

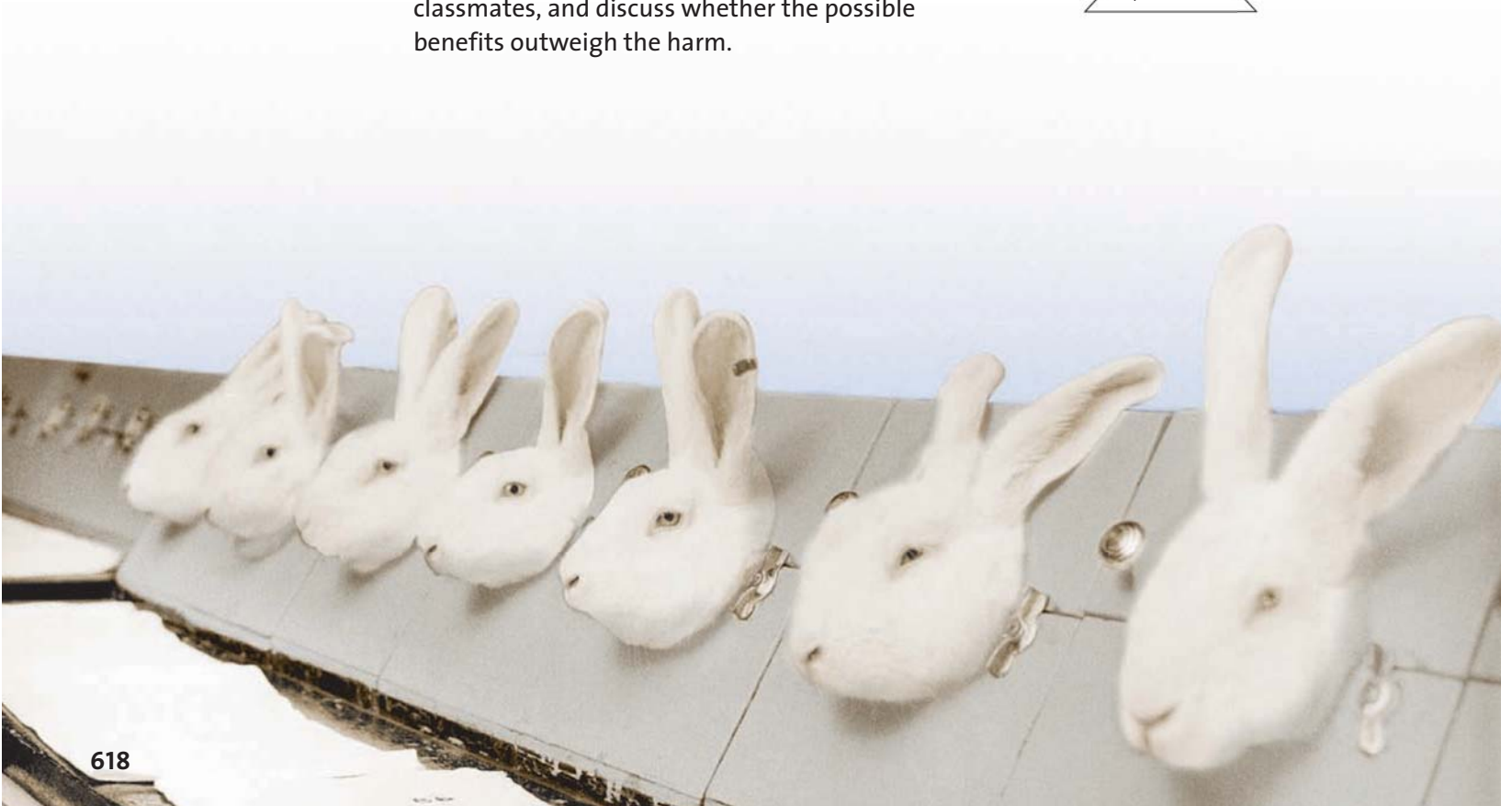
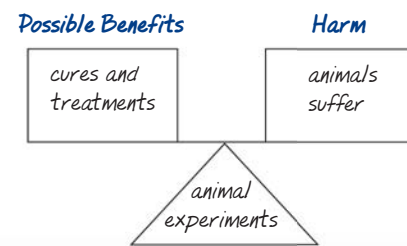
Use of Animals in Biomedical Research

Position Paper by the American Medical Association

Do the ENDS justify the means?

KEY IDEA You have read about Jane Goodall's objections to some aspects of **animal research**. In "Use of Animals in Biomedical Research," the American Medical Association addresses the issue of whether improving human health outweighs the suffering of animals in medical laboratories.

DISCUSS Think of a situation in which an unpleasant or disturbing action may lead to a worthy outcome. Create a balance scale like the one shown. Jot down the possible benefits of the action in one box and the harm caused by it in the other. Share your balance scale with your classmates, and discuss whether the possible benefits outweigh the harm.



● ELEMENTS OF NONFICTION: COUNTERARGUMENTS

Although the American Medical Association is firmly in favor of using animals in research, it does not ignore the views of opponents. Instead, it states the opponents' views and then disputes them with **counterarguments**. As you read "Use of Animals in Biomedical Research," use a chart like the one shown to keep track of counterarguments in the selection.

| <i>Opposing Viewpoint</i> | <i>Counterargument</i> | <i>Support for Counterargument</i> |
|---|---|--|
| <i>Animal experimentation isn't needed.</i> | <i>Most modern medical advances have required such experiments.</i> | <i>Many Nobel Prizes have been awarded for medical research involving animals.</i> |

● READING STRATEGY: MONITOR

When you **monitor** as you read, you check your comprehension and use strategies to improve it. For example, if you find an argument difficult to follow, you might slow your reading pace. The following strategies may be helpful for reading "Use of Animals in Biomedical Research":

- Ask questions about ideas in the text, and read to find the answers.
- Reread difficult passages. Paraphrase if necessary.

As you read, note passages or words that are unclear to you, and use these strategies to increase your understanding.

▲ VOCABULARY IN CONTEXT

Figure out the meaning of each word from the context provided, and write a sentence that shows your understanding.

1. support from a **proponent** of this plan
2. a **speculative** and unreliable conclusion
3. a speech full of insincere **rhetoric**
4. obstacles that **impede** our progress

Background

American Medical Association

Founded in Philadelphia in 1847, the American Medical Association (AMA) is the largest professional organization for physicians in the United States. The AMA identifies its core purpose as the promotion of "the science and art of medicine and the betterment of public health." The AMA formulates policies on a wide range of health care and ethical issues, such as tobacco use and discrimination against AIDS patients. Many important studies have been published in the prestigious *Journal of the American Medical Association*.

Animal Rights Versus Animal Welfare

Discussions of animal protection often distinguish between the animal rights and animal welfare movements. Animal rights advocates believe that all experimentation on animals is wrong, even if it relieves human suffering. According to People for the Ethical Treatment of Animals (PETA), the world's largest animal rights organization, "animals, like humans, have interests that cannot be sacrificed or traded away just because it might benefit others. . . . Animals are not ours to use for food, clothing, entertainment, or experimentation." Animal welfare advocates, on the other hand, do not entirely rule out the use of animals in research, but they believe that the animals should be treated as humanely as possible. The animal welfare movement also calls for a reduction in the numbers of animals used in research and for the development of experimental procedures that do not require animals.



Use of Animals in Biomedical Research

American Medical Association

Animals have been used in experiments for at least 2,000 years, with the first reference made in the third century B.C. in Alexandria, Egypt, when the philosopher and scientist Erisistratus used animals to study body functions.

Five centuries later, the Roman physician Galen used apes and pigs to prove his theory that veins carry blood rather than air. In succeeding centuries, animals were employed to discover how the body functions or to confirm or disprove theories developed through observation. Advances in knowledge made through these experiments included Harvey's demonstration of the circulation of blood in 1622, the effect of anesthesia on the body in 1846, and the relationship between bacteria and disease in 1878.

Today, animals are used in experiments for three general purposes: (1) biomedical and behavioral research, (2) education, (3) drug and product

testing. . . . Biomedical research increases understanding of how biological systems function and advances medical knowledge. . . . Educational experiments are conducted to educate and train students in medicine, veterinary medicine, physiology,¹ and general science. In many instances, these experiments are conducted with dead animals. . . . Animals also are employed to determine the safety and efficacy² of new drugs or the toxicity³ of chemicals to which humans or animals may be exposed. Most of these experiments are conducted by commercial firms to fulfill government requirements. . . .

Use of Animals Rather than Humans

A basic assumption of all types of research is that man should relieve human and animal suffering. One objection to the use of animals in

A MONITOR

What additional information might help you understand lines 20–39?

1. **physiology** (fīz'ē-ōl'ə-jē): a branch of biology that deals with the functioning of organisms.
2. **efficacy** (ēf'ī-kə-sē): the capacity to produce a desired effect.
3. **toxicity** (tōk-sī's'ī-tē): the quality of being poisonous or harmful.

biomedical research is that the animals are used as surrogates for human beings. This objection presumes the equality of all forms of life; animal rights advocates argue that if the tests are for the benefit of man, then man should serve as the subject of the experiments. There are limitations, however, to the use of human subjects both ethically, such as in the testing of a potentially toxic drug or chemical, and in terms of what can be learned. The process of aging, for instance, can best be observed through experiments with rats, which live an average of two to three years, or with some types of monkeys, which live 15 to 20 years. Some experiments require numerous subjects of the same weight or genetic makeup or require special diets or physical environments; these conditions make the use of human subjects difficult or impossible. By using animals in such tests, researchers can observe subjects of uniform age and background in sufficient numbers to determine if findings are consistent and applicable to a large population. **B**

Animals are important in research precisely because they have complex body systems that react and interact with stimuli much as humans do. The more true this is with a particular animal, the more valuable that animal is for a particular type of research. One important property to a researcher is discrimination—the extent to which an animal exhibits the particular quality to be investigated. The greater the degree of discrimination, the greater the reliability and predictability of the information gathered from the experiment.

For example, dogs have been invaluable in biomedical research because of the relative size of their organs com-

pared to humans. The first successful kidney transplant was performed in a dog, and the techniques used to save the lives of “blue babies,” babies with structural defects in their hearts, were developed with dogs. Open-heart surgical techniques, coronary bypass surgery,⁴ and heart transplantation all were developed using dogs.

Another important factor is the amount of information available about a particular animal. Mice and rats play an extensive role in research and testing, in part because repeated experiments and controlled breeding have created a pool of data to which the findings from a new experiment can be related and given meaning. Their rapid rate of reproduction also has made them important in studies of genetics and other experiments that require observation over a number of generations. Moreover, humans cannot be bred to produce “inbred strains”⁵ as can be done with animals; therefore, humans cannot be substituted for animals in studies where an inbred strain is essential. **C**

Scientists argue repeatedly that research is necessary to reduce human and animal suffering and disease. Biomedical advances depend on research with animals, and not using them would be unethical because it would deprive humans and animals of the benefits of research. . . .

Benefits of Animal Experimentation

The arguments advanced by animal rights activists in opposing the use of animals in biomedical research . . . are scientific, emotional, and philosophic. . . . The scientific challenge raised by animal rights activists goes to the heart

4. **coronary bypass surgery:** open-heart surgery to improve the blood supply to the heart.

5. **inbred strains:** groups of animals produced by the mating of siblings over at least 20 generations, resulting in individuals as genetically similar as possible.

B COUNTERARGUMENTS

What counterargument is given to dispute the view that humans should be the subjects of experiments that benefit humans?

C MONITOR

How would you paraphrase the main idea in lines 110–114?

of the issue by asking whether animal
130 experiments are necessary for scientific
and medical progress and whether all
the experiments being performed and
all the animals being used are justified
and required. Scientists insist that they
are; animal rights activists insist that
they are not.

Scientists justify use of animals in
biomedical research on two grounds: the
140 contribution that the information makes
to human and animal health and welfare,
and the lack of any alternative way to
gain the information and knowledge.
Animal rights activists contest experi-
ments that utilize animals on both these
grounds and assert that this practice no
longer is necessary because alternative
methods of experimentation exist for
obtaining the same information. **D**

D MONITOR

Reread lines 137–148.
What questions do you
have about the ideas in
this passage?

In an appearance on the *Today* show
150 in 1985, Ingrid Newkirk, representing
People for the Ethical Treatment of
Animals (PETA), stated: “If it were such
a valuable way to gain knowledge, we
should have eternal life by now.” This
statement is similar in spirit to one made
in 1900 by an antivivisectionist⁶ who
stated that, given the number of experi-
ments on the brain done up to then,
the insane asylums of Washington, D.C.
160 should be empty.

Scientists believe that such assertions
miss the point. The issue is not what
has not been accomplished by animal
use in biomedical research, but what *has*
been accomplished. A longer life span
has been achieved, decreased infant
mortality⁷ has occurred, effective treat-
ments have been developed for many
diseases, and the quality of life has been
170 enhanced for mankind in general.

One demonstration of the criti-
cal role that animals play in medical
and scientific advances is that 54 of
76 Nobel Prizes awarded in physiolo-
gy or medicine since 1901 have been
for discoveries and advances made
through the use of experimental ani-
mals. Among these have been the Prize
awarded in 1985 for the studies (using
180 dogs) that documented the relation-
ship between cholesterol and heart
disease; the 1966 Prize for the studies
(using chickens) that linked viruses
and cancer; and the 1960 Prize for
studies (using cattle, mice, and chicken
embryos) that established that a body
can be taught to accept tissue from dif-
ferent donors if it is inoculated⁸ with
different types of tissue prior to birth
190 or during the first year of life, a finding
expected to help simplify and advance
organ transplants in the future. Studies
using animals also resulted in success-
ful culture of the poliomyelitis⁹ virus;
a Nobel Prize was awarded for this
work in 1954. The discovery of insulin
and treatment of diabetes, achieved
through experiments using dogs, also
earned the Prize in 1923.

200 In fact, virtually every advance in
medical science in the 20th century,
from antibiotics and vaccines to anti-
depressant drugs and organ transplants,
has been achieved either directly or indi-
rectly through the use of animals in labo-
ratory experiments. The result of these
experiments has been the elimination
or control of many infectious diseases—
smallpox, poliomyelitis, measles—and
the development of numerous life-saving
210 techniques—blood transfusions, burn
therapy, open-heart and brain surgery.

6. **antivivisectionist** (än'tê-vîv'î-sëk'shən-îst): someone opposed to the act of operating on live animals for science experiments.

7. **infant mortality**: the death rate during the first year of life.

8. **inoculated** (î-nök'yə-lä'tîd): injected.

9. **poliomyelitis** (pô'lê-ô-mî'ê-lî'tîs): a highly infectious viral disease that generally affects children and may lead to paralysis and deformity. Also called *polio*.



A boy is vaccinated for polio in 1955 under the gaze of his sister, who became paralyzed from a polio infection. The first polio vaccine was developed through experiments on animals.

This has meant a longer, healthier, better life with much less pain and suffering. For many, it has meant life itself. Often forgotten in the **rhetoric** is the fact that humans *do* participate in biomedical research in the form of clinical trials.

They experience pain and are injured, and in fact, some of them die from this participation. Hence, scientists are not asking animals to be “guinea pigs” alone for the glory of science. . . . **E**

Scientists feel that it is essential for the public to understand that had scientific research been restrained in the first decade of the 20th century as antivivisectionists and activists were then and are today urging, many millions of Americans alive and healthy today would never have been born or would have suffered a premature death. Their parents or grandparents would have died from diphtheria, scarlet fever, tuberculosis, diabetes, appendicitis, and countless other diseases and disorders. . . .

The Danger of Restricting Research

The activities and arguments of animal rights and animal welfare activists and organizations present the American people with some fundamental decisions that must be made regarding the use of animals in biomedical research.

The fundamental issue raised by the

philosophy of the animal rights movement is whether man has the right to use animals in a way that causes them to suffer and die. To accept the philosophical and moral viewpoint of the animal rights movement would require a total ban on the use of animals in any scientific research and testing. The consequences of such a step were set forth by the Office of Technology Assessment (OTA) in its report to Congress: “Implementation of this option would effectively arrest most basic biomedical and behavioral research and toxicological testing in the United States.” The economic and public health consequences of that, the OTA warned Congress, “are so unpredictable and **speculative** that this course of action should be considered dangerous.” **F**

No nation and no jurisdiction within the United States has yet adopted such a ban. Although . . . laws to ban the use of animals in biomedical research have been introduced into a number of state legislatures, neither a majority of the American people nor their elected representatives have ever supported these bills.

Another aspect of the use of animals in biomedical research that has received little consideration is the economic consequences of regulatory change. Clearly, other nations are not curtailing the use of animals to any significant degree. Some of these, like Japan, are major competi-

rhetoric (rĕt'ər-ĭk) *n.*
grand but empty talk

E COUNTERARGUMENTS

What opposing viewpoints are disputed in lines 200–223?

speculative
(spĕk'yə-lə-tĭv) *adj.* based on guesses and theories rather than fact

F MONITOR

What strategy would you use to gain a deeper understanding of lines 251–262?

G GRAMMAR AND STYLE

Reread lines 313–325. Because this is a paper written for a professional audience, it contains elements of **formal language**, including complex vocabulary and sentence structure, standard punctuation, and a lack of contractions.

proponent (prə-pō'nent)
n. a person who pleads for or supports a cause

impede (ĩm-pēd') *v.* to obstruct or hinder

H COUNTERARGUMENTS

What counterargument is made in response to the animal welfare movement in lines 326–336?

tors of the United States in biomedical research. Given the economic climate
280 in the United States, our massive trade imbalance, and our loss of leadership in many areas, can the United States afford not to keep a leading industry, i.e., biomedical science, developing as rapidly as possible? Many nations are in positions to assume leadership roles, and the long-term economic impact on our citizens could be profound. This economic impact would be expressed in
290 many ways, not the least of which would certainly be a reduction in the quality and number of health services available for people who need them.

Through polls and by other means, the American people have indicated that they support the use of animals in research and testing. At the same time they have expressed a strong wish that the animals be protected against
300 any unnecessary pain and suffering. The true question, therefore, is how to achieve this without interfering with the performance of necessary research. Scientists already comply with a host of federal, state, municipal, and institutional guidelines and laws. However, in this era of cost containment, they fear that overregulation will become so costly that research progress will suffer.
310 Scientists emphasize that a reasonable balance must be achieved between increased restrictions and increased cost.

What must be recognized, say scientists, is that it is not possible to protect all animals against pain and still conduct meaningful research. No legislation and no standard of humane care can eliminate this necessity. The only alternative is either to eliminate
320 the research, as animal rights adherents urge, and forego the knowledge and the benefits of health-related research that would result, or to inflict the pain

and suffering on human beings by using them as research subjects. **G**

The desire by animal welfare **proponents** to ensure maximum comfort and minimal pain to research animals is understandable and appeals
330 to scientists, the public, and to legislators. But what also must be recognized and weighed in the balance is the price paid in terms of human pain and suffering if overly protective measures are adopted that **impede** or prevent the use of animals in biomedical research. **H**

In short, the American people should not be misled by emotional appeals and philosophic rhetoric on this issue.
340 Biomedical research using animals is essential to continued progress in clinical medicine. Animal research holds the key for solutions to AIDS, cancer, heart disease, aging, and congenital defects.¹⁰ In discussing legislation concerning animal experimentation, the prominent physician and physiologist Dr. Walter B. Cannon stated in 1896 that “. . . the antivivisectionists are the second of the
350 two types Theodore Roosevelt described when he said, ‘Common sense without conscience may lead to crime, but conscience without common sense may lead to folly, which is the handmaiden of crime.’”

The American Medical Association has been an outspoken proponent of biomedical research for over 100 years, and that tradition continues today.
360 The Association believes that research involving animals is absolutely essential to maintaining and improving the health of the American people. The Association is opposed to any legislation or regulation that would inappropriately limit such research, and actively supports all legislative efforts to ensure the continued use of animals in research, while providing for their humane treatment.

10. **congenital defects:** defects present at birth.

Comprehension

1. **Recall** What is the AMA's position on the use of animals in medical research?
2. **Recall** How important has **animal research** been to medical science?
3. **Clarify** How do the animal rights and animal welfare movements differ from each other?
4. **Summarize** According to the AMA, what consequences will result from banning or restricting the use of animals in medical experiments?

Critical Analysis

5. **Recognize Monitoring Techniques** Identify the passage in the selection that you found most difficult to understand. Discuss how one or more strategies helped you monitor your comprehension of the passage.
6. **Interpret Statements** Reread lines 301–336. Does the AMA favor any changes in current practice to minimize the pain and suffering of research animals? Give reasons for your interpretation.
7. **Draw Conclusions** What values have influenced the AMA's position on animal research? Cite evidence to support your conclusion.
8. **Make Judgments** Does the AMA fairly represent the opposing viewpoints of the animal rights movement in this paper? Explain why or why not.
9. **Evaluate Support** Consider the **reasons** and **evidence** that the AMA gives to support the view that animal research is necessary for medical science. Does the AMA provide sufficient support for its claim? Explain your opinion.
10. **Evaluate Counterargument** Supporters of animal rights argue that it is morally wrong for humans to use animals in a way that causes them to suffer or die. Review the chart you created as you read. Does the AMA offer a satisfactory counterargument to this viewpoint? Cite evidence to support your opinion.
11. **Compare Texts** The AMA's position on animal research differs greatly from the views expressed by Jane Goodall in "I Acknowledge Mine." Compare and contrast the techniques that the AMA and Goodall use to persuade readers.

Vocabulary in Context

VOCABULARY PRACTICE

Choose the word from the list that best completes each sentence.

1. Until we get the facts from the proper sources, everything is _____.
2. Concrete actions speak louder than empty _____.
3. As a _____ of conservation, she signed a petition for the preservation of wetlands.
4. I do not want to _____ your work, so please let me know if I'm a distraction.

WORD LIST

impede
proponent
rhetoric
speculative

VOCABULARY IN WRITING

Using two or more vocabulary words, write about the importance of science in your life. Here is an example of how you might begin.

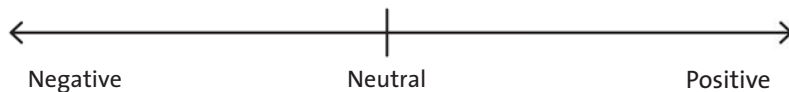
EXAMPLE SENTENCE

*I am a **proponent** of increased funding for science education because I believe that people need to make informed decisions about scientific issues, such as the use of animals in research.*


VOCABULARY STRATEGY: CONNOTATION

A word's **connotation** is the overtone of meaning that it has beyond its basic meaning. Some connotations may be positive or negative. For example, although the nouns *rhetoric* and *discourse* can both be used to refer to written or oral expression in language, *rhetoric* can have a negative connotation because it can suggest language that is empty or insincere. When you choose words in writing, be sure to consider whether their connotations fit the context.

PRACTICE Place the words in each group on a continuum like the one shown, to identify whether they have positive, negative, or neutral connotations. Then compare your answers with those of a classmate.



1. sentimental, overemotional, romantic
2. childlike, youthful, immature
3. thrifty, economical, stingy
4. strange, quaint, peculiar

 **VOCABULARY PRACTICE**
For more practice, go to the **Vocabulary Center** at ClassZone.com.

Reading-Writing Connection

Explore the ideas presented in “Use of Animals in Biomedical Research” by responding to these prompts. Then use **Revision: Grammar and Style** to improve your writing.

| WRITING PROMPTS | SELF-CHECK |
|--|---|
| <p>A. Short Response: Write a Speech</p> <p>Suppose that you were invited to speak at the opening of a new medical research laboratory. Write a one- or two-paragraph speech in which you discuss the benefits of animal research.</p> | <p>An effective speech will . . .</p> <ul style="list-style-type: none">• explain why animals are used in medical research• include information from the selection on achievements made possible by animal research |
| <p>B. Extended Response: Write a Letter</p> <p>How do you feel about animal rights, animal welfare, and the use of animals in experiments? Write a three- to-five-paragraph letter to the AMA in which you express your views on these issues.</p> | <p>A strong letter will . . .</p> <ul style="list-style-type: none">• clearly state your personal views• provide reasons and evidence to support those views |

REVISION: GRAMMAR AND STYLE

CONSIDER AUDIENCE Review the **Grammar and Style** note on page 624. When deciding how to craft a particular piece of writing, it is important to consider your audience. For example, your writing style in an e-mail to a friend will probably differ from the style you use in a research paper. For most school and business communication, you should use **formal language**. Typically, this style of language does not contain contractions and consists of standard punctuation and more complex vocabulary and sentence structure. Here is an example of how the American Medical Association uses formal language in its position paper.

Animal rights activists contest experiments that utilize animals on both these grounds and assert that this practice no longer is necessary because alternative methods of experimentation exist for obtaining the same information. (lines 143–148)

Notice how the revisions in red create a more formal writing style. Use similar methods to revise your responses to the prompts.

STUDENT MODEL

This wonderful new research facility is part of a tradition that goes back *hundreds of years. Many* a long ways. *Lots of* people contributed to its completion. *which* ~~This~~ shows that support for science remains strong.

WRITING TOOLS

For prewriting, revision, and editing tools, visit the **Writing Center** at ClassZone.com.