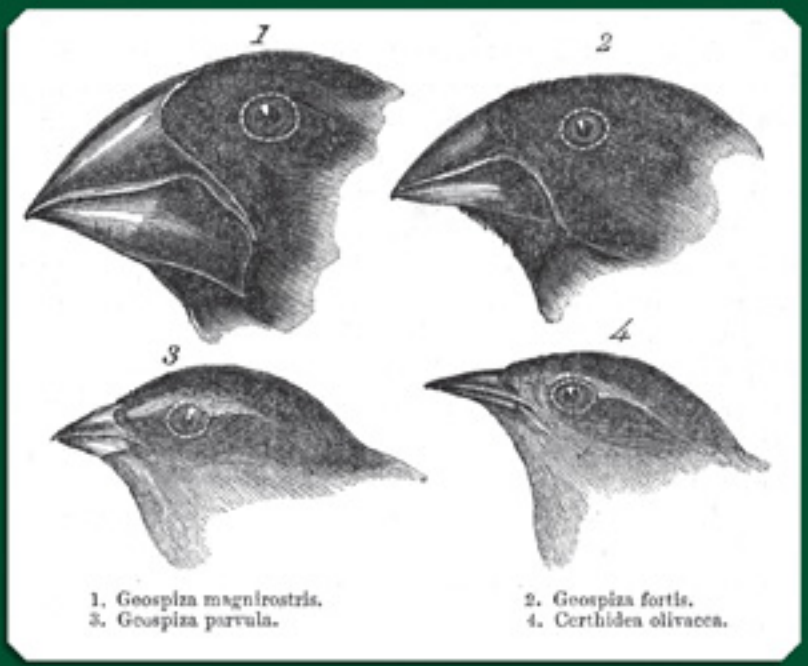
Debating the DOCUMENTS

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?



1. Geospiza magnirostris.
2. Geospiza fortis.
3. Geospiza parvula.
4. Certhidea olivacea.

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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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Contents

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.

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 knowledgable 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.

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."

Primary Source Documents 1 & 2

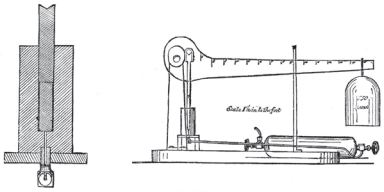
Document 1

The Granger Collection, New York

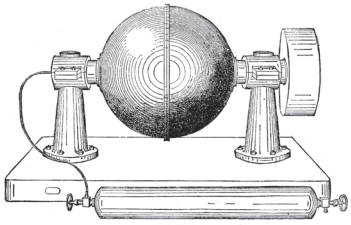
Document 2

KEELY MOTOR, THE. 409

This will be done at the same time with the application for his letters patent. It is believed by those most conversant with Mr. Keely's work that in a few months he will succeed in securing a commercial engine, since all that remains to be done by him is to control the speed of the engine. The "liberator," which is supposed to liberate the mysterious etheric force and prepare it for application, is represented in its present condition by the illustration on page 408. It is the result of twelve generators, each an improvement, the inventor says, on its predecessors. About four years ago, Mr. Keely discarded the use of water in the production of his force, and this necessitated important changes in the mechanism. The clumsy generator of several tons' weight gave place to the lighter "liberator." Three of these have been constructed, each one slighter than its predecessor, until that at present in his laboratory weighs less than 150 pounds, while the inventor has in process of construction the fourth and last one, which "is a perfect machine of its kind," weighing less than seventy-five pounds, with which he expects to produce a greater force than has ever before been shown. Some idea of the wide experimental field that has been covered may be gained by Mr. Keely's statement that "since 1872 there have been over thirty changes in the progressive development of the mechanical to reach the present, and what I call the perfect system." And as many as 124 different machines or engines have been constructed in experimenting with one "liberator." Brass tubes, plates of steel, and tuning-forks, make up the strange machine. The lever, shown in the second illustration, on application of the force generated by the liberator, lifts heavy weights. The third illustration shows the engine, by means



THE LEVER.



THE ENGINE.

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.

Primary Source Documents 3 & 4

Document 3

The Granger Collection, New York

Document 4

The Granger Collection, New York

Information on Documents 3 & 4

Document 3. Paul Gustave Dore (1832–1883) was a French artist with a flair for romantic, even bizarre images. He created hundreds of Bible story illustrations that were enormously popular. This is his *Transfiguration of Jesus* (based on Mark 9: 1–8), in which Jesus appears before three of his apostles in clothes of a brilliant whiteness and speaks with Moses and the prophet Elijah. Dore's mysterious dreamlike images offered a dramatic and emotional religious vision for an age dominated by science, political realism, iron, and steam.

Document 4. In the nineteenth century, the Catholic Church often opposed liberal reform, Enlightenment ideas, and the spirit of science. Pope Pius IX (served from 1846 to 1878) issued his encyclical *Jamdudum Cernimus* (1861) denouncing certain modern ideas. This English cartoon commenting on the encyclical is captioned "Papal Allocution/Snuffing Out Modern Civilization." Later, Pope Pius IX included this set of prohibitions in a much larger list called the *Syllabus of Errors* (1864).

Study the Documents: Sources 1 & 2

Instructions: Take notes on these questions. Use your notes to discuss the documents and answer the DBQ.

1 Visual Features—Doc. 1

What details in this illustration help it to produce what could be called the "heroic view of the scientist at work"?

2 Background Knowledge

Briefly sum up what you know about Pasteur and explain why his scientific research helped add to the popular prestige science gained in the nineteenth century.

3 Compare & Contrast

Document 2 does not illustrate a scientifically sound device. Are Documents 1 and 2 evidence of two different—or even opposed—views toward science in the nineteenth century? Or are they evidence of the same view? Explain your answer.

Study the Documents: Sources 3 & 4

Instructions: Take notes on these questions. Use your notes to discuss the documents and answer the DBQ.

1 Main Idea—Both Docs.

Write captions for each of these illustrations. In each case, complete captions that start with the phrase: "Religious faith in the nineteenth century..."

2 Cartoon Analysis—Doc. 4

An "allocution" is a formal address making clear the Pope's views on key issues. What objects and other symbols does this cartoon use to make fun of the Pope's 1861 encyclical? What point specifically does the artist hope to make by using the symbol of the sun as he does?

3 Compare & Contrast

If Documents 3 and 4 were the only existing sources of knowledge about the subject, how would you sum up the state of religious faith in the nineteenth century? How would you describe the way it responded to the key forces for change in that century? Remember, use only these two images as the basis for your answer.

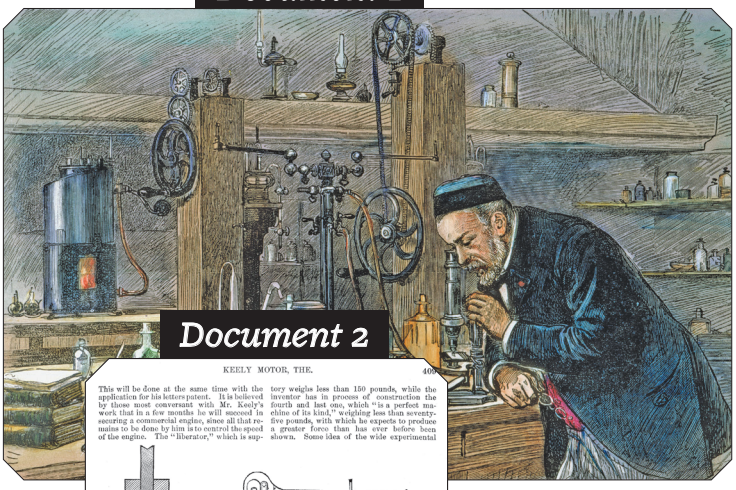
Comparing the Documents

The Sources

Answer the question by checking one box below. Then complete the statements on the Comparison Essay worksheet. Use all your notes to help you take part in an all-class debate about these documents—and to answer the final DBQ for the lesson.

Which of these primary source documents would be most useful to a historian trying to understand science and faith in the nineteenth century?

Document 1



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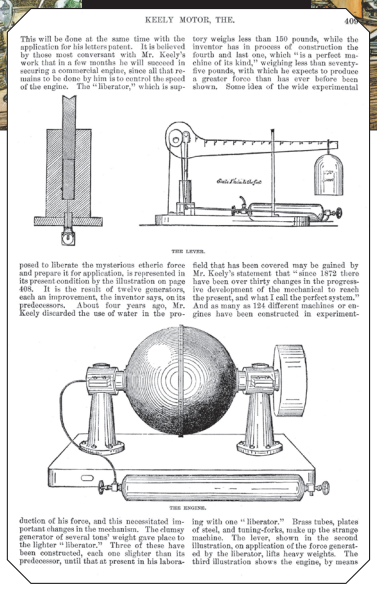
Document 2



KEELY MOTOR, THE.

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THE LEVER.

THE ENGINE.

The Granger Collection, New York

Document 3

The Granger Collection, New York

Document 4

The Granger Collection, New York

Documents 1 & 2 ☐ *Documents 3 & 4* ☐

Comparison Essay

I chose Documents _____ because:

_____

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_____

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_____

_____

_____

I did **not** *choose Documents _____.*
However, a historian still might use the documents in the following way:

_____

_____

_____

_____

_____

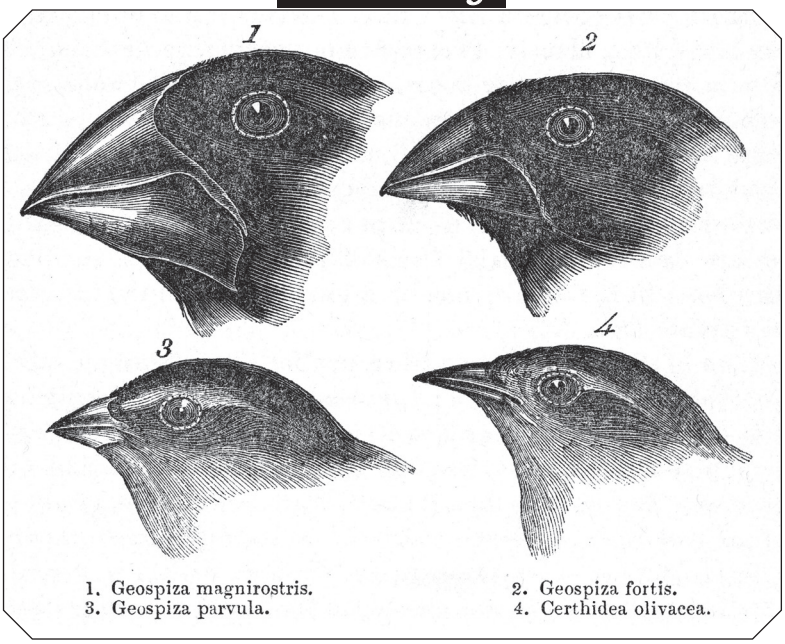
_____

_____

Keep this in mind: Some sources are very biased. A biased source is one that shows you only one side of an issue. That is, it takes a clear stand or expresses a very strong opinion about something. A biased source may be one-sided, but it can still help you to understand its time period. For example, a biased editorial cartoon may show how people felt about an issue at the time. The usefulness of a source depends most of all on what questions you ask about that time in the past.

Primary Source Documents 5 & 6

Document 5



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Document 6

The Granger Collection, New York

Information on Documents 5 & 6

Document 5. In 1831, Charles Darwin began his famous voyage on the HMS *Beagle.* This page is from a nineteenth-century edition of his *Journal of Researches* from the voyage. It shows slight variations in the size of the beaks of finches Darwin observed. For Darwin these variations later provided evidence for his theory of natural selection. That is, he theorized that the birds' beaks changed slightly from one generation to another as the birds adapted to alterations in the food supply or other differences in environmental conditions.

Document 6. This is the title page of the first volume of the second edition of Karl Marx's *Das Kapital* (1872). The page is inscribed to Charles Darwin from "his sincere admirer, Karl Marx." Marx may have sent Darwin his book because he admired what he saw as Darwin's fully materialist explanation of how human evolution worked. Marx felt he was providing just such a fully materialist theory of how human history worked. Despite what some have claimed, there is no evidence Darwin ever wrote to Marx about this or anything else.

Primary Source Documents 7 & 8

Document 7

The Granger Collection, New York

Document 8

The Granger Collection, New York

Information on Documents 7 & 8

Document 7. Darwin was a man of science and reason. However, he was to become much more than this, both to his detractors and his admirers. This admiring 1882 cartoon on the occasion of Darwin's death celebrates the importance of his theory of evolution using imagery that might almost be seen as religious or spiritual.

Document 8. A similar use of religious imagery can be seen here with regard to socialism, which often presented itself as based on hard scientific reasoning. This 1885 illustration shows the angel of socialism approaching in order to rescue labor from being devoured by the demon of capitalism.

Study the Documents: Sources 5 & 6

Instructions: Take notes on these questions. Use your notes to discuss the documents and answer the DBQ.

1 Background—Doc. 5

Darwin drew the four finches here as part of his researches during his voyage on the HMS *Beagle,* which began in 1831. Briefly explain why this voyage proved so important to the history of modern science.

2 Visual Features—Doc. 5

Darwin drew these four finches in such a way as to stress one key feature. What feature is that, and why did he think variations in that feature were so significant?

3 Interpreting Meanings

In his book *Das Kapital*, Karl Marx analyzed what he saw as the economic laws that explained social and political life. Why do you think he sent Darwin a copy of this book and inscribed it to "Mr. Charles Darwin on the part of his sincere admirer"?

Study the Documents: Sources 7 & 8

Instructions: Take notes on these questions. Use your notes to discuss the documents and answer the DBQ.

1 Main Idea—Both Docs.

Create a caption for each of these illustrations that sums up its central message.

2 Visual Features

Both of these illustrations have been described as "basically religious images." Do you agree? Explain why or why not with specific reference to details in each illustration.

3 Compare & Contrast

Of the eight sources for this lesson (Primary Source Documents 1–8), choose the two that best sum up what you see as the relationship of science and faith in the nineteenth century. Describe these two sources and explain why you chose them.

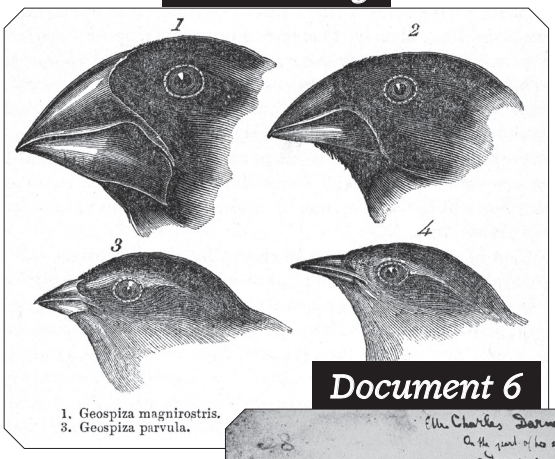
Comparing the Documents

The Sources

Answer the question by checking one box below. Then complete the statements on the Comparison Essay worksheet. Use all your notes to help you take part in an all-class debate about these documents—and to answer the final DBQ for the lesson.

Which of these primary source documents would be most useful to a historian trying to understand science and faith in the nineteenth century?

Document 5

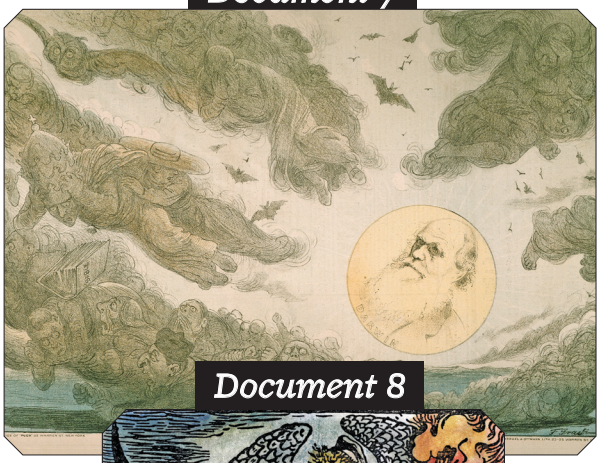


The Granger Collection, New York

Document 6

The Granger Collection, New York

Document 7



The Granger Collection, New York

Document 8

The Granger Collection, New York

Documents 5 & 6 ☐

Documents 7 & 8 ☐

Comparison Essay

I chose Documents _____ because:

_____

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However, a historian still might use the documents in the following way:

_____

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Keep this in mind: Some sources are very biased. A biased source is one that shows you only one side of an issue. That is, it takes a clear stand or expresses a very strong opinion about something. A biased source may be one-sided, but it can still help you to understand its time period. For example, a biased editorial cartoon may show how people felt about an issue at the time. The usefulness of a source depends most of all on what questions you ask about that time in the past.

Document-Based Question

Your task is to answer a document-based question (DBQ) on the relationship between science and faith in the nineteenth century. In a DBQ, you use your analysis of primary source documents and your knowledge of history to write a brief essay answering the question. Using all four sets of documents, answer this question. Below are two DBQs. The first is somewhat less demanding than the second. Use whichever DBQ your teacher assigns.

Document-Based Question

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

OR

2 **"The conflict between science and faith in the 19th century was partly the fault of religion, but also partly the fault of science acting as a new religion." Explain why you do or do not agree with this statement.**

Below is a checklist of key suggestions for writing a DBQ essay. Next to each item, jot down a few notes to guide you in writing the DBQ. Use extra sheets to write a four- or five-paragraph essay.

- *Introductory Paragraph*
  Does the paragraph clarify the DBQ itself? Does it present a clear thesis, or overall answer, to that DBQ?

- *The Internal Paragraphs—1*
  Are these paragraphs organized around main points with details supporting those main ideas? Do all these main ideas support the thesis in the introductory paragraph?

- *The Internal Paragraphs—2*
  Are all of your main ideas and key points linked in a logical way? That is, does each idea follow clearly from those that went before? Does it add something new and helpful in clarifying your thesis?

- *Use of Primary Source Documents*
  Are they simply mentioned in a "laundry list" fashion? Or are they used thoughtfully to support main ideas and the thesis?

- *Concluding Paragraph*
  Does it restate the DBQ and thesis in a way that sums up the main ideas without repeating old information or going into new details?

Worksheet Answers and Guidelines

Some worksheet questions call for specific answers to factual questions. In these cases, correct answers are provided here. Most worksheet questions are open-ended and call on students to offer their own interpretations and personal reactions. In those cases, we offer suggestions based on the purpose of the question and the sort of interpretive activity it calls for.

Worksheet 1

Sources 1 & 2

1. It shows Pasteur as a scientist alone in his laboratory, patiently making his discoveries by himself, etc.
2. His discoveries regarding the germ theory of disease, creation of a rabies vaccine, the process called pasteurization, etc. His work had practical applications that affected the lives of many in a very immediate way, so people in the nineteenth century naturally respected scientists as the explorers of their time.
3. Since a perpetual-motion machine is physically impossible, students may see the image as fanciful and at odds with the one of Pasteur. However, others may stress the way in which both images show a idealized view of scientists and their work.

Worksheet 2

Sources 3 & 4

1. Answers here may vary, since the images are very different from one another.
2. The sun is a symbol for the "enlightened" view of mankind that science was offering. The keys with which the Pope is trying uselessly to lock out the sun's light refer to a New Testament passage in which Christ gives Peter "the keys of the kingdom of heaven": "Whatever you bind on earth will be bound in heaven, and whatever you loose on earth will be loosed in heaven."
3. Answers may vary.

Worksheet 3

Sources 5 & 6

1. It was on this voyage that Darwin made the observations on which he based his theory of evolution by natural selection.
2. The feature is the beak of each bird. Variations in these beaks, Darwin felt, showed the workings of natural selection in that finches evolved different beaks because of the need to get different types of food in varying environments.
3. Marx viewed his theory as similar to Darwin's. For him, changing economic forces determined historical evolution just as natural environmental forces determined biological evolution.

Worksheet 4

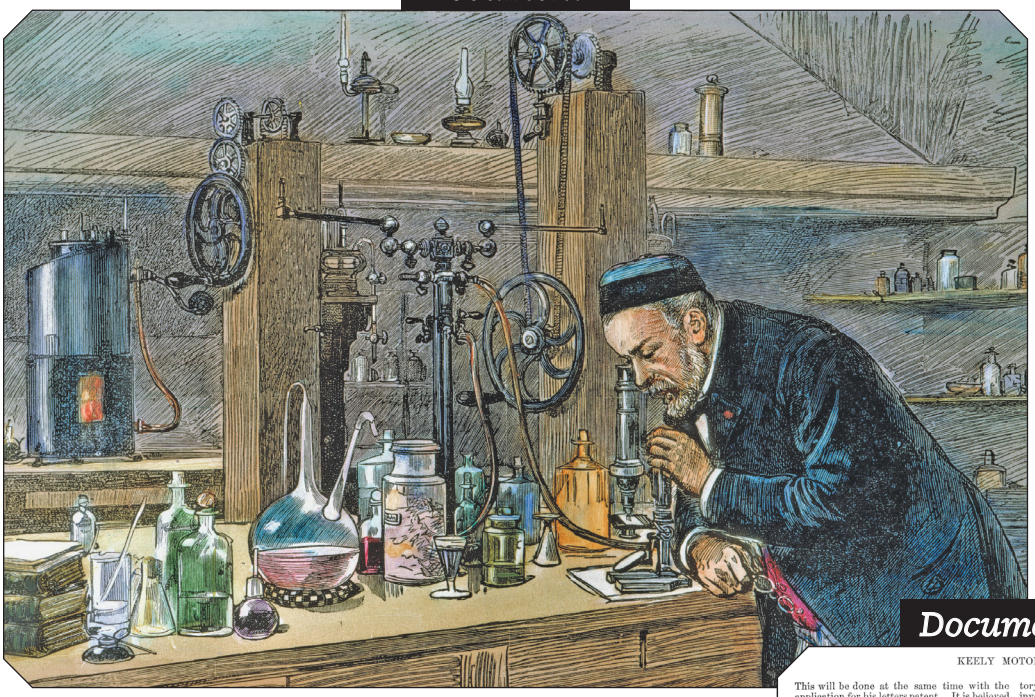
Sources 7 & 8

1. Captions may vary.
2. Students may point to the notion of Darwin as the sun, a near-godlike figure banishing the clouds and demons of ignorance. The socialist poster depicts socialism as an angel defeating capitalism in what closely resembles a medieval church scene.
3. Choices and answers will vary.

Visual Primary Sources

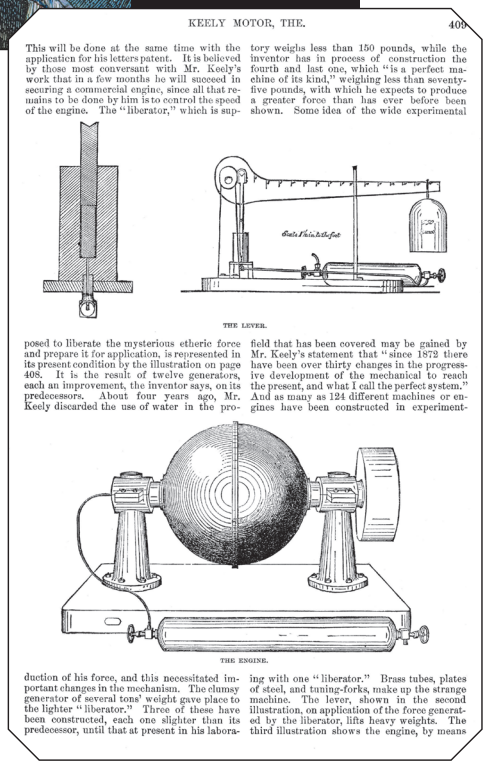
First Group—Documents 1 & 2

Document 1



The Granger Collection, New York

Document 2



KEELY MOTOR, THE. 409

This will be done at the same time with the application for his letters patent. It is believed by those most conversant with Mr. Keely's work that in a few months he will succeed in securing a commercial engine, since all that remains to be done by him is to control the speed of the engine. The "liberator," which is supposed to liberate the mysterious etheric force and prepare it for application, is represented in its present condition by the illustration on page 408. It is the result of twelve generators, each an improvement, the inventor says, on its predecessors. About four years ago, Mr. Keely discarded the use of water in the production of his force, and this necessitated important changes in the mechanism. The clumsy generator of several tons' weight gave place to the lighter "liberator." Three of these have been constructed, each one slighter than its predecessor, until that at present in his laboratory weighs less than 150 pounds, while the inventor has in process of construction the fourth and last one, which "is a perfect machine of its kind," weighing less than seventy-five pounds, with which he expects to produce a greater force than has ever before been shown. Some idea of the wide experimental field that has been covered may be gained by Mr. Keely's statement that "since 1872 there have been over thirty changes in the progressive development of the mechanical to reach the present, and what I call the perfect system." And as many as 124 different machines or engines have been constructed in experimenting with one "liberator." Brass tubes, plates of steel, and tuning-forks, make up the strange machine. The lever, shown in the second illustration, on application of the force generated by the liberator, lifts heavy weights. The third illustration shows the engine, by means

THE LEVER.

THE ENGINE.

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First Group—Documents 3 & 4

Document 3

The Granger Collection, New York

Document 4

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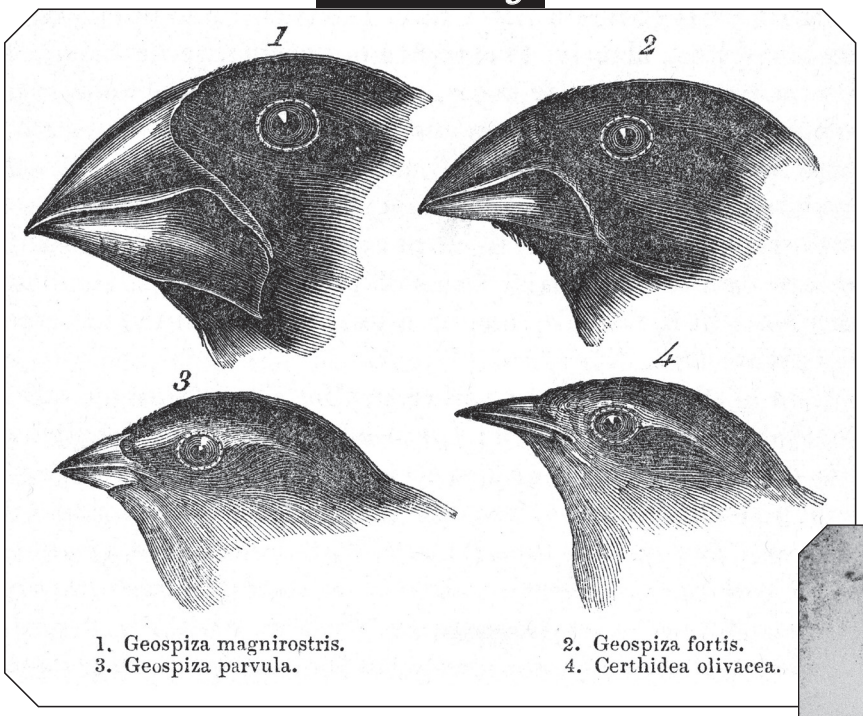
Second Group—Documents 5 & 6

Document 5



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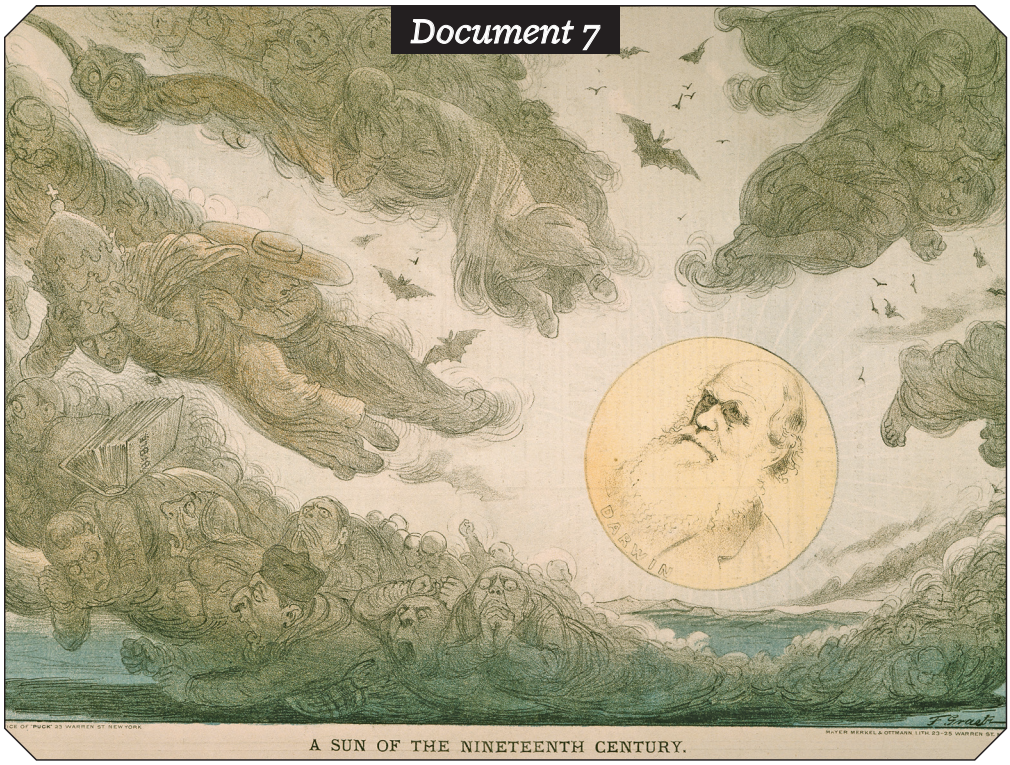
Document 6

The Granger Collection, New York

Second Group—Documents 7 & 8

Document 7



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Document 8

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