evolving pattern. In this view, religion is no more than a stage of human consciousness and growth, though Hegel saw Christianity as the highest stage attained so far.

1798-1857

Lifetime of Auguste Comte, a French thinker often seen as the founder of sociology. He sees society as having passed through three stages: the Theological, the Metaphysical, and the Scientific (which he also calls "Positive"). In this last phase, all of political and social life, including moral obligations and religious feelings, can be understood scientifically. Comte offers an extreme version of a purely material understanding of the world.

1846

As evangelical Protestantism spreads, some 800 delegates from 50 denominations in Europe and America meet in London to form the Evangelical Alliance. Its members emphasize conversion experiences, reliance on Scripture, and missionary work. Rather than turning to a church hierarchy and its rituals, evangelicals stress the need for personal conversion based on an intense emotional and imaginative sense of one's sinful nature and Christ's salvation. In this sense, evangelical Protestantism is an example of Romanticism's influence on religion in the nineteenth century.

1848

Karl Marx publishes *The Communist Manifesto*. Marx adopts Hegel's view of history as an evolutionary process moved by "dialectical" conflict. However, rather than Hegel's conflict of ideas, he sees a conflict of classes, with the classes themselves shaped by material, economic forces. Marx was an atheist. For him, religion is mere mythology meant to console those oppressed by society. To realize humanity's hopes, what is needed is a communist revolution led by those who understand society scientifically.

1859

Darwin publishes *On the Origins of Species by Means of Natural Selection*. This is seen by many as offering a profound challenge to literal interpretations of the Bible, especially its story of creation.

1864

Pope Pius IX issues the *Syllabus of Errors* condemning many modern practices and beliefs, including liberalism, nationalism, socialism, separation of church and state, civil marriage, and the reliance on human reason as the sole source of truth.

1871-1878

In the recently united German Empire, Chancellor Otto von Bismarck launches his *Kulturkampf*, a campaign to strengthen the secular state and reduce the political and social influence of the Roman Catholic Church. He later reverses much of this effort, but it is still a good example of a widespread movement in many nations to reduce the role of established churches.

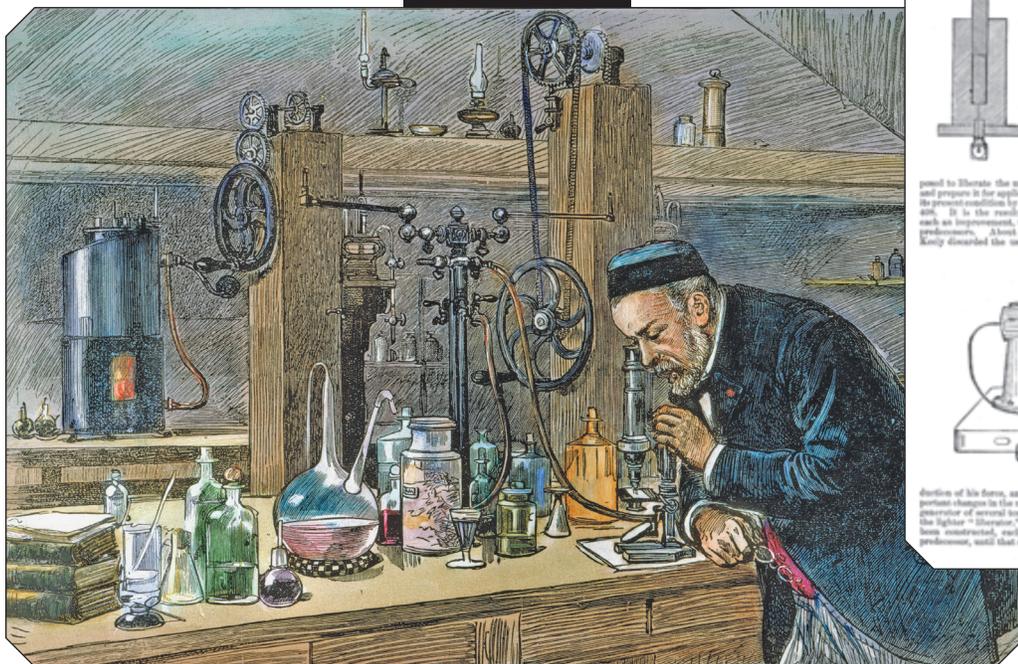
1891

Pope Leo XIII issues *Rerum Novarum*, a papal encyclical dealing with the dire condition of the working classes. It outlines the duties of capital and labor and the need for society to do something about "the misery and wretchedness pressing so unjustly on the majority of the working class."

DOCUMENTS 1 & 2

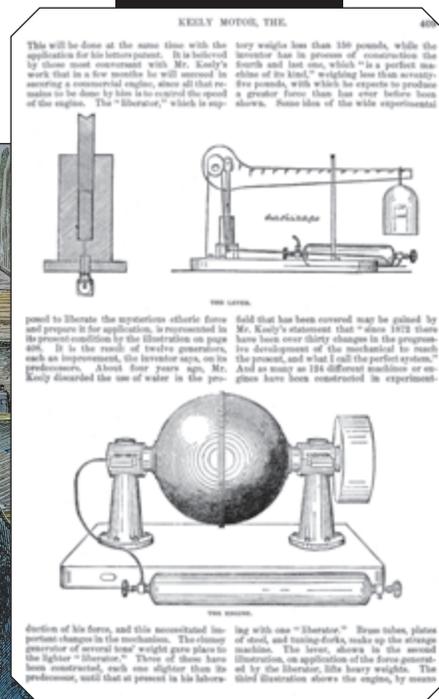
# Primary Source Documents 1 & 2

Document 1



The Granger Collection, New York

Document 2



The Granger Collection, New York

## Information on Documents 1 & 2

**Document 1.** In the nineteenth century, science's direct benefits to the development of technology and a better life came to be widely recognized. The scientist in his laboratory became a cultural hero. This illustration from around 1890 of Louis Pasteur in his laboratory conveys this sense of the scientist at work for all of humanity.

**Document 2.** Popular illustrations of science in the nineteenth century were not always as thoughtful or as grand and noble in tone as in the illustration of Pasteur. Here, for example, is an illustrated report on John Keely and his Keely Motor, the most celebrated fraudulent perpetual-motion machine of the nineteenth century.