# DOCUMENTS

Interpreting Alternative Viewpoints in Primary Source Documents

# Science and Technology The Threat and the Promise

Technical innovation has transformed life in the modern era. Have the benefits outweighed the costs?





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Interpreting Alternative Viewpoints in Primary Source Documents

# Science and Technology The Threat and the Promise

The 2017 World History Course and Exam Description of the College Board Advanced Placement Program<sup>\*</sup> 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 Themes:

- 2 Development and interaction of cultures.
- **4** Creation, expansion, and interaction of economic systems.

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# **Teacher Introduction**

## Using Primary Sources

Primary sources are called "primary" because they are firsthand 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 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.

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#### 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 overall impact of science and technology in the twentieth century, and explain why you see that impact as primarily positive or primarily negative.

- 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.

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## 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 Technology

Imagine a person born in a village in Italy during the Roman Empire. Such a person transported to a village in the year 1800 would have found very little to be shocked or confused about. To go from 1800 to 1900 would have been slightly more of a change, but only slightly. The village would be larger; a nearby railroad might provoke wonder. Somewhere in town, someone might be operating a telegraph. Perhaps even a telephone or two could be found. Horse-drawn vehicles, dirt roads, simple houses would all be very similar, except for a few new household implementsperhaps a sewing machine, some canned food, or a kerosene-fueled lamp or stove. The town's wealthiest resident might be tinkering with a bicycle or new-fangled automobile, but he could quickly explain its workings. Adjusting would not be particularly hard for this time traveler.

Obviously, in some cities (mostly in Europe and North America), the changes brought by nineteenth-century industrialization would be more startling, with streetcars, steel, electric lighting, cash registers, elevators, telephones, moving pictures. Nevetheless, it would not take long to learn to live with and use these things.

The twentieth century would be different: A timetraveler from 1900 could not hardly begin to fathom the world of the year 2000. Being thrust into it would be a mind-boggling disorienting experience. Radio, television, airplanes, helicopters, radar, frozen food, plastics, penicillin, kidney dialysis machines, along with massproduced automobiles, refrigerators, central heating systems, air conditioning, and hundreds of other appliances and gadgets all appeared before 1950. So did also the theory of relativity, quantum mechanics, and the atomic bomb.

After 1950, the innovations and changes become even more astounding and bewildering: intercontinental ballistic missiles, the moon landing, the Mars rovers, nuclear power plants, microwave ovens, the hydrogen bomb, credit cards, personal computers and the Internet, fax machines and cell phones, the discovery of DNA, genetically engineered crops, cloning, oral contraceptives, organ transplants, artificial hearts, MRIs and CAT scans, and thousands of new medicines, to name but a few.

Three themes regarding all of this stand out:

In the first place, these amazing advances have added enormously to humans' well-being. Average life expectancy shot up in the twentieth century from about 47 years to 67 years. Income levels have risen in all but the very poorest nations on earth. In addition, a better and richer understanding of the universe, the natural environment, and the human condition has made life more meaningful for millions.

Second, the technical knowledge behind these innovations has become increasingly specialized and mysterious to all but a few highly trained experts. Even though knowledge has expanded enormously, few of us have much real understanding of the scientific principles and techniques behind most of what we use daily. In a way, the technical world appears to us almost as a sort of magic. We know it is based on science, but is our own thinking as rational, or scientific, as we think it is? And if not, what does this imply about the role of informed citizens in the future?

Third, many (if not all) of these advances can be used in harmful as well as helpful ways. As C. S. Lewis noted (see Written Source 3 for this lesson), each increase in man's power over nature is also an increase in the power of some men over others. In the case of nuclear weaponry, biological or chemical warfare, or genetic engineering, the issue has already alarmed and disturbed many. The moral questions raised are only likely to grow more challenging in the future.

The sources for this lesson should help you discuss and explore further all three of these aspects of the threat and promise of science and technology in the twentieth century.

# **Science and Technology Time Line**



The mechanically inclined Wright brothers make the first successful pilotcontrolled flight in a powered airplane.

Albert Einstein publishes his Special Theory of Relativity, which links space and time in a startling new mathematical analysis of the basic structure of the universe. Einstein's discoveries will guide the study of the farthest reaches of outer space, as well as of the strange laws governing the behavior of sub-atomic particles. They also lead to the unleashing of nuclear power and will have an impact on cultural attitudes far removed from the science itself.

Philo Taylor Farnsworth describes the basic operating principles of television and in 1927 is the first to transmit an image of 60 horizontal lines.

Scottish scientist Alexander Fleming discovers that penicillin kills bacteria. By the late 1930s, other scientists find out how to use penicillin to fight infections and save millions of lives.

The world's first particle accelerator is used to split the nucleus of an atom (lithium). In 1938, scientists in Nazi Germany split a uranium atom, annihilating some of its mass in the process. This releases energy in huge amounts in accord with Einstein's famous formula E=mc<sup>2</sup>. The possibility soon becomes clear of creating a rapid "chain reaction" of atom-splitting, thereby triggering a huge explosion. At the urging of Einstein and other scientists, the U.S. launches an effort to build a nuclear bomb ahead of the Nazis. In 1945, the U.S. successfully tests the bomb, and then uses two to destroy two cities and end the war with Japan. Thus, the atomic age is born.

Based on earlier mathematical theorizing, scientists invent the Electronic Numerical Integrator and Computer (ENIAC), the first electronic digital computer.

Francis Crick and James Watson discover the structure of DNA and determine how it carries the information needed for living organisms to develop. In 1992, a map is made of the human genome, the arrangement of all the DNA in human genes. In 1997, a British scientist clones a sheep from a single cell.

The Soviet Union launches *Sputnik,* the first man-made satellite to orbit the Earth. In the space race that follows, the U.S. will land a man on the moon in 1969.

Dr Christiaan Barnard performs the first heart transplant in South Africa, a landmark achievment after more than a decade of successes by others in performing deceased-donor organ transplants of many sorts.

The U.S. Department of Defense establishes the Advanced Research Projects Agency Networks (ARPANET), a way of sharing information among geographically dispersed defense computers. This leads ultimately to the development of the Internet.

• In-vitro fertilization results in the first "test-tube baby."

Tim Berners-Lee and others lead the way in developing the computer languages and techniques needed to create the World Wide Web.

#### DOCUMENTS 1 & 2

### Visual Primary Source Documents 1 & 2



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### Information on Documents 1 & 2

**Document 1** shows the Hubble Space Telescope in high orbit around the Earth. Named for influential American astronomer Edwin P. Hubble, this device has revolutionized our understanding of the universe. It has given us amazingly clear views of space all the way out to the most remote galaxies which formed soon after the "Big Bang," which began the universe some 13.7 billion years ago.

**Document 2** is a scan of a human brain. "Neuroimaging" is the term for the various techniques researchers now use to uncover the mysteries of the structure and functioning of the human brain. This particular image is of an MRI (Magnetic Resonance Imaging) scan. MRI machines use magnetic fields and radio waves to create detailed images of soft tissue and physiological processes as they occur, something that conventional X-ray machines cannot do. This area of technological development makes use of amazing advances in electronics and computer science to further knowledge in biological sciences and medicine, as well as to promote health and healing.