

Waiting to Inhale

INTEGRATED
CURRICULUM UNIT
ON TOBACCO
AND SMOKING

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UNIT OVERVIEW

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Unit Summary

Although smoking is perceived with increasing disfavor in the United States, it is a habit that continues to flourish around the world and is taken up by thousands of young people every day. In this unit, students will explore the past and present influence of tobacco on social, political, and economic life in the United States and around the world and its impact on individual and public health.

In Subunit 1, students are introduced to the historical and economic realities of tobacco. They will explore the origin of tobacco use and the development of the tobacco industry, beginning with the European exploration of the Americas and including the role of tobacco in the founding and growth of our nation. Students will also learn about the economic impact of tobacco by examining current trends of tobacco sales and regulation in the United States and around the world.

Subunit 2 turns to the physiological and general health effects of tobacco. Students begin with the action pathway of nicotine, exploring the biological causes of tobacco addiction by studying the brain and the function of neurotransmitters. The subunit also includes lessons on the effects of tobacco use on various body systems, such as the cardiovascular and respiratory systems, for smokers and those around them. The subunit concludes with suggestions for quitting.

In Subunit 3, students examine how advertising helps to create an appealing public image of tobacco and to minimize the negative effects. Students will begin by reviewing the history of tobacco in the public eye in the 20th century. They will also analyze domestic and foreign tobacco ads and create their own advertisements promoting the true effects of tobacco use.

The unit concludes with students examining current and proposed legislation and regulations to ban smoking in public areas. Variations on this type of legislation are becoming more common in the United States, and have drawn varying levels of opposition from the tobacco industry, smokers, and individual-rights advocates. Students will review the positions of the various stakeholders and discuss their views on the essential question.

Culminating Event

This unit could culminate with a variety of projects. Students could have a formal debate over the essential question. Alternatively, they could use their antismoking advertisements to launch a campaign in the school or community. Another possibility would be to have students research their own community's laws and regulations regarding smoking and possibly advocate for changes that would improve public health.

Key Questions/Issues

- Tobacco is native to the Americas. What is the history of the spread of tobacco use around the world? What role did tobacco play in the founding of our nation? (World History)
- What are the short- and long-term physical effects of tobacco use? What are the short- and long-term effects of secondhand smoke? (Biology and Health Science I)
- Why is it so hard to stop smoking? (Biology and Health Science I)
- What are some techniques or methods I can use to help someone quit smoking? (Biology and Health Science I)
- How do we currently regulate tobacco use and distribution in the United States? How has this changed over time? What are the major recent court and legal decisions affecting tobacco production and use? (U.S. Government)
- If tobacco is so bad for you and everyone knows it, why is it legal? Is it all a big conspiracy? (World History and U.S. Government)

Waiting to Inhale

UNIT OVERVIEW

- How much does it cost to smoke? How much will I spend over the course of my life if I smoke? (Algebra I and II)
- I know people who smoked who lived to be 80. Doesn't this prove that smoking is it not really so bad for my health? (Algebra I)
- How has public opinion about tobacco changed over the years? What forces have influenced our opinions? (History and English Language Arts)
- How do tobacco companies persuade new consumers to start smoking? (English Language Arts)
- How has medical opinion about tobacco changed over the years? (History and Health Science I)

Learning Scenario to Kick Off the Unit

Every day it becomes a little harder to be a smoker. There is no smoking in restaurants, no smoking in stores, certainly no smoking on school property—not even in the parking lot! Smoking is banned in all government buildings. Smoking is even banned at some beaches. And in 2006, Calabasas, California, passed the country's strictest legislation, banning smoking in all public indoor and outdoor locations.

It gets more and more expensive to purchase cigarettes, and legislatures keep raising the taxes. Sometimes more than 50% of the cost is going to taxes. Some people say this is appropriate: smokers should pay for their habit—through taxes—because they are more likely to get cancer and require expensive medical care. Others say it's not fair. Through it all, many smokers are starting to get angry. They argue that they are being treated like criminals, forced to stand outside in back alleys and pay exorbitant fees to indulge in their completely legal habit. What is the right action to take?

Biomedical/Healthcare and Education Partner Roles

- The school librarian or media specialist can assist students with research on tobacco use and advertising. Students can use the media center to find magazine and other advertising materials for analysis.
- Professional partnerships could include local and state government agencies, the American Red Cross, National Health Occupations Students of America (HOSA), and local public health officials.

SUBUNITS AND MAJOR TOPICS (ACROSS ACADEMIC AND TECHNICAL SUBJECT AREAS)

Subunit 1 <i>Smoking and Society</i>	Subunit 2 <i>Smoke and Fire</i>	Subunit 3 <i>Smoke and Mirrors</i>
ENGLISH LANGUAGE ARTS · WORLD HISTORY · U.S. GOVERNMENT · ALGEBRA I · ALGEBRA II	BIOLOGY · HEALTH SCIENCE I · ENGLISH LANGUAGE ARTS	ENGLISH LANGUAGE ARTS · VISUAL ARTS
<ul style="list-style-type: none"> • Historical social and economic impact of the discovery and exportation of tobacco from the Americas • Laws and regulations regarding tobacco distribution and use • Financial cost of smoking for individuals, using rate of inflation and geometric series • Graphing linear and exponential equations • Counterexamples in mathematics 	<ul style="list-style-type: none"> • Nervous system, including parts and function of the brain, neurons, neurotransmitters, and action potential • Chemical properties of the nicotine molecule and its effect on neurotransmission • Primary biological effects of tobacco smoke on the function and structures of the respiratory system • Potential physical effects of smoking and secondhand smoke • Strategies to quit smoking 	<ul style="list-style-type: none"> • Changes in social and cultural perception of tobacco use and influence of tobacco in the United States • Contextual analysis of print materials in English • Persuasive rhetoric in writing • Writing for specific audiences • Communication through visual art

Smoking and Society

SUBUNIT 1 OVERVIEW

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Subunit Goals

Subunit 1 gives students a view of tobacco use that extends from individual experience and misconceptions to historical impacts and national policy decisions. Students begin by interviewing smokers to get a real-life picture of how smoking affects the individual. They then examine the impact of the tobacco industry on the world and this nation. The subunit concludes with mathematical modeling of the financial cost of smoking and the likelihood of becoming ill from using tobacco.

Subunit Key Questions

- Why do people, especially teens, begin to smoke when everyone knows it is bad for you? (English Language Arts)
- What has been the economic impact of tobacco on the world, and especially the U.S.? How have regulations and policy involving tobacco changed over time? (World History and U.S. Government)
- What are the financial costs of a smoking habit to the individual and to society? (Algebra I or II)
- How likely is it that I will get sick from smoking when I haven't seen any sick smokers around me? (Algebra I)

Lesson Summaries

Lesson	Subject	Description
1.1	English Language Arts	Smoking: Up Close and Personal Students interview current and past smokers about their experiences of becoming addicted and trying to quit. They also consider the efficacy of the messages in anti-smoking advertising.
1.2	World History	Tobacco Timeline Students trace the growth and regulation of the tobacco industry from the introduction of tobacco in Europe to the present.
1.3	U.S. Government	Tobacco Legislation and Litigation Students research the range of laws and regulations that govern smoking at the state and national levels. They also examine important court cases involving the tobacco industry.
1.4	Algebra I or II	An Expensive Habit Students explore linear and exponential relationships based on the additive cost of smoking over a number of years.
1.5	Algebra I	It Won't Happen to Me Students analyze the common perception that if you have never observed the negative health effects of smoking in others, then smoking can't harm you. Students work with the concepts of sampling, percentages, and counterexamples to explore emphysema rates in smokers.

Smoking: Up Close and Personal

LESSON 1.1

ENGLISH LANGUAGE ARTS

Time
50 minutes

Materials
Smokers Speak Out handout

Prior Student Learning
Students should know how to conduct interviews and turn their data into short reports.

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Objectives

After completing this lesson, students will be able to

- Describe why their peers begin to smoke, continue to smoke, attempt to quit and fail, or finally abandon the habit.
- Construct an interview protocol and conduct an interview with a smoker or ex-smoker.
- Write a coherent report of three to five pages based on their interview data.

Lesson Activities

Lesson Springboard

Everyone knows “smoking is bad for you.” And everyone knows that teenagers who smoke will die much earlier if they don’t quit than their peers who never smoke at all. Moreover, teens who smoke find it much harder to quit than people who start to smoke in their 20s or 30s. So why do so many teens take up smoking? Ask students for their views. Invite current smokers to explain why they started, but don’t pressure them to speak. Ask students whether teens begin to smoke, and continue to smoke, for the same reasons as those presented in antitobacco advertising. Do antismoking advocates reach teens? In which ways do they succeed, and where do they fail?

Lesson Development

Class Discussion

One answer to why teens smoke is that they don’t think very much about the future, which is very far away—and furthest away is old age, illness, and death. Few 16-year-olds think much about death, even when they are committed smokers and risk a death that will be painful and premature. Antitobacco ads that focus on smokers’ mortality tend not to be very effective among teens.

What’s missing in a lot of discussion about young people and smoking is the simple question “How does it feel to smoke?” What is it like to *be* a smoker, in the beginning or after some years of smoking, and what is it like to quit (or to attempt to quit)? In all the research on smoking, and all the ads that condemn it, there’s not much information about the actual experience of teens who smoke—or at least not much that comes from teenagers themselves.

Ask the class what messages they can remember from antismoking advertisements or other sources that discourage smoking, such as parents,

Subunit 1—Smoking and Society

Smoking: Up Close and Personal

LESSON 1.1

guest speakers, or lessons they've had in school. Which messages were effective, and which seemed distant, irrelevant, or abstract?

Interview Project

Tell students that in this lesson they will fill in the gaps that are obvious in so much antismoking advertising and research. They will conduct interviews with smokers (or ex-smokers) to investigate smoking *as a personal experience*, and in *as much detail as possible*. They may interview more than one subject, and are free to touch on any aspect of smoking as it affects the smoker or the people around him or her. They may even conduct the interview in the form of a focus group or a conversation. But at a minimum, students must address these issues:

- When and why did you begin to smoke?
- How did it feel when you began to smoke, and did the feeling change as you continued? If so, when?
- Did you try to quit? What was that like?
- If you're an ex-smoker, how do you look back on your experience? Does it seem different now in some ways than it did when you were smoking?

In the remaining time, students will prepare their questionnaire and consider whom they will interview. Distribute the Smokers Speak Out handout to help students envision their interview. You may have them pair off to practice a short interview.

Lesson Closure

Remind students that their job is to investigate smoking as a personal experience in all of its fine-grained and often grim detail and to report about this experience. The interview must provide considerable detail about the smoking experience, sufficient to be the main source for a written report. The report must be written in the third person and be between three and five pages long. It must not be a verbatim transcript of the interview.

Possible Prior Misconceptions

Students may confuse the interview with the questionnaire. Although interviews are structured by questions, they allow room for the subject to extrapolate and may take the form of a conversation. Likewise, a report is not a verbatim transcript but allows the writer to organize and select from the data.

Student Assessment Artifacts

Three- to five-page report based on original interview

Variations and Extensions

Most anti-tobacco statements focus on smoking and mortality, but critics say this is ineffective because teens are oblivious to the future. Put the critics to the test. Ask students to imagine growing old, in as much

Smoking: Up Close and Personal

LESSON 1.1

detail as possible, and write down their thoughts. Give them time to ponder this. With old age comes sickness, fatigue, weakness, disability, and a myriad of aches and pains. All of these come sooner for people who smoke.

Divide students into teams and have each team organize a focus group on the smoking experience. Focus groups work best if their members are diverse and can draw upon different backgrounds and points of view. Have the teams videotape their focus groups and select the best videos to view in class.

National and State Academic Standards

NATIONAL

NCTE Standards for the English Language Arts

4. Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.
5. Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.
6. Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language, and genre to create, critique, and discuss print and non-print texts.
12. Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).

STATE

List your state-specific standards in the space below.

Name _____ Date _____ Period _____

Smokers Speak Out

The following are comments from smokers about their experience, excerpted from a variety of sources. They may help you formulate your questions and give you an idea of the sorts of things smokers expect, long for, flee from, anguish over, or simply take into account as a part of their lives.



“At the age of 15 I was a fitness junkie. Sports were my life, and I was full of courage and confidence. If anybody had said to me that I would end up smoking a hundred cigarettes a day, I would have just laughed in his face ... By the age of 40 I was addicted to smoking. I reached the stage where I couldn’t carry out the most mundane act without lighting up. I couldn’t even change a TV channel or a light bulb without lighting up.” (Journalist, 55)



“You can’t smoke at the movies. That’s two hours without a cigarette. Is this movie worth going two hours without a cigarette for? You’ll notice that if you have friend that smokes, they will want to smoke in your car while going to the movies. If they can’t smoke on the way there, they will have to smoke outside just before going in. That way they can get their “fix” that will last them for two hours. If they are really addicted, they will have to smoke one in the middle of the movie. So instead of enjoying the story, they will be looking for a boring part so they can sneak out and burn one without missing anything.” (College student, 22)



“I got to where smoking, the smell and taste of it, was normal for me. It wasn’t till after I quit that I felt what my friends, at least the ones who didn’t smoke, must have felt all along. When a smoker smokes, the cigarette smoke fills the room. Everyone has to breathe it. And to a nonsmoker, it stinks. There can be a room with 200 people, and if just one person smokes it changes everything. You are now in a smoky room. The smell goes everywhere and gets into everything. Even after the smoker leaves, his smell is still there. It also gets into your clothes and hair. Now, a few years after I quit, if I’m in a room with smokers, I have to go home and change clothes and take a bath to get rid of the smell. Sometimes I have to put my clothes outside so as not to stink up the house.” (Plumber, 35, three years after quitting)



“I’m short of breath and can’t run as far as I used to. It’s harder, say, walking uphill on hot humid days, which is a problem for me at football practice because our coach makes us run the stadium steps and it’s almost impossible to do without wheezing or coughing. Fortunately, I’m in great shape and can compensate for that. It just takes more effort to keep up. I figure that if I smoke, I just have to work that much harder.” (High school student, 18)



“I started when I was 15, because my boyfriend smoked, and so did a couple of my good friends. It was just a social thing at first, but eventually I was addicted. I’ve tried to quit several times, either cold turkey or gradually weaning myself away, but here I am, still a smoker. I always go back to cigarettes. I always end up back at the smoker’s pit at my school. There’s a hill you have to walk up to get to the pit. Because I’m a smoker, I get out of breath walking up the hill. Then at the top, I light a cigarette. It doesn’t help.” (High school student, 18)

Name _____ Date _____ Period _____

“I’m 16 years old. I started smoking maybe about two years ago, in my freshman year of high school, and I did it mainly because it was my choice. Some of my friends smoked and some of them didn’t. I didn’t do it to hang out with anyone, but I think maybe I did it to tick my parents off or as my way of rebelling, maybe. I only smoked for about three months, and during those three months, I think I became quite addicted. But stopping: my parents watched me and I was not allowed to go anywhere or do basically anything until I had proven to them that I had quit. So they kind of cut off my supply of getting any cigarettes. And about six months after that, I hadn’t had a cigarette because I had almost no way of getting to one.” (High school student, 16)



“One night I was hanging out with my friend who is a smoker. He was like, “Hey, man, take a cig.” We were in my home, so I didn’t smoke it. I just had the cigarette stuck in my mouth. I was walking around like I was cool, with my brother (who also had a cigarette in his mouth), playing out scenes from *Good Will Hunting*. We felt cool, holding the cigarette in different positions, flicking the butt. Then my brother, Joe, and I went out to buy something. Joe suggested we go by the park and have a puff. I was about to decline when I thought, let me just try it and see what all the rave is about. The whole thing was a rush—from the first puff until I stubbed it out, leaving a stain of ashes on the cement. I felt so cool, watching the smoke coming out of my mouth. My brother and I practiced trying to have a conversation while smoking. Wasn’t that cool? Remember how Matt Damon flicked his butt in *Good Will Hunting*? “That’s cool! Let’s do that!” raved my younger brother. It was the high point of the week: how cool we felt smoking.” (Software developer, 24)



“It’s said that many young people start smoking because of peer pressure and the glamorization of smoking on television and in advertisements, but our research implies the opposite might be true. Most of the youths we interviewed think peer pressure is just a crazy idea because they don’t experience it. The times they have smoked, they said it was because the cigarette was there and available, not because they were pressured into it. We also found that younger kids seem to experiment with tobacco all the way to high school, but then things change. At the high-school level, it’s no longer about curiosity. They start identifying themselves as smokers. And ... if we have ads telling young kids to stop smoking, but they don’t see themselves as smokers, then that advertising goes right over their heads.” (Anthropology student, University of Florida, 21)



“I had been thinking about smoking for awhile, and today I finally decided to try it on the way to work. I am 18 but have never done anything like this before. I was really nervous and excited when buying my first pack and lighter. I decided to get Camel Lights because I thought it would be a good first one to try. I was really nervous, but it ended up fine ... I felt bad and tough—but in a good way. I was anxious to light it up so I went to a shopping center and parked and opened my car door ... I lit my first cigarette. It was pretty cool holding it and watching the smoke come out of the tip, and I felt really good about it. So after holding it and feeling good I decided to take my first drag. I tried to make it as short as possible, and I did, and nothing really happened. Weird. So I tried it again, same short drag, and I breathed out immediately and smoke came out. I thought that was cool and I didn’t really feel anything pleasurable after the drag except I thought it was cool seeing the smoke coming out and seeing myself as a smoker.

Name _____ Date _____ Period _____

I couldn't believe I was doing it. However, a few seconds later I gagged like three times. I felt really close to throwing up those times. I threw the cigarette down, stomped it out. I got back in my car and drove to the nearest Kroger. I absolutely hated the smell and my car stunk. I bought an air freshener, sprayed, and tried to get the smell out of my car. Anyways, for the next couple of hours I randomly would smell cigarette smoke and whenever I did I gagged. It felt awful." (High school student, 18)



"The other day I bought a pack of cigs, and later that night I went out and smoked one outside. I was not sure about the taste, I did get a little lightheadedness, but that felt quite nice, although I cannot say it was an amazingly enjoyable experience. The next day I tried another, and it was the same. Now I have the fags, I feel that I should smoke them because well, \$5 is quite a bit of money to just throw away." (College student, 20)

Subunit 1—Smoking and Society

Tobacco Timeline

LESSON 1.2

WORLD HISTORY

Time

50 minutes

Materials

Equipment

Computer lab with Internet access

Resources

- Tobacco Timeline handout
- History of Tobacco handout
- Tobacco history websites:
 - http://www.tobacco.org/resources/history/Tobacco_History.html
 - <http://www.cnn.com/US/9705/tobacco/history/>
 - <http://www.wramc.amedd.army.mil/education/tobaccohistory.htm>
 - <http://academic.udayton.edu/health/syllabi/tobacco/history.htm>

Prior Student Learning

None

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Objectives

After completing this lesson, students will be able to

- Describe historical trends of tobacco use around the world, beginning with the European exploration of the Americas.
- Explain the role of tobacco in the economy of colonial America.
- Trace the growth of the tobacco industry from the introduction of tobacco into Europe to the present.
- Identify changes in public policy and perception regarding tobacco and correlate them to changes in social attitudes and advances in scientific knowledge.

Lesson Activities

Lesson Springboard

Begin by asking the class if they can identify the first people to smoke tobacco, or if they can guess when tobacco use first became prevalent throughout the world. Although students may know that Native Americans used tobacco, they may be surprised to discover that tobacco is native only in the Americas and was not introduced in Europe until Columbus's return from the New World in the late 1400s.

Lesson Development

Class Discussion

Ask students to consider how attitudes regarding tobacco may have changed over time. Do they think tobacco was ever fully accepted in society? Was there ever a time when tobacco was in greater disfavor than it is now? Tell students that they will be researching the history of tobacco and constructing an annotated timeline of the use of tobacco and the tobacco industry.

Computer Research

Pass out the Tobacco Timeline handout. Have students research the history of tobacco using a variety of sources. You may want to provide students with an electronic copy of the History of Tobacco handout as a starting point; it contains hyperlinks to many other resources. The Tobacco Timeline handout contains suggested questions that cover a broad range of topics related to the history of tobacco. Altering the questions on the handout will allow you to align the lesson with your own content standards. You will need to edit the handout to reflect those changes.

Subunit 1—Smoking and Society
Tobacco Timeline

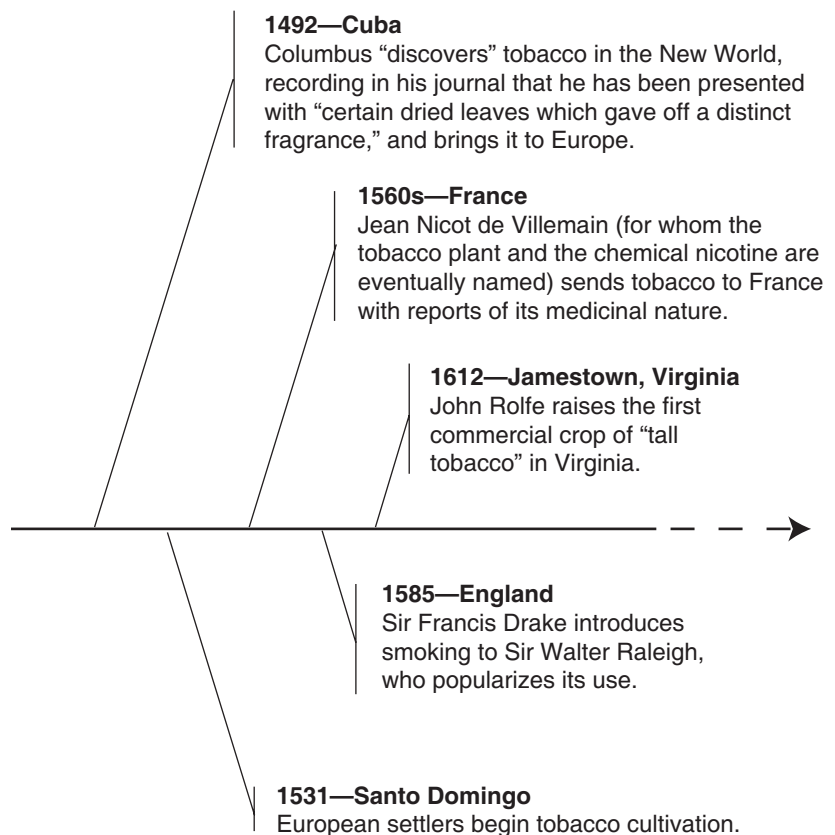
LESSON 1.2

Alternatively, you could ask groups of students to conduct in-depth research on different periods of tobacco use, or you could have them concentrate on various aspects of the tobacco industry—e.g., the discovery and worldwide spread of tobacco, beliefs about its effects on health, its sale and marketing, or its regulation and legislation.

Support Strategy
Provide students with a timeline template and ask them to fill in the appropriate dates for specified events.

Timeline

After students have completed their research and answered all the questions in the Tobacco Timeline handout, have them organize the information chronologically and compile their information into a timeline, either on paper or electronically. You may wish to create a sample timeline, as shown in the example below, to demonstrate the level of detail you want from students.



Students may need several days in the computer lab to complete this assignment, or you may have them complete the assignment for **home-work**.

Student Assessment Artifacts

Tobacco Timeline handout

Variations and Extensions

Although most of the discussion about the history of tobacco dates back to 1492, tobacco has been used for thousands of years. Have students

Subunit 1—Smoking and Society
Tobacco Timeline

LESSON 1.2

research the early use of tobacco in the pre-Columbian Americas. A good starting point for this research might be Larry Breed's collection of tobacco history websites (<http://smokingsides.com/docs/hist.html>).

National and State Academic Standards

NATIONAL **NCSS Curriculum Standards for Social Studies**

II. Time, Continuity, and Change

Social studies programs should include experiences that provide for the study of the ways human beings view themselves in and over time, so that the learner can:

- a. demonstrate that historical knowledge and the concept of time are socially influenced constructions that lead historians to be selective in the questions they seek to answer and the evidence they use;
- d. systematically employ processes of critical historical inquiry to reconstruct and reinterpret the past, such as using a variety of sources and checking their credibility, validating and weighing evidence for claims, and searching for causality;

STATE

List your state-specific standards in the space below.

Name _____ Date _____ Period _____

Tobacco Timeline

Although tobacco use is becoming increasingly stigmatized in today's society, the commercial cultivation of tobacco has played an important role in the history of the United States. Research the topics listed below. When you have completed the questions, create a timeline of important events in the history of tobacco. Your timeline should include the following:

- At least 15 major events in tobacco history
- An explanation of each event's importance or relevance in history

Geographic Spread of Tobacco

1. Tobacco is indigenous to which continent(s)?
2. Who were the first people to use tobacco? When did tobacco use first begin?
3. When, and by whom, was tobacco first introduced in Europe? To which country?
4. When and how did tobacco become popular in England?
5. When and how did tobacco become popular in France?
6. When and how did tobacco become popular in Asia?

Commercial Cultivation

1. When and where was the first commercial tobacco cultivation?
2. When and where was the first commercial tobacco cultivation in the present United States?
3. How did the amount of tobacco produced in America change between the first commercial cultivation and the start of the American Revolution?
4. What is Brightleaf? When was it developed, and what was its impact on the tobacco industry?
5. What is a Bonsack Machine, and when was it patented?

Health

1. Who first reported a link between smoking and health problems? When?
2. When was smoking considered beneficial for health, and for what purposes?
3. Who published the first large-scale study linking smoking to health problems in the United States? When?
4. When was the first Surgeon General's Report released, and what did it say?

Public Perception

1. When was the *Counterblaste to Tobacco* written? Who was the author, and what was the message?
2. Where and when did bans of tobacco first take place?
3. What was the role of tobacco in World War I and II?

Regulations

1. When was broadcast tobacco advertising banned?
2. When was smoking on interstate public transit and airline flights banned?
3. When did sales to minors begin to be regulated?
4. When was the first failed health-related lawsuit filed? Who was involved?
5. When was the first successful health-related lawsuit filed? Who was involved?

Name _____ Date _____ Period _____

History of Tobacco

Tobacco smoking is believed to have begun in the Americas well before European explorers reached the continent in the 1400s. Native Americans were the first to grow and use tobacco, which was smoked, chewed, used as a medicine, and given as gifts (see <http://academic.udayton.edu/health/syllabi/tobacco/native02.htm>).

In the 1400s, European explorers came to America and encountered Native Americans. Christopher Columbus is said to have received “certain dried leaves” as a gift from Native Americans (see http://www.tobacco.org/resources/history/Tobacco_History.html). Because he had no use for the leaves, they were thrown away. Soon thereafter, Columbus notes in a journal, “We found a man in a canoe going from Santa Maria to Fernandia. He had with him some dried leaves which are in high value among them, for a quantity of it was brought to me at San Salvador.”

The first European smoker is said to be Rodrigo de Jerez. He took the habit to Europe and was arrested and imprisoned for frightening people with the tobacco smoke pouring from his nose and mouth. By the time of Jerez’s release, smoking had become popular in Europe.

During the 1500s, Europeans called tobacco a medicine and recommended it for ailments such as toothache, worms, halitosis, and cancer. Through expeditions, Spanish and Portuguese sailors spread smoking across the globe. European demand for tobacco increased and became a major driving force in the colonizing of America.

The first permanent English colony in America, Jamestown, was established in Virginia in 1607 (see <http://thingstodo.com/states/VA/history.htm>). Under the leadership of John Smith, Jamestown struggled to maintain itself against starvation, hostile confrontations with Native Americans, and limited economic prospects due to its lack of a profitable export.

In Europe, tobacco had become popular while Spain held a monopoly on Europe’s tobacco market. Virginians attempted to grow tobacco and enter the market, but their native tobacco was undesirable to Europe. A Jamestown colonist, John Rolfe, imported seeds of a different tobacco strain and cultivated tobacco plants. This new tobacco was of better quality, and its desirability boosted Virginia’s exports, ensuring the colony’s economic survival. Rolfe married Pocahontas, daughter of a Native American chief, Powhatan, which smoothed relations between settlers of Jamestown and the Native Americans.

Increased tobacco demand and production required additional labor, which led the colonies to begin importing slaves in 1619. Ultimately, tobacco became a “cash crop”—it was used in place of gold and silver, which were the standard for values placed upon other items. Tobacco was often used as currency in Virginia (see <http://www.tobacco.org/History/colonialtobacco.html>).

Tobacco use was not accepted by everyone. King James I of England wrote an essay in 1604 titled “A Counterblaste to Tobacco,” which stated that tobacco use is “lothsome to the eye, harmfull to the braine, dangerous to the lungs ...” (see <http://www.la.utexas.edu/research/poltheory/james/blaste/blaste.html>). Ultimately, tariffs were placed on tobacco imported into England. All tobacco sold by Jamestown was required to be sold through London, where it was taxed.

Name _____ Date _____ Period _____

By 1760, many Virginian tobacco planters (see <http://www.marxists.org/archive/braverman/1946/03/amer-rev.htm>) were in debt to Great Britain because of taxes (see <http://www.tax.org/Museum/1756-1776.htm>). England's tobacco import duties rose as tobacco prices dropped, while successful farmers received credit from England. The taxes required that farmers continually expand their land to increase tobacco production to pay their debt to the British Crown. The colony's merchants and planters opposed the Crown's changes and wanted the system to return to the way it was before the taxes. To compound matters, as tobacco quantity increased, the quality decreased (see <http://www.tobacco.org/History/colonialtobacco.html>). Tobacco plants deplete soil of its nutrients, rendering the soil unusable after about three years of farming. Survival of the colony's tobacco industry became dependent on two things: the acquisition of new land (usually at the expense of Native Americans) and slave labor.

Laws were established to prevent lower-quality tobacco from being exported, but they were not enforced until the Virginia Inspection Acts were signed into law. These laws established warehouses where the tobacco could be inspected and set a quality standard for Virginia's tobacco exports.

In 1760, P. Lorillard built a manufacturing plant in New York. It became the first U.S. tobacco company.

Britain had accumulated large amounts of debt during the French and Indian War (see http://encarta.msn.com/encyclopedia_761575603/French_and_Indian_War.html) and passed this debt on to the colonies as taxes. Britain began to reassert control over the colonies. Colonists were against Britain's interference and new taxes (see <http://www.tax.org/Museum/1777-1815.htm>). Colonists coined the slogan "No taxation without representation," because the colonies were not represented in the British Parliament. These events and the colonies' desire for independence gave rise to the American Revolution (see http://encarta.msn.com/encyclopedia_761569964_2/American_Revolution.html and <http://www.pbs.org/ktca/liberty/index.html>), in which colonists rebelled against British rule, eventually leading to the Declaration of Independence and the Revolutionary War (1775–1783) (see <http://members.aol.com/TeacherNet/Revolutionarywar.html>).

After the war, in the 1800s, the tobacco industry continued to flourish. The cigar became popular. The match was invented, which made smoking more convenient, and the rolled cigarette became favored.

In 1828, students performing research in Germany isolated nicotine and determined it to be a "dangerous poison."

Tobacco control in the United States began in the 1830s, and other episodes of antitobacco research, issues, and opinions surfaced at the same time. In 1840, smoking was banned in Boston because it posed fire hazards.

During the 17th and 18th centuries, one-third of the United States' internal revenue was generated by tobacco taxes. The rations of both northern and southern Civil War soldiers included tobacco (see <http://www.civilwarhome.com/tobacco.htm>). The first U.S. federal tax was placed on tobacco during that war, contributing about \$3 million to war expenses.

Transportation advances in the nineteenth century increased the marketing possibilities for tobacco companies. With the ability to distribute products over wider geographical areas came the need to build product awareness through advertising. For instance, Allen and Ginters stiffened their cigarette packaging with cards that displayed images of popular actresses, boxers, baseball players, and Indian chiefs.

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Cigarettes at that time were costly because they were hand rolled. In the 1800s, Allen and Ginters offered a reward for the development of a machine that could produce cigarettes rapidly. James Albert Bonsack (see http://www.tobacco.org/resources/history/Tobacco_Historynotes.html#aa7) created a machine that could make 70,000 cigarettes per day (see <http://www.wclynx.com/burntofferings/adscigmaker.html>). Allen and Ginters did not use the machine, feeling its output would exceed the market's demand. But James B. "Buck" Duke (founder of Duke University) had no reservations about using the machine or creating demand (see <http://www.ibiblio.org/dukehome/family.html>). Using two machines, he eventually became the president of American Tobacco Company (ATC) and it grew into a cigarette monopoly (see <http://www.econlib.org/LIBRARY/enc/Monopoly.html>).

In 1884, Buck Duke produced 744 million cigarettes and undercut the prices of other tobacco companies. Philip Morris was created in 1885.

In 1890, tobacco was included in the government's official listing of drugs. Ten years later, in 1900, Washington, Iowa, Tennessee, and North Dakota outlawed the sale of cigarettes. An anticigarette movement formed in the United States, wiping out many small tobacco companies. Buck Duke was left selling 9 out of 10 cigarettes in the country.

Regulatory and advocacy organizations were formed. The American Lung Association (ALA) formed in 1904 to fight tuberculosis. The Food and Drug Administration (FDA) was begun in 1906. Tobacco industry lobbying succeeds in removing nicotine from the drug listing. The drug definitions applied made it possible to exclude tobacco unless it was used to prevent disease or cure illness.

Market forces enabled tobacco companies to pay growers low prices for tobacco. In 1904, a group of growers known as the Tobacco Night Riders began committing violent acts, known as the Black Patch War, in protest of the low prices (see <http://tennesseencyclopedia.net/imagegallery.php?EntryID=B047>). This group destroyed tobacco crops and equipment, burned stored tobacco, killed livestock, and assaulted tobacco growers and tobacco buyers who would not join their cause.

Antitrust charges were filed against the American Tobacco Company in 1907. A Supreme Court ruling broke up the company, which it determined had violated the Sherman Antitrust Act. At that time, ATC was making \$240 million dollars per year, controlling 92% of the world's tobacco market. The original ATC was split up into four tobacco companies—ATC, Liggett Myers, P. Lorillard, and R.J. Reynolds—leaving the new, smaller ATC in control of 37% of the tobacco market.

In the early years of the twentieth century, tobacco regulations were enacted in other countries. In England, sale of tobacco to children under 16 was banned because it was thought that smoking stunts growth. In Canada, similar laws were passed but not enforced. In New York City, women were forbidden from smoking in public areas.

An association between lung cancer and smoking was suggested by Dr. Isaac Adler. In 1912, a lung removal was performed to treat a lung cancer patient, the patient did not survive. The American Cancer Society was formed in 1913.

In 1917, the Trading With The Enemy Act was established, which prohibited importing Cuban cigars.

Name _____ Date _____ Period _____

During World War I, cigarettes were included in soldiers' rations. It is believed that many soldiers smoked to relieve stress. General John J. Pershing was quoted as saying, "You ask me what it is we need to win this war. I answer tobacco as much as bullets." Many soldiers were said to have returned from the war with smoking habits.

Camel cigarettes were introduced in a packs of 20, and become popular nationwide. By 1923, they had accounted for 45% of the U.S. cigarette market.

In 1939, a comprehensive scholarly report was published in Germany, "The Tabak und Organismus" (Tobacco and the Organism), which attributes all cancers in "smoke alley" (smoke-exposed tissue from the lips to the lungs) to smoking. It also recognized the danger of secondhand smoke.

In 1941 in Kentucky, America's tobacco companies were convicted of price fixing and monopolizing.

During World War II, cigarettes were again included in soldiers' rations. Millions of cigarettes (of popular brands) were sent to soldiers, and a tobacco shortage developed. Roosevelt declared tobacco a protected crop during the war years. By the end of the war, cigarette consumption had reached record highs.

In 1994, the FTC decided against regulating Joe Camel, the Camel cigarette mascot introduced in the 1980's believed to attract young smokers.

In the year 2000 and since, there have been many judgments against tobacco companies in many parts of the world. Many countries and states have begun enacting laws that ban smoking in public places and raise tobacco taxes. Theoretically, price increases should reduce demand. But the demand for tobacco has proven to be relatively inelastic, and tobacco sales have not declined in proportion to tax increases.

Tobacco Legislation and Litigation

LESSON 1.3

U.S. GOVERNMENT

Time

100 minutes

Materials

Equipment

Computer lab with Internet access

Resources

- Tobacco Regulations worksheet
- Supreme Court Case Study worksheet
- Schoolhouse Rock video, “How a Bill Becomes a Law” (<http://www.school-house-rock.com/Bill.html>)

Prior Student Learning

Students should have a basic understanding of the judicial system.

Support Strategy

Have students conduct their research in pairs or small groups.

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Objectives

After completing this lesson, students will be able to

- Explain how laws are passed at the national, state, and local levels.
- Describe current regulations governing the tobacco industry.
- Explain the role of the judicial system and the concept of checks and balances within the U.S. government.
- Research the details of a Supreme Court decision and analyze the ruling.

Lesson Activities

Ask students if they have ever seen signs about tobacco regulation at the supermarket or a convenience store. Some students may recall seeing the warning about the minimum age for purchasing tobacco. Ask students if they know the minimum age for purchasing tobacco in their state. Also ask them to share other examples of tobacco regulation they might be familiar with from the media or popular culture. Possible examples might include a smoking ban on the school campus, a smoking ban in restaurants, “Big Tobacco” lawsuits in the news or as depicted on film, and so on.

Tell students that there are a number of laws regulating the tobacco industry. Select a recent law concerning the tobacco industry at the local, state, or national level, depending on which level of government they are currently studying. Using this law as an example, take the class through the steps required to pass a new law. You may wish to show the video of the Schoolhouse Rock cartoon “How a Bill Becomes a Law” to provide a succinct overview of how federal laws are passed.

Have students research the range of laws and regulations that govern the tobacco industry and record their findings on the Tobacco Regulations worksheet.

You may wish to divide the class into two groups: one-half of the class could examine regulations on the age restrictions placed on the sale and use of tobacco, and the other half could explore regulations on the advertising of tobacco products. You then could group students into mixed pairs and have them share their research with each other.

Briefly review the regulations that students researched in the first half of the lesson. Tell students that sometimes these laws are passed in reaction to lawsuits, and sometimes these laws result in lawsuits.

Subunit 1—Smoking and Society

Tobacco Legislation and Litigation

LESSON 1.3

Remind students that the highest level of the judicial system in the United States is the U.S. Supreme Court. Ask students if they can recall any recent cases argued before the Supreme Court.

Introduce or review the levels of the judicial system with the class and explain the process by which cases reach the Supreme Court. Provide students with a list of Supreme Court cases concerning the tobacco industry. These can be either landmark cases or recent cases on the advertising and use of tobacco or those related to the liability of tobacco companies. You may also wish to include state and local decisions.

Possible landmark cases include the following:

- *Phillip Morris, Inc., et al. v. Engle* (smoker's rights)
- *Northwest Airlines v. Duncan* (secondhand smoke)
- *Lorillard Tobacco Co. v. Thomas Reilly, Attorney General of Massachusetts* (advertising)
- *Grady Carter v. Brown & Williamson Tobacco Corp.* (lung cancer)
- *FDA et al. v. Brown & Williamson Tobacco Corp. et al.* (FDA authorized to regulate tobacco)
- *Buckingham v. RJ Reynolds Tobacco Company* (secondhand smoke)
- *Hill v. RJ Reynolds Tobacco Company* (fraud)
- *Small v. Lorillard Tobacco Company* (addicted smokers)
- *Leslie Whitley v. Phillip Morris Company and RJ Reynolds Tobacco Holdings* (settled in California Superior Court, \$22 million in damages awarded to a lung cancer patient)

Support Strategy
Select a single case for the entire class to study, or assign specific cases to individual students and provide the text of the court decision.

Pass out the Supreme Court Case Study worksheet. Have students select a court case and ask them to research the details of the arguments and the decision on the Internet. You may wish to suggest possible websites for them to begin their search:

- FindLaw (<http://www.findlaw.com/cascode/supreme.html>)
- Cornell University Law School Supreme Court Collection (<http://www.law.cornell.edu/supct>)
- U.S. Supreme Court (<http://www.supremecourtus.gov>)

Have students work on their analysis of their selected court case for the rest of the class session. Students who do not finish their research in class will need to finish the assignment for **homework**.

Student Assessment Artifacts

Tobacco Regulations worksheet
Supreme Court Case Study worksheet

Tobacco Legislation and Litigation

LESSON 1.3

Variations and Extensions

Have students compare their state's regulations on the sale and age for use of tobacco products with the regulations of other states.

Arrange for a guest speaker from the legal community to explain the court procedure that was used in a specific landmark court decision.

Have students read *The Runaway Jury* by John Grisham (1996). Compare the decision made by the jury in the novel to decisions made in the cases they have researched.

Ask groups of students to make presentations about their key cases. As a class, compare and contrast the specifics of each case. Are the various rulings consistent? Were the same standards and expectations applied in each case? If not, should they have been, and what accounts for the difference? Alternatively, have students write an essay analyzing the differences between the cases presented.

National and State Academic Standards

NATIONAL NCSS Curriculum Standards for Social Studies

VI. Power, Authority, and Governance

Social studies programs should include experiences that provide for the study of how people create and change structures of power, authority, and governance, so that the learner can:

- a. examine persistent issues involving the rights, roles, and status of the individual in relation to the general welfare;
- b. explain the purpose of government and analyze how its powers are acquired, used, and justified;
- c. analyze and explain ideas and mechanisms to meet needs and wants of citizens, regulate territory, manage conflict, establish order and security, and balance competing conceptions of a just society;

STATE

List your state-specific standards in the space below.

Name _____ Date _____ Period _____

Tobacco Regulations

Sales to Minors

Marketing and Advertising

Trade and Taxation

Smoking Bans

Name _____ Date _____ Period _____

Supreme Court Case Study

Case Name _____

Facts/Background

Arguments

Side A _____

Side B _____

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Decision of the Court

Majority Opinion Author _____

Other Justices Who Signed Majority _____

Summary of Majority Opinion

Name _____ Date _____ Period _____

Dissenting Opinion Author (if any) _____

Other Justices Who Dissented _____

Summary of Dissenting Opinion

Impact of Court Ruling

Your Thoughts on the Ruling

An Expensive Habit

LESSON 1.4

ALGEBRA I OR II

Time

100 minutes

Materials

Equipment

- Graph paper
- Rulers
- Graphing calculators
- Colored pencils (optional)

Resources

Your Money Up in Smoke worksheet

Prior Student Learning

Students should already be familiar with graphing linear equations and calculating exponents.

Algebra II students should also be familiar with arithmetic and geometric series and summation notation.

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Objectives

After completing this lesson, students will be able to

- Create and graph linear and exponential equations describing real-world situations.
- Give contextual meaning to x - and y -intercepts in a linear graph.
- Describe the slope characteristics of parallel lines.
- Use linear relationships to predict the financial cost of smoking.
- Predict the future cost of cigarettes based on the current rate of inflation (Algebra I) and factor that into the cost of smoking over a lifetime using the sum of a geometric series (Algebra II).

Lesson Activities

Lesson Springboard

There is clear evidence that smoking is harmful to an individual. We know about the bad effects on health, but how does smoking affect one's financial situation? This lesson will use algebraic modeling to analyze the financial cost of smoking to the individual.

Ask students to name the components of the total cost of smoking. Make sure that they consider not only the cost of a pack of cigarettes, but also lighters or matches, anything that might be bought to freshen your breath, added healthcare costs, etc. Statistics are also available about the lowered productivity of smokers in the workforce.

Lesson Development

Small Group Work

Creating and graphing linear equations

To simplify the problem, have the class begin modeling the cumulative cost solely of buying cigarettes for a number of years. Assume that the current cost of one pack of cigarettes is \$5, and beginning this year, a person smokes one pack a day for the next 20 years. Ask students in their groups to come up with both an equation and a graph describing the situation. Have the class agree on the scale of the graph to make comparisons between graphs easier. Make the independent variable (x) the number of years past the current year, and the dependent variable (y) the cumulative cost of smoking. Make sure students include the negative region of the x -axis on their graph, as that will be needed later. Have groups compare their graphs to make sure the entire class agrees on the equation.

Subunit 1—Smoking and Society
An Expensive Habit

LESSON 1.4

Meaning of x - and y -intercepts in context

Then ask groups to graph the cost for an individual who started smoking 8 years ago instead of this year. How would their cost equation be different? Some students might suggest that the equation doesn't change at all, and others might say that since x = number of years after the current year, the new equation must add a constant to represent the cost of smoking for the previous 8 years.

Have groups create an in-out table representing the cost for the new individual and graph it on the same set of axes as the original equation, preferably in a different color. Depending on how they interpreted the situation, some groups will have the second line stop at its y -intercept, and others will have the line stop at its negative x -intercept. Discuss with the class whether the two lines are different, and why groups made their particular graphing choice. Have students give clear explanations of what the x - and y -intercepts mean in the cost graphs for the two smokers.

Return to the discussion about whether the two individuals have the same cost equation, or if one must add a constant to make up for the 8 years of previous smoking. Make sure that the class understands that the two lines have two unique equations and why that is, both mathematically and in the context of the situation.

Ask the class if there is a situation when the y -intercept will be negative. This would be a good time to discuss the appropriate domain and range for the situation when the equation creates an infinite set of points.

Slope of Parallel Lines

Have students offer explanations about why the two lines they graphed never intersected, and what an intersection point would mean if they did meet. Students should realize that if both individuals smoke the same amount each day and buy cigarettes at the same cost, they are spending money at exactly the same rate. However, the second individual started smoking earlier, so the first smoker has no chance of catching up if he or she continues at this rate. Using this knowledge, ask students to predict where the lines of individuals who started smoking 10 years ago or 7 years in the future would be on the graph. They should figure out that the slope stays the same but the x -intercept changes, which shifts the line parallel to the previous lines. Reinforce the definition of *slope* as a rate of change and define parallel lines as having the same slope.

To check for understanding of slope, ask students to estimate where the line would be if someone had to pay \$6 per pack of cigarettes, or got a discount and paid only \$3 per pack. How does the cost equation change? Are these lines parallel to the original lines? Why not? What else would change the slope of the line? Students should realize that changing the amount a person smokes each day would also change the slope of the cost equation.

Subunit 1—Smoking and Society
An Expensive Habit

LESSON 1.4

Factoring in Inflation

Unfortunately for smokers, the cost of cigarettes is not constant. Introduce the idea of inflation, explaining that a simple linear equation would no longer describe the cumulative cost of buying cigarettes.

Assume that, on average, inflation is 3% per year. Ask students to calculate how much a pack of cigarettes would cost given the number of years past the date when it was exactly \$5.

Algebra I students may have to make an in-out table to find the pattern and then write the equation. Some students will want to multiply by 0.03 and then add the previous term, so discuss how it might be more convenient, and equivalent, to multiply by 1.03 because it will make the resulting equation easier to find. Then have students graph their table and come up with an equation, choosing an appropriate scale. Discuss the y -intercept of this graph and its meaning, as well as the meaning of not having an x -intercept in this case. Remind students that this is the equation for the cost of one pack of cigarettes as the years progress, and not the cost of smoking to the individual.

Algebra II students should already be familiar with exponential equations and can derive an equation for the cumulative cost. Ask them to calculate the first few years of cigarette cost, factoring in inflation. Notice that the cost each year is the previous year's cost multiplied by 1.03. Thus, the cost per year is a geometric sequence, and the cumulative cost per year is the sum of a finite geometric series. Have students express the cumulative cost to the smoker for 20 years and n years in summation notation. Then derive the explicit formula for the sum of a finite geometric series in the manner most appropriate for the class. Students can then use the explicit formula to graph the more accurate cumulative cost of cigarettes, either on paper or using a graphing calculator.

Lesson Closure

Discuss the other items or experiences that one could purchase with the money spent smoking, and whether students feel smoking is worthwhile in terms of opportunities that are lost. The large monetary figures might be a motivational tool for those trying to fight their addiction to quit or might discourage those thinking about whether to start. Students might be asked to create a poster or brochure using their financial calculations to help convince others to quit or never start smoking.

Return to the idea that the cost of cigarettes is not the only cost of smoking, and have students come up with other factors and their possible modeling equations.

Possible Prior Misconceptions

None

Subunit 1—Smoking and Society
An Expensive Habit

LESSON 1.4

Student Assessment Artifacts

Group graphs of linear and exponential equations

Derivation of explicit formula for the sum of a finite geometric series
and derivation of the equation for cumulative cost of cigarettes with inflation

Variations and Extensions

What if each year the money saved by not smoking was put in the bank with compounding interest?

Calculate the cost to society of each smoker by finding information about added healthcare costs and smokers' lost productivity compared to nonsmokers.

Extend the problem to highlight the intersections of two equations and their meaning by asking when two individuals would spend the same amount of money at the same time. Alternatively, ask students to calculate what the price of cigarettes must be for an individual to spend the same amount of money as another person by a certain year.

Subunit 1—Smoking and Society
An Expensive Habit

LESSON 1.4

National and State Academic Standards

**NATIONAL
NCTM Standards for School Mathematics**

Algebra

- Understand patterns, relations, and functions;
- Represent and analyze mathematical situations and structures using algebraic symbols;
- Use mathematical models to represent and understand quantitative relationships;
- Analyze change in various contexts.

STATE

List your state-specific standards in the space below.

Name _____ Date _____ Period _____

Your Money Up in Smoke

How much does a person spend smoking each year?

Assume that the cost of a pack of cigarettes is \$5. Person A starts smoking this year and averages one pack a day. Person B started smoking 8 years ago, and also averages one pack a day.

1. Write the expressions for the amount of money Person A would spend in a week, a month, and a year.
2. Write the equation that would describe the amount of money Person A would spend cumulatively through many years. The independent variable represents the number of years past the current year, and the dependent variable is the cumulative amount of money spent.
3. Graph this equation after agreeing on an appropriate scale with the class. Make sure to include a negative region on the x-axis for later use.
4. Repeat questions 2 and 3, only for Person B. What do you notice about the two lines?
5. Explain what the x - and y - intercepts mean in each of the lines you graphed.
6. Describe what would happen to the graphed lines if Person A had to spend \$6 for each pack of cigarettes, and Person B only had to spend \$3 per pack. How would each individual line change?
7. What do you know about the slopes of lines that are parallel? Lines that intersect?

The cost of everyday things doesn't stay the same as years pass. Inflation usually makes things more expensive as time goes on. Assume that the average rate of inflation for the next few decades is 3% per year.

8. What is the cost of a pack of cigarettes 3 years from now, if it costs \$5 today? What is the cost 15 years from now? How about 2 years ago? Choose several more points and record your calculations in an in-out table.
9. Graph the results of question 8. Determine the equation that describes the cost of a pack of cigarettes given the year.
10. Calculate the cumulative cost of cigarettes with inflation for people who smoke for different numbers of years. If possible, come up with a new formula that calculates cumulative cost when factoring in inflation.

Look at your graphs. Come up with worthwhile items or experiences that a person could buy with the money they spend on cigarettes if they

- a. Smoke for 5 years.
- b. Smoke for 10 years.
- c. Smoke for 20 years.
- d. Smoke for 45 years.

Write a paragraph to convince a person not to start smoking, using the calculations you just made.

It Won't Happen to Me

LESSON 1.5

ALGEBRA I

Time

55 minutes

Materials

Equipment

M&Ms or other small candies with different colors

Resources

Emphysema in the Population worksheet

Prior Student Learning

Students should already be familiar with simple statistical measures such as calculating the mean and finding the probability of independent events.

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Objectives

After completing this lesson, students will be able to

- Express the importance of test sample size and composition when generalizing statements to describe a population or individuals in the population.
- Define the term *counterexample* as used in mathematics and use appropriate counterexamples to disprove statements.

Lesson Activities

Lesson Springboard

Ask students whether they have ever met an elderly person who has smoked her or his entire life and is still completely healthy. Mention that many people, including, perhaps, students in the class, look at examples such as these healthy smokers as justification for continuing smoking themselves. They feel that if they can see one person survive a lifetime of smoking that they must be free from risk themselves. This lesson is a mathematical investigation of the notion “They didn’t get hurt, so it must be pretty safe.”

Lesson Development

Class Discussion

Almost all longtime smokers will suffer from some form of emphysema, causing shortness of breath, the inability to do vigorous physical activity, and permanent damage to the lungs. The lung damage slowly builds over time, making it hard to know how serious the problem is and to stop smoking until it is too late. Symptoms do not start appearing until the smoker is 50 to 60 years old.

Before class starts, fill a bowl with 200 candies of five different colors (A, B, C, D, and E): 8 A’s, 1 B, 21 C’s, 31 D’s, and 139 E’s. Evenly distribute the candy colors throughout the bowl. Divide the class into groups of 4 or 5 students each.

Show students the bowl and tell them that there are 200 pieces of candy and that the bowl represents the population of the United States. Split the candy evenly among the groups; each portion of candy represents a sample of the population. In other words, it could represent the people in different neighborhoods randomly chosen across the country.

Subunit 1—Smoking and Society
It Won't Happen to Me

LESSON 1.5

Define what each color represents in the candy sample:

- Candy A—longtime smokers over 60 who suffer from emphysema
- Candy B—longtime smokers over 60 who do not have emphysema
- Candy C—all others over 60
- Candy D—smokers under 60
- Candy E—nonsmokers under 60

Ask groups to analyze their sample without looking at the other groups' candy. They should record their thoughts and answer the questions on the Emphysema in the Population worksheet.

Hold a class discussion about the conclusions drawn from examining the samples. From their sample, does the group feel it is likely or unlikely to develop emphysema? What do you think the rate of emphysema is in smokers? Ask the group with the smoker over 60 who does not have emphysema to identify themselves. If that person were the only elderly smoker in their sample, what would they assume about smoking and emphysema? If they had other elderly smokers in their sample, what conclusion would they draw about the emphysema rate in longtime smokers? Make the connection between drawing conclusions from the candy samples and drawing conclusions based on the people you've met in your life.

Pool all 200 candies together and answer the remaining questions on the worksheet. Discuss the implications of the new results.

From doing this activity, the class should discover that if you are over 60 years old and have been a longtime smoker, your chance of suffering from some form of emphysema is approximately 90%. People over 60 constitute 15% of the total population, and of those, 30% smoked for over half of their lives. Twenty percent of the entire population smokes, but many of them are under 60 so they don't know if they will develop emphysema or not. Even though there are relatively few emphysema incidents in the general population, it is very likely that a person with certain behaviors will develop emphysema. Tie this analysis in with the idea of a smoker never meeting an emphysema patient, and thus concluding that emphysema is unlikely to affect him or her.

Students sometimes lack a clear understanding of the use of counter-examples in mathematics and the real world. Emphasize that meeting one elderly smoker who does not have emphysema *does not* disprove the statement that elderly smokers are *likely* to get the disease. It does, however, disprove the statement that *all* elderly smokers will get the disease. Mathematical statements have an implicit "always" or "in every case" that is often not written. For example, the statement "Odd numbers are the sum of an even number and 1" actually means "All odd numbers are *always* the sum of an even number and 1." Because there are no counter-examples to this statement, it is true.

Subunit 1—Smoking and Society
It Won't Happen to Me

LESSON 1.5

When a student says, “Cars have four wheels,” it is generally accepted as true in real life because it is interpreted to mean “All the cars I’ve seen have four wheels,” or “It is extremely likely that when you see a car, it has four wheels.” Mathematically, however, the statement means, “All cars always have four wheels,” and is false because a few cars have only three wheels. There is a counterexample, and even though very few students may have seen it, it is enough to falsify the statement.

Lesson Closure

Tie together the concepts of appropriate sampling and experimental probability, counterexamples, and the interpretation of statements to the context of smoking and disease. Have students comment on the statement that they often hear at school, at home, and in the media: “Smokers get lung cancer and emphysema.”

Possible Prior Misconceptions

Students may believe that because they have never seen a counterexample it must not exist. Inversely, they may believe that because they have seen a counterexample to a certain statement, they can discount the likelihood that the consequences of the statement relate to them.

Student Assessment Artifacts

Emphysema in the Population worksheet

Variations and Extensions

Invite a guest speaker to talk about his or her experiences with emphysema or about caring for a loved one with emphysema.

Extend the conversation to discuss other high-risk behaviors for teens, such as inexperienced driving, driving under the influence of alcohol, drug use, and unprotected sex.

Extend the lesson to include a more serious discussion of statistical analysis and sampling and variability of samples in a population.

National and State Academic Standards

NATIONAL **NCTM Standards for School Mathematics**

Algebra I

- Identify essential quantitative relationships in a situation and determine the class or classes of functions that might model the relationships;
- Use symbolic expressions, including iterative and recursive forms, to represent relationships arising from various contexts;
- Draw reasonable conclusions about a situation being modeled.

STATE

List your state-specific standards in the space below.

Name _____ Date _____ Period _____

Emphysema in the Population

Emphysema is a serious respiratory disease that is mainly caused by smoking. It usually doesn't affect people until later in life. People who suffer from emphysema have shortness of breath, trouble with physical exertion, and permanent lung damage. This activity will help you see the accuracy of your assumptions concerning the likelihood of getting emphysema if you smoke when these assumptions are based on your everyday observations.

SECTION 1: Small Sample of the Population (one neighborhood)

Answer the following questions using only the sample your group received. Do not look at the other samples.

1. What percentage of the entire sample are smokers?
2. What percentage of the sample is over 60 years old?
3. What percentage of those over 60 are smokers?
4. What percentage of the smokers has emphysema?
5. What percentage of the entire sample has emphysema?
6. If you lived in the neighborhood where this sample was taken, what would you conclude about the likelihood of getting emphysema? Explain in your own words how a person who is considering smoking would interpret the data you collected. Would the data make them more or less likely to smoke? Why?

SECTION 2: Large Sample of the Population (many neighborhoods)

Collect all of the smaller samples in the classroom and combine them into one large sample.

1. What percentage of the entire sample are smokers?
2. What percentage of the sample is over 60 years old?
3. What percentage of those over 60 are smokers?
4. What percentage of all smokers has emphysema?
5. What percentage of those over 60 has emphysema?
6. What percentage of smokers over 60 has emphysema?
7. What percentage of the entire sample has emphysema?
8. What do you think about the likelihood of getting emphysema after analyzing the larger sample? What are the factors that make it more likely to get the disease?

SECTION 3: True or False?

State if each statement is true or false, and explain your answer.

1. T/F. If you smoke, you will get emphysema.
2. T/F. There is an increased likelihood that if you smoke for a long time, you will get emphysema.
3. T/F. If I can find someone who smokes and doesn't have emphysema, then my likelihood of getting emphysema if I smoke gets lower.

SECTION 4:

Think about a person who is considering smoking and thinks that they don't have much risk of getting sick because they don't know anyone in their neighborhood who has emphysema. What would you tell this person about their likelihood of getting emphysema?

Smoke and Fire

SUBUNIT 2 OVERVIEW

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Subunit Goals

Subunit 2 addresses the physical effects of smoking, smokeless tobacco, and indirect or secondhand smoke. Students model the respiratory effects of smoking and learn about how nicotine changes neurotransmission. In Health Science and Biology, they discuss the major harmful chemicals in tobacco and their related diseases. Students then investigate the evidence supporting different views on the dangers of ambient secondhand smoke and write a persuasive letter detailing their own opinions. Finally, students learn about the different methods available to help smokers quit the habit and create brochures advertising available resources.

Subunit Key Questions

- How is nicotine addictive? What does nicotine do to the brain? (Biology)
- What are the chemicals that are harmful in cigarette smoke? What are the long- and short-term health effects of smoking? (Health Science I and Biology)
- What are the dangers of secondhand smoke? Who are the stakeholders in the secondhand smoke debate? (English Language Arts)
- What are effective methods to quit smoking, given the physically and psychologically addictive qualities of tobacco? (Health Science I)

Lesson Summaries

Lesson	Subject	Description
2.1	Biology	<i>Nicotine Action Pathway</i> Students learn the sequence of events involved in communication at the synapse and how nicotine affects neurotransmission.
2.2	Health Science I	<i>Effects of Tobacco Use</i> Students get an overview of the long- and short-term physical effects of tobacco use and debate the appropriateness of smoking bans in the workplace.
2.3	Biology	<i>The Respiratory System</i> Students describe and model the effects of smoking on the respiratory system.
2.4	English Language Arts	<i>Secondhand Smoke: Whom Do You Trust?</i> Students investigate and analyze conflicting opinions about the dangers of ambient secondhand smoke and write a persuasive letter about whether smoking should be banned in public places.
2.5	Health Science I	<i>Smoked Out: Strategies for Stopping</i> Students investigate different pharmacotherapies and counseling as methods to quit smoking. They create informational brochures to advertise the resources available to those who want to quit.

Nicotine Action Pathway

LESSON 2.1

BIOLOGY

Time

100 minutes

Materials

Equipment

- Overhead projector
- Transparencies
- Props for neurotransmission simulations (optional)

Resources

Neurotransmission worksheet

Prior Student Learning

Students should be familiar with the organization and basic components of the central nervous system.

Students should be familiar with the anatomy of a neuron, including dendrites, the cell body, the axon, and synapses.

Students should be familiar with the direction of information flow between presynaptic and postsynaptic neurons, specifically that dendrites carry information toward the cell body and axons carry information away.

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Objectives

After completing this lesson, students will be able to

- Explain the sequence of events involved in communication at the synapse.
- Recognize that synaptic transmission involves neurotransmitters that may be either excitatory or inhibitory.
- Explain the effects of nicotine on neurotransmission.

Lesson Activities

Lesson Springboard

Make a transparency of the Neurotransmission worksheet and project it for the class. Have students speculate about what each diagram represents. Prompt the students to identify the synapse, the axon terminal of the presynaptic neuron, the dendrite of the postsynaptic neuron, the action potentials, and the two types of neurotransmitters and receptors represented. (Note: Receptors on the diagrams are not represented appropriately if you wish to include discussion of ion channels.)

Lesson Development

Direct Instruction

Pass out a copy of the Neurotransmission worksheet to each student. Introduce (or reinforce) the concept that neurons communicate using a combination of electrical messages (action potentials) and chemical messages (neurotransmitters). Review the actions occurring in each panel and have students take notes in the space provided. Note that the worksheet shows an axon terminal that is capable of releasing more than one type of neurotransmitter, reflecting that Dale's principle has been shown to be false. However, you should mention to students that many, perhaps even most, of the brain's neurons release only one type of neurotransmitter.

Class Discussion

Explain to students that many recreational drugs increase dopamine signaling. Dopamine is the primary neurotransmitter involved with reward pathways in the brain. Release and uptake of dopamine within the brain can trigger feelings of euphoria. Given this information, and their knowledge of the mechanism by which neurons communicate with each other, ask students to speculate on ways that drugs could act to increase dopamine signaling. Encourage students to discuss the following possibilities:

Note:

Dopaminergic neurons are not the only action sites for recreational drugs. LSD, for example, acts on serotonin receptors, both as an agonist and an antagonist.

Nicotine Action Pathway

LESSON 2.1

1. Increase in number of impulses leading to frequent dopamine release
2. Release of dopamine without impulse
3. Release of increased amount of dopamine per impulse
4. Inhibit reuptake of dopamine from the synaptic cleft, leaving more neurotransmitters available in the synaptic cleft

Simulations Part 1

As a class, develop a role-play simulation of normal neurotransmission. Have the class decide what roles would need to be filled. (Possibilities include neurotransmitters, vesicles, action potentials, transporters [reuptake pumps], and receptors.) Discuss and agree on actions for each role.

If students have trouble generating ideas for their simulation, you could start by providing a simple example sometimes used at lower grades called “synaptic tag.” The object of the game is to get as many neurotransmitters across the synapse to the dendrite without their being reabsorbed by the transporters. This is played like a game of tag. Establish one wall as the axon terminal and the opposite wall as the dendrite. Two-thirds of the students are neurotransmitters and begin the game touching the axon terminal wall. One-third of the students are transporters and wait in the gap. At the “go” signal, the neurotransmitters attempt to run to the dendrite wall without being tagged by the transporters. Getting tagged by the transporter means you must return to the axon terminal wall.

Warn students that this simulation, in addition to being simple, also contains several highly inaccurate representations (e.g., the transporters are mobile in the synaptic cleft). Steer students away from similar inaccuracies in their initial simulation.

Have half the class perform the simulation while the other class observes. Then have students switch places so the first set of performers can observe the simulation as well.

Class Discussion

Simulations can never be completely accurate. After everyone has watched the simulation, have students critique it in terms of how accurate it is in representing neurotransmission. Discuss whether the inaccuracies can be fixed or if they are due to limitations inherent in a simulation. Have the class make suggestions to change the role-play to improve accuracies where possible.

Simulations Part 2

Once the class has developed a good simulation of normal neurotransmission, divide the students into four groups. Have each group come up with modifications to the simulation that represent each of the four potential action mechanisms of drugs.

Nicotine Action Pathway

LESSON 2.1

After the groups have finalized their modifications, secretly assign each group two of the four action mechanisms. As each group performs their role-play, the rest of the class should observe and identify which action mechanism is being represented.

Have the last group perform either simulation #1 or 3, representing two of the action mechanisms described above.

Direct Instruction

Inform the class that nicotine is highly addictive partly due to the fact that it alters neurotransmission in multiple ways. First, nicotine excites dopaminergic (dopamine-containing) neurons in the ventral tegmental area of the brain so that they produce more action potentials. Because each action potential releases vesicles, more action potential leads to increased neurotransmitter release into the synapse (as in simulation #1).

Second, nicotine can also bind to special receptors near the axon terminal of dopaminergic neurons. When these receptors are bound, any individual action potential triggers a greater than average release of dopamine.

Third, nicotine's chemical structure is very similar to that of acetylcholine, another neurotransmitter. This similarity allows nicotine to bind and trigger cholinergic receptors normally bound by acetylcholine. Cholinergic receptors are found in many parts of the body and are involved in the control of muscle movement, heart rate, learning, and memory. As a result, nicotine can sometimes produce temporary improvement in reaction and muscle control. However, because nicotine is not identical to acetylcholine, it can disrupt the normal functioning of the brain. As cholinergic receptors become tolerant to the nicotine stimulation, the person will require a regular nicotine supply to maintain typical function.

Research on nicotine is ongoing and further effects of nicotine on neurotransmission may be discovered.

Lesson Closure

Have students write up instructions to a simulation of one of the nicotine action pathways. Each write-up should include descriptions of how the simulation is a good representation of the nicotine action pathway and how it is an inaccurate representation.

Possible Prior Misconceptions

Diagrams of neurons in textbooks and on worksheets often leave students with the impression that neurotransmission is always linear. Be sure to emphasize that dendrites and axons can have many branches and are connected together in complex networks.

Students often believe that any individual neuron releases only one type of neurotransmitter (Dale's principle). Although this is the case for many of the brain's neurons, it is not always true.

Nicotine Action Pathway

LESSON 2.1

Students may have the impression that a neurotransmitter has one function (i.e., it is excitatory or inhibitory), but in fact the neurotransmitter is only a signal. It is the nature of the receptor and the postsynaptic cell that determines the response.

Student Assessment Artifacts

Completed neurotransmission notes
 Simulations of neurotransmission and the various drug actions on neurotransmission
 Write-up of nicotine action pathway simulation

Variations and Extensions

Have students view a detailed summary and animation of neurotransmission at <http://www.sumanasinc.com/webcontent/anisamples/neurobiology/synaptictransmission.html>.

Invite a neuroscientist to speak to the class about the nervous system and injuries to the brain.

Expand the lesson to include the details of action potentials, including resting potential, stimulation, rising phase, peak, falling phase, under-shoot, and refractory period.

Expand the lesson to include the actions of other recreational drugs on neurotransmission.

For Chemistry, introduce the chemical formula and structure of nicotine ($C_{10}H_{14}N_2$) and compare its physical structure with that of acetylcholine ($C_7H_{16}NO_2$).

National and State Academic Standards

NATIONAL NRC National Science Education Standards

The Cell

- Cells have particular structures that underlie their functions. Every cell is surrounded by a membrane that separates it from the outside world. Inside the cell is a concentrated mixture of thousands of different molecules which form a variety of specialized structures that carry out such cell functions as energy production, transport of molecules, waste disposal, synthesis of new molecules, and the storage of genetic material.

Personal and Community Health

- An individual's mood and behavior may be modified by substances. The modification may be beneficial or detrimental depending on the motives, type of substance, duration of use, pattern of use, level of influence, and short- and long-term effects. Students should understand that drugs can result in physical dependence and can increase the risk of injury, accidents, and death.

STATE

List your state-specific standards in the space below.

Name _____ Date _____ Period _____

Neurotransmission

<p>A.</p> 	
<p>B.</p> 	
<p>C.</p> 	
<p>D.</p> 	
<p>E.</p> 	
<p>F.</p> 	

Subunit 2—Smoke and Fire

Effects of Tobacco Use

LESSON 2.2

HEALTH SCIENCE I

Time

110 minutes

Materials

Resources

- *Boston Globe* article “At Mich. Firm, smoking at home is a firing offense” (http://www.boston.com/business/articles/2005/02/09/at_mich_firm_smoking_at_home_is_a_firing_offense)
- CDC pages
 - http://www.cdc.gov/tobacco/data_statistics/sgr/sgr_2006/index.htm, including one on secondhand smoke
 - http://www.cdc.gov/tobacco/secondhand_smoke/index.htm
- No Smoking? worksheet

Prior Student Learning

None

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Objectives

After completing this lesson, students will be able to

- Identify the hazardous chemicals present in various forms of tobacco.
- Describe the short- and long-term health hazards of tobacco use, including the physical effects on the cardiovascular and respiratory systems of the body, as well as its potential effect during pregnancy.
- Recognize that smokeless tobacco and secondhand smoke are also hazardous to health.

Lesson Activities

Lesson Springboard

Ask students if they know anyone who is trying to or has quit smoking. Have students relate to the class what they know about what prompted this person to begin smoking, what prompted them to quit, and what struggles they have faced in quitting.

Lesson Development

Begin by introducing the three key chemical components of various forms of tobacco.

Nicotine

- The addictive substance in cigarettes.
- Physically and psychologically addictive.
- Causes an increase in blood pressure and heart rate.

Tar

- Gives the cigarette flavor.
- Contains carcinogens—cancer-causing agents that penetrate airways and lungs and form a brown sticky substance in the lining of the air sacs of the lungs.
- Damages the cilia.
- One pack of cigarettes per day per year is the same as drinking or ingesting one quart of actual *tar*—the same stuff they use to pave roads!

Carbon Monoxide

- Smoking produces carbon monoxide; the same gas that makes automobile fumes dangerous.

Subunit 2—Smoke and Fire

Effects of Tobacco Use

LESSON 2.2

- Carbon monoxide that is inhaled passes through the lungs and goes directly into the bloodstream.
- Carbon monoxide prevents hemoglobin from carrying oxygen to cells, which causes anoxia—a decreased oxygen level in the blood.

Another type of tobacco used is known as *smokeless tobacco*. There are two common forms of smokeless tobacco: chewing tobacco and snuff. Chewing tobacco is made from poor-quality tobacco leaves and is placed between the cheek and gums and chewed. Snuff is finely ground tobacco that is inhaled through the nose or held between the cheek and gums.

Like cigarettes, the key ingredient of smokeless tobacco is nicotine; however, with smokeless tobacco, the nicotine enters the bloodstream through the membranes in the mouth or nose. The effect of the nicotine remains the same as when it is smoked.

Due to the way it is used, smokeless tobacco has some unique hazards distinct from those of smoking. Sand, grit, and sugar in smokeless tobacco products destroy the surface of the teeth and lead to dental cavities and cancers of the mouth, throat, and tongue. Smokeless tobacco users are 50% more likely to develop oral cancer.

Introduce and explain the follow physical consequences of general tobacco use:

Cardiovascular Disease

- Kills over 115,000 tobacco users in the United States each year.
- A smoker is 3 times more likely to suffer a heart attack than a non-smoker.
- A heart attack is 5 to 10 times more likely to kill a smoker than a nonsmoker

Chemical Effects on the Heart

- Chemicals in tobacco force the heart to work harder to deliver oxygen.
- Blood vessels weaken due to the increased force of the blood.
- These conditions lead to high blood pressure.
- Nicotine promotes the buildup of fatty material on the walls of blood vessels.

Respiratory Disease

- Tar destroys cilia, so dust particles and mucus accumulate in the air passages.
- Coughing is the body's attempt to clear these passages.
- Once coughing doesn't work anymore, mucus fills the bronchial tubes.

Subunit 2—Smoke and Fire

Effects of Tobacco Use

LESSON 2.2

Chronic Bronchitis

- Condition in which the bronchial tubes become swollen and clogged with mucus.
- Simple activities are too hard—too difficult to breathe.
- No cure for chronic bronchitis, but some medications can temporarily open the tubes.

Emphysema

- Breathing disorder in which the small air sacs in the lungs lose their ability to expand and contract.
- People with emphysema cannot get enough oxygen into the body to rid the body of carbon dioxide.
- People with emphysema are always short of breath.
- Damage done cannot be reversed, even if they quit smoking.

Cancer

- Cancer can begin anywhere in the body and spread.
- Lung cancer caused by smoking can take 15 to 20 years to develop.
- In the United States today, lung cancer is the most deadly form of cancer.
- It is estimated that 87% of deaths from lung cancer are associated with smoking.
- Lung cancer is the leading cause of cancer deaths among women in the United States.

Tobacco Use in Pregnancy

- Increases the fetus's heart rate.
- Decreases the supply of oxygen to the fetus.
- Slows fetal growth.
- Results in low birth weight.
- Increases the chance of stillbirth.
- Increases the chance of spontaneous abortion and prenatal death.

Ask students if they are familiar with the concept of secondhand smoke. Do any of the students in the class who are not smokers live with someone who is a smoker or hang out with friends who are smokers? Ask the class if they think that nonsmokers are affected by secondhand smoke. Present the Surgeon General's major conclusions concerning the effects of secondhand smoke on adults and children http://www.cdc.gov/tobacco/secondhand_smoke/index.htm.

Next, have students read *The Boston Globe* article "At Mich. Firm, smoking at home is a firing offense." (http://www.boston.com/business/articles/2005/02/09/at_mich_firm_smoking_at_home_is_a_firing_offense)

Subunit 2—Smoke and Fire
Effects of Tobacco Use

LESSON 2.2

or another local article on smoking bans. Have students gather in groups of four to discuss the article. Using the worksheet, have students in each group construct a list of the arguments supporting and opposing the smoking ban.

Based on the list of pros and cons they have developed and their knowledge of smoking and its hazards from the lesson lecture, have students begin to develop an outline of the key points they would include in a persuasive “Letter to the Editor” on the smoking ban issue. They will complete the letter in their English class (Lesson 2.4).

As a **homework** assignment, ask students to write a one-page essay about the similarities and differences between smoking cigarettes and using smokeless tobacco. These essays should include a discussion of the unique health hazards of smokeless tobacco products. You may want to work with the English Language Arts teacher to have either this essay or the Letter to the Editor graded as both a Health Science and English assignment.

Student Assessment Artifacts

Letter to the Editor on smoking ban
Essay on smokeless tobacco products

Variations and Extensions

Invite a former smoker to come to speak about his or her efforts to quit smoking.

Build a smoking machine (check with your principal to see if this is allowed in your school) and have students observe how much tar is contained in the smoke.

National and State Career Technical Education Standards

NATIONAL NCHSTE National Healthcare Skill Standards

Foundation Standard 1: Academic Foundation

Healthcare workers will know the academic subject matter required for proficiency within their area. They will use this knowledge as needed in their role.

Foundation Standard 2: Communications

Healthcare workers will know the various methods of giving and obtaining information. They will communicate effectively, both orally and in writing.

Foundation Standard 9: Health Maintenance Practices

Healthcare workers will understand the fundamentals of wellness and the prevention of disease processes. They will practice preventive health behaviors among the clients.

STATE

List your state-specific standards in the space below.

Name _____ Date _____ Period _____

No Smoking?

1. What company is discussed in the article “Smoking at home is a firing offense” and what business is it in?

2. Why is the company banning smoking?

3. What was the reaction of employees?

4. What was the reaction of other companies?

Arguments in Favor of Ban	Arguments Against Ban

The Respiratory System

LESSON 2.3

BIOLOGY

Time

150 minutes

Materials

Equipment

- Drinking straws
- Plastic coffee stirrers
- Cigarettes
- Matches
- Plastic syringe or plastic bottle
- Cotton balls
- Tape or clay
- Computer lab with Internet access
- Overhead projector (optional)

Resources

- Images from <http://www.biologyofhumanaging.com/slides/emphys06.htm>
- Environmental Tobacco Smoke and Lung Development Activity website (http://www.biology.arizona.edu/chh/activities/tobacco_smoke/sign_in.html)

Prior Student Learning

Students should be familiar with the anatomy of the respiratory system and how it works.

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Objectives

After completing this lesson, students will be able to

- Explain the effects of cigarette smoke on the respiratory system.
- Describe the anatomy of the respiratory system.

Lesson Activities

Lesson Springboard

Cut the drinking straws so they are approximately the same length as the coffee stirrers. Pass out a drinking straw and a plastic coffee stirrer to each student. Have the students breathe through the drinking straw for about 30 seconds. Then have them try breathing through the coffee stirrer.

How long are students able to successfully breathe through the thinner straw? Ask students to explain why it was so difficult to breathe through the thin straw. Students should recognize that less air could be inhaled through the passage of a narrow straw with any given inhalation.

Lesson Development

Direct Instruction

Draw an analogy between the straws and the bronchial tubes of the lungs. Remind students of the respiratory system's anatomy. Cigarette smoke affects the respiratory system in several primary ways. First, the toxic substances present in cigarette smoke irritate cells in the lining of your respiratory system. In reaction, they will become inflamed, causing air passages to narrow and tighten up. This makes breathing more difficult in much the same way as trying to breathe through a narrow straw. This tightness gives rise to the feeling that one is not getting enough air.

Inflammation of the lung tissue triggers the secretion of proteases (e.g., elastase) that can break down the alveolar septum (the walls of the alveoli). This results in larger, less-elastic alveoli, which have decreased ability to ventilate air. Over time, an increasing amount of oxygen-depleted air becomes trapped in the lungs. The more of this oxygen-depleted air that is trapped, the less oxygen-rich air can be inhaled. This condition is a chronic obstructive pulmonary disease known as *emphysema*.

Download and show the class a comparison of lung tissues from a healthy lung and a diseased lung (<http://www.biologyofhumanaging.com/slides/emphys06.htm>). Students should be able to observe the noticeable difference between the samples.

Subunit 2—Smoke and Fire

The Respiratory System

LESSON 2.3

Virtual Lab

Take the class to the computer lab and have them go to the website for the Environmental Tobacco Smoke and Lung Development Activity (http://www.biology.arizona.edu/chh/activities/tobacco_smoke/sign_in.html).

This Internet activity simulates an actual experiment conducted by the University of Arizona on the effects of cigarette smoke on lung growth and development. The activity is highly scaffolded. You may wish to download the images used from the websites below and structure the activity yourself with less guidance:

- http://www.biology.arizona.edu/chh/activities/tobacco_smoke/graphics/sample_count.gif
- <http://www.biology.arizona.edu/chh/activities/tsnew/graphics/0055.gif>
- <http://www.biology.arizona.edu/chh/activities/tsnew/graphics/0110.gif>
- <http://www.biology.arizona.edu/chh/activities/tsnew/graphics/0090.gif>
- <http://www.biology.arizona.edu/chh/activities/tsnew/graphics/0056.gif>
- <http://www.biology.arizona.edu/chh/activities/tsnew/graphics/0149.gif>
- <http://www.biology.arizona.edu/chh/activities/tsnew/graphics/0030.gif>

Direct Instruction

A second way that smoking affects the respiratory system is by interfering with the primary defense mechanism of the lungs. Remind students that lungs come into greater contact with the outside world than almost any other internal organ. Ask students to recall how the lungs normally protect themselves from contaminants. Students should respond that mucus and cilia are the lungs' first line of defense.

Demonstration

Check with your school administrator before using this demonstration, as tobacco products are not permitted on school grounds.

Place cotton balls inside a large plastic syringe or a plastic bottle. Insert a cigarette into the end of the syringe, or affix the cigarette through the mouth of the soda bottle with modeling clay. Light the cigarette and simulate smoking by moving the syringe plunger in and out, or by squeezing and releasing the plastic bottle. Have students observe cotton balls after several "breaths." You may wish to repeat the demonstration with several varieties of cigarettes (filtered, unfiltered, low-tar) to demonstrate that all cigarette smoke leaves a significant residue.

Class Discussion

As you pass around the contaminated cotton balls, ask students what the cotton balls represent in an individual. Students should recognize that the cotton balls have collected any residue the lungs would collect. Discuss how the presence of the residue they have observed would im-

The Respiratory System

LESSON 2.3

pact the functioning of the cilia. Explain that many chemicals present in tobacco smoke are toxic to cilia, paralyzing and eventually destroying them. With reduction of the cleansing cilia action, the normal mucus the lungs produce begins to build up, blocking the passage of air, especially in smaller air passages. A body's attempt to rid itself of the excess mucus gives rise to the characteristic "smoker's cough."

Direct Instruction

The final significant impact of smoking also results from the buildup of mucus in your lungs. As a result of the decreasing cilia action, the lungs become a breeding ground for disease. The normal defense and cleansing is not occurring, and mucus can easily become infected. Equally serious, mucus traps carcinogenic substances from the tobacco smoke in the lungs. Continued exposure to these substances leads to abnormal cell growth and development and can result in lung cancer.

Lesson Closure

Assign students to make a trifold brochure describing the effects of smoking on the respiratory system. The brochure should include an overview of the anatomy of the respiratory system and a description of how smoke affects the functioning of the respiratory system.

Possible Prior Misconceptions

There is often confusion regarding the use of the term *respiration*. The ventilation of the lungs, commonly called *respiration* due to its association with the respiratory system, is properly referred to as *breathing*. However, the exchange of oxygen and carbon dioxide between the air and blood in the lungs is appropriately referred to as *external respiration*. There is also *cellular respiration*, which refers to the cellular processes that release energy from food substances, whereas *breathing* refers to the exchange of gases between an organism and its environment. Finally, this should not be confused with *internal respiration*, which is sometimes used to refer to the exchange of carbon dioxide and oxygen in the cells of the body.

Student Assessment Artifacts

Trifold brochure on effect of smoking on the respiratory system

Variations and Extensions

Invite a pathologist or pulmonary specialist to speak and/or show slides of lung diseases associated with smoking.

Include additional lessons on the biological effect of smoking on other important systems of the body, especially the cardiovascular system.

Have students research the effects of smoking on the respiratory and other body systems through a Web search.

Subunit 2—Smoke and Fire
The Respiratory System

LESSON 2.3

National and State Academic Standards

NATIONAL
NRC National Science Education Standards

Personal and Community Health

- The severity of disease symptoms is dependent on many factors, such as human resistance and the virulence of the disease-producing organism. Many diseases can be prevented, controlled, or cured. Some diseases, such as cancer, result from specific body dysfunctions and cannot be transmitted.
- Personal choice concerning fitness and health involves multiple factors. Personal goals, peer and social pressures, ethnic and religious beliefs, and understanding of biological consequences can all influence decisions about health practices.

STATE

List your state-specific standards in the space below.

Secondhand Smoke: Whom Do You Trust?

LESSON 2.4

ENGLISH LANGUAGE ARTS

Time

100 minutes

Materials

Equipment

Computer lab with Internet access

Resources

- Articles related to the health effects of secondhand smoke and public policy with conflicting viewpoints, for example:
 - Surgeon General's Report (http://www.cdc.gov/tobacco/data_statistics/sgr/sgr_2006/index.htm)
 - http://www.cdc.gov/tobacco/secondhand_smoke/index.htm
 - "Phony Science and Public Policy" (<http://jewishworldreview.com/cols/williams041107.php3>)
 - Clearing the Air page on secondhand smoke (<http://cleanairquality.blogspot.com/2004/04/american-cancer-society-test-results.html>)
- Ban Smoking in Public? worksheet

Prior Student Learning

Students should already be aware of the health effects of tobacco use from a previous lesson.

Preferably, students will have already completed Lessons 1.2 and 1.3 about the history and legislation of tobacco. They should have also completed Lesson 2.3 in Biology, which includes a brief introduction to the subject of secondhand smoke.

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Objectives

After completing this lesson, students will be able to

- Describe the differing views about secondhand smoke.
- Analyze and interpret the arguments made from data about secondhand smoke.
- Speak and write persuasively about whether smoking in public places should be completely banned.

Lesson Activities

Lesson Springboard

It has been very well documented that smoking has serious and harmful effects on the individual smoker, as students have learned in previous lessons. Ask the class to consider the potential dangers of secondhand smoke inhalation, or *involuntary smoking*. Discuss opinions on what types of behaviors are appropriate to regulate, and why. Further, discuss what information would be necessary to consider before making a decision to ban public smoking to prevent exposure to secondhand smoke.

Lesson Development

Class Discussion

Before class starts, assign the class to read excerpted passages from reports by the U.S. Surgeon General, the Environmental Protection Agency (EPA), and their critics. You can also find other appropriate articles. If needed, define the roles of the Surgeon General, the EPA, and the Occupational Safety and Health Administration (OSHA) agency. Begin the class with a discussion about areas of agreement and disagreement among the differing viewpoints.

Have students do a close reading of their articles to find the supporting evidence each side presents when making claims. Discuss what each side might be misrepresenting or purposefully excluding from their arguments. Ask whether the class feels that the articles chosen for this lesson are representative of the public conversation about this topic, or if they are biased in a certain direction. Determine what questions must be answered or information provided before students feel comfortable forming a conclusion about banning public smoking.

Have students make a list of at least three of their lingering concerns, possibly for **homework** if there is limited time.

Secondhand Smoke: Whom Do You Trust?

LESSON 2.4

Internet/Library Research

At the computer lab or library, allow students to explore the scope of opinions and research studies involving the health effects of secondhand smoke. Then ask students to try to find the answers to the concerns they listed previously. They should properly cite sources for their answers, and include with each answer a brief analysis of the validity of the information they found.

Class Discussion

After students have done their own research on the topic, discuss whether their opinions changed on the subject of smoking bans. Were there any sources of information that they decided not to trust? If so, why? Determine what was most convincing to students when they read differing reports. Ask students to consider whether they think there is consensus in the general scientific community about the effects of secondhand smoke. A connection can be made to other current events involving science, such as legislation on global warming and greenhouse gas emissions.

Lesson Closure

Discuss the value of searching for different perspectives on a topic that has powerful and opposing stakeholders. Ask the class to consider the consequences of individuals' having the ability to publish anything they write on the Internet. Does this make it easier or more difficult to find legitimate information? How do writers use statistics and carefully constructed graphs to convey the impression of scientific validity? Should we believe everything we read on the Internet?

Have students write a persuasive "Letter to the Editor" on whether they believe smoking should be banned in public on the basis of preventing secondhand smoke exposure.

Possible Prior Misconceptions

Students may not have been aware of the different stakeholders involved in the smoking ban policy discussion.

Students may think that every published scientific paper has reliable results and that statistics have only one "correct" interpretation.

Student Assessment Artifacts

Ban Smoking in Public? worksheet
Letter to the Editor

Variations and Extensions

Invite health officials and speakers with differing views on regulation of individual behavior to speak about secondhand smoke.

Invite scientific researchers to speak about the scientific process and the significance of differing interpretations and results in scientific studies.

Hold a debate about banning smoking in public instead of writing letters.

Secondhand Smoke: Whom Do You Trust?

LESSON 2.4

Include instruction on how to read scientific articles for understanding and have students find scientific studies on secondhand smoke.

Expand the discussion about the persuasiveness of the statistical data and scientific arguments in this public policy debate by including a math lesson on confidence intervals and a science lesson on how scientific fact is established. Investigate the sometimes-opposing influences of public opinion, major special interests, and science on public policy, including issues like global warming and teaching evolution.

Secondhand Smoke: Whom Do You Trust?

LESSON 2.4

National and State Academic Standards

NATIONAL

NCTE Standards for the English Language Arts

1. Students read a wide range of print and non-print texts to build an understanding of texts, of themselves, and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works.
5. Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.
7. Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and non-print texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.
8. Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.
12. Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).

STATE

List your state-specific standards in the space below.

Name _____ Date _____ Period _____

Foreword

This twenty-ninth report of the Surgeon General documents the serious and deadly health effects of involuntary exposure to tobacco smoke. Secondhand smoke is a major cause of disease, including lung cancer and coronary heart disease, in healthy nonsmokers.

In 2005, it was estimated that exposure to secondhand smoke kills more than 3,000 adult nonsmokers from lung cancer, approximately 46,000 from coronary heart disease, and an estimated 430 newborns from sudden infant death syndrome. In addition, secondhand smoke causes other respiratory problems in nonsmokers such as coughing, phlegm, and reduced lung function. According to the CDC's National Health Interview Survey in 2000, more than 80 percent of the respondents aged 18 years or older believe that secondhand smoke is harmful and nonsmokers should be protected in their workplaces.

Components of chemical compounds in secondhand smoke, including nicotine, carbon monoxide, and tobacco-specific carcinogens, can be detected in body fluids of exposed nonsmokers. These exposures can be controlled. In 2005, CDC released the Third National Report on Human Exposure to Environmental Chemicals, which found that the median cotinine level (a metabolite of nicotine) in nonsmokers had decreased across the life stages: by 68 percent in children, 69 percent in adolescents, and 75 percent in adults, when samples collected between 1999 and 2002 were compared with samples collected a decade earlier. These dramatic declines are further evidence that smoking restrictions in public places and workplaces are helping to ensure a healthier life for all people in the United States.

However, too many people continue to be exposed, especially children. The recent data indicate that median cotinine levels in children are more than twice those of adults, and non-Hispanic blacks have levels that are more than twice as high as those of Mexican Americans and non-Hispanic whites. These disparities need to be better understood and addressed.

Research reviewed in this report indicates that smoke-free policies are the most economic and effective approach for providing protection from exposure to secondhand smoke. But do they provide the greatest health impact. Separating smokers and nonsmokers in the same airspace is not effective, nor is air cleaning or a greater exchange of indoor with outdoor air. Additionally, having separately ventilated areas for smoking may not offer a satisfactory solution to reducing workplace exposures. Policies prohibiting smoking in the workplace have multiple benefits. Besides reducing exposure of nonsmokers to secondhand smoke, these policies reduce tobacco use by smokers and change public attitudes about tobacco use from acceptable to unacceptable.

Research indicates that the progressive restriction of smoking in the United States to protect nonsmokers has had the additional health impact of reducing active smoking. In November 2005, CDC's Tobacco-Free Campus policy took full effect in all facilities owned by CDC in the Atlanta area. As the Director of the nation's leading health promotion and disease prevention agency, I am proud to support this effort. With this commitment, CDC continues to protect the health and safety of all of its employees and serves as a role model for workplaces everywhere.

Julie Louise Gerberding, M.D., M.P.H.

Director, Centers for Disease Control and Prevention

Administrator, Agency for Toxic Substances and Disease Registry

SOURCE: U.S. Department of Health and Human Services. (2006). *The health consequences of involuntary exposure to tobacco smoke: a report of the Surgeon General—Executive summary*. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.

Name _____ Date _____ Period _____

Setting the Record Straight: Secondhand Smoke Is a Preventable Health Risk

The Epidemiology Studies

In assessing the studies several different ways, it becomes clear that the extent of the consistency defies attribution to chance. When looking only at the simple measure of exposure of whether the husband ever smoked, 24 of 30 studies reported an increase in risk for nonsmoking women with smoking husbands. Since many of these studies were small, the chance of declaring these increases statistically significant was small. Still, nine of these were statistically significant, and the probability that this many of the studies would be statistically significant merely by chance is less than *1 in 10 thousand*.

It is unprecedented for such a consistency of results to be seen in epidemiology studies of cancer from environmental levels of a pollutant. One reason is that it is extremely difficult to detect an effect when virtually everyone is exposed, as is the case with secondhand smoke. However, consistent increased risks for those most exposed and consistent trends of increasing exposure showing an increasing effect provide strong evidence that secondhand smoke increases the risk of lung cancer in nonsmokers.

How Big a Lung Cancer Risk for Adults?

The evidence is clear and consistent: secondhand smoke is a cause of lung cancer in adults who don't smoke. EPA has never claimed that minimal exposure to secondhand smoke poses a huge individual cancer risk. Even though the lung cancer risk from secondhand smoke is relatively small compared to the risk from direct smoking, unlike a smoker who chooses to smoke, the nonsmoker's risk is often involuntary. In addition, exposure to secondhand smoke varies tremendously among exposed individuals. For those who must live or work in close proximity to one or more smokers, the risk would certainly be greater than for those less exposed.

The 11 U.S. Lung Cancer Studies

The consistency of study results in the highest exposure category and exposure-response trends discussed above also apply to the U.S. studies. For example, seven of the 11 U.S. studies had fewer than 45 cases, making statistical comparisons difficult. Nonetheless, eight of the 11 had increased overall risks, and for the seven studies which reported on risks by amount of exposure, the highest exposure groups in all seven had increased risks. While the 11 U.S. studies are not, by themselves, conclusive, they do support the conclusion that secondhand smoke is causally associated with lung cancer.

90% vs. 95% Confidence Intervals

Critics of the EPA report have charged that EPA changed the confidence interval in order to come to a predetermined conclusion. However, the conclusion that secondhand smoke is a known human carcinogen simply does not hinge on whether or not a 95% or 90% "confidence interval" was used. A confidence interval is used to display variability in relative risk estimates in the epidemiology studies. As discussed above, the Group A designation is based on the total weight of the available evidence. The consistency of results that are seen in the numerous studies examined lead to a certainty of greater than 99.9% that secondhand smoke increases the risk of lung cancer in nonsmokers.

In the non-cancer respiratory effects portions of the report, "two-tailed tests" and 95% confidence intervals were used, since there was less prior evidence from smokers to suggest that secondhand smoke would cause bronchitis, pneumonia, and ear infections in children.

SOURCE: Office of Air and Radiation, Office of Radiation and Indoor Air Indoor Environments Division (6609J), EPA Document Number 402-F-94-005, June 1994.

Name _____ Date _____ Period _____

List at least three research questions you would like to investigate before solidifying an opinion about banning smoking in public.

Research Question 1:

Research Question 2:

Research Question 3:

Additional Questions:

Write down or print out the information you found on a separate piece of paper. Make sure that you cite the source of your information. You will use this information in your persuasive Letter to the Editor.

Subunit 2—Smoke and Fire

Smoked Out: Strategies for Stopping

LESSON 2.5

HEALTH SCIENCE I

Time

90 minutes

Materials

Equipment

Computer lab access

Resources

- Learn to Quit handout
- Be a Quitter Brochure handout

Prior Student Learning

Students should have an understanding of nicotine's effect on neurotransmission in the brain from Lesson 2.1 in Biology.

Students should have a basic understanding of the underlying physical reactions contributing to addiction.

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Objectives

After completing this lesson, students will be able to

- Explain the underlying biological reasons for addiction and how they have an effect on efforts to quit smoking.
- Describe the psychological components that contribute to addiction and inhibit quitting.
- Discuss methods and techniques used to help smokers quit using tobacco including pharmacotherapies and counseling.

Lesson Activities

Lesson Springboard

Have students volunteer examples of bad habits they have tried to change in their own lives. Consider as a class what may have contributed to successful or unsuccessful attempts at changing behavior in these examples. Ask students to consider how those experiences might compare with attempting to break an addiction like smoking.

Lesson Development

Direct Instruction

Explain to students that tobacco use may lead to physical and psychological dependence, both of which should be addressed in order to increase the chances of successfully quitting.

When a person uses tobacco, the nicotine present in her or his body is absorbed into the bloodstream. Nicotine triggers increased release of dopamine, a key reward neurotransmitter, producing pleasant feelings in the user. Physical dependence results when smokers become accustomed to these increased levels of dopamine, which require continuing use of nicotine to maintain. When a smoker stops using tobacco, the body will react to the absence of nicotine, and the smoker will experience withdrawal symptoms, including restlessness, irritability, headaches, feelings of frustration and anger, and depression.

Classroom Management

Students should have already learned about the physical effects of tobacco use on the nervous, cardiovascular, and respiratory systems in this class or in their Science class. If not, additional instruction is required at this stage.

Individual/Small Group Work

Pass out the Learn to Quit handout. Tell students that nicotine-replacement therapy is one way to relieve some of the physical withdrawal symptoms a person may encounter when quitting smoking. Using a nicotine substitute allows smokers to gradually reduce their dependence on nicotine while immediately removing the other health hazards as-

Smoked Out: Strategies for Stopping

LESSON 2.5

sociated with smoking. Reducing the symptoms of withdrawal allows a smoker to concentrate on dealing with the psychological aspects of addiction—that is, breaking a habit that will require a major change in behavior. For many smokers, there are strong social and emotional ties to smoking. Counseling, the support of family and friends, and quitting programs are all key to one's success in quitting.

Ask students to research the various nicotine-replacement therapies (nicotine patch, nicotine gum, nicotine inhaler, etc.) and the suggested associated counseling programs by following the guidelines in the Learn to Quit handout. Possible websites to begin their research include the following:

- http://www.cdc.gov/tobacco/quit_smoking/index.htm
- <http://www.smokefree.gov>
- <http://www.cancer.org>

Support Strategy

Have students conduct research and construct the brochure working in pairs or small groups.

Using the information they have learned in class and results of their research as a **homework** assignment, have students design and produce a Be a Quitter Brochure, as explained in the handout in this lesson, that provides smokers who would like to quit with information on the various resources available to them. Each student can produce a brochure about one specific treatment.

Lesson Closure

Have students share their brochures with the class to receive constructive feedback about their overall impact and effectiveness.

Possible Prior Misconceptions

Students may have thought that it was easier to quit smoking and may have misconceptions about mental and physical addictions in general.

Student Assessment Artifacts

Be a Quitter Brochure

Variations and Extensions

Invite a guest speaker to talk to the students about quitting smoking. You could invite a health professional to speak about the clinical aspects of quitting. You could also find an adult that students might know (perhaps another teacher or a parent) who has personal experience with quitting smoking and ask that person to share her or his experiences.

The class may choose to distribute their brochures to students outside the class as part of a Stop Smoking Campaign. Or they may design brochures about reasons not to start smoking for younger students and make them available to teachers in local middle or elementary schools.

Smoked Out: Strategies for Stopping

LESSON 2.5

National and State Career Technical Education Standards

NATIONAL

NCHSTE National Healthcare Skill Standards

Foundation Standard 1: Academic Foundation

Healthcare workers will know the academic subject matter required for proficiency within their area. They will use this knowledge as needed in their role.

Foundation Standard 2: Communications

Healthcare workers will know the various methods of giving and obtaining information. They will communicate effectively, both orally and in writing.

Foundation Standard 9: Health Maintenance Practices

Healthcare workers will understand the fundamentals of wellness and the prevention of disease processes.

STATE

List your state-specific standards in the space below.

Name _____ Date _____ Period _____

Learn to Quit

Tobacco dependence is a chronic condition that sometimes requires repeated efforts to quit before success is attained. Although some people can quit “cold turkey,” many smokers require additional treatment and support to succeed. Yet treatments available today can result in long-term or even permanent success. Research the purpose, mechanism, and effectiveness of each of the following treatments.

Pharmacotherapies

- Nicotine gum
 - What is the purpose of nicotine gum?
 - How does it work to help someone quit smoking?
 - What are the differences between the various brands available?
 - What are the gum’s advantages or disadvantages over other treatments, if any?
- Nicotine patch
 - What is the purpose of nicotine patches?
 - How do they work to help someone quit smoking?
 - What are the differences between the various brands available?
 - What are patches’ advantages or disadvantages over other treatments, if any?
- Nicotine inhaler
 - What is the purpose of nicotine inhalers?
 - How do they work to help someone quit smoking?
 - What are the differences between the various brands available?
 - What are inhalers’ advantages or disadvantages over other treatments, if any?
- Nicotine nasal spray
 - What is the purpose of nicotine nasal spray?
 - How does it work to help quit smoking?
 - What are the differences between the various brands available?
 - What are the spray’s advantages or disadvantages over other treatments, if any?
- Bupropion SR
 - What is bupropion SR?
 - How does it work to help quit smoking?
 - What are the differences between the various brands available?
 - What are bupropion SR’s advantages or disadvantages over other treatments, if any?

Counseling

- Practical counseling—problem solving and skills training
 - What factors cause relapses into smoking?
 - How can these events or problems be avoided?
 - What skills are needed to quit smoking?
 - What other information is needed by those trying to quit?
- Support counseling—in treatment and outside treatment
 - What kinds of social support should be provided by families and friends?
 - Where can smokers go to find help?

Name _____ Date _____ Period _____

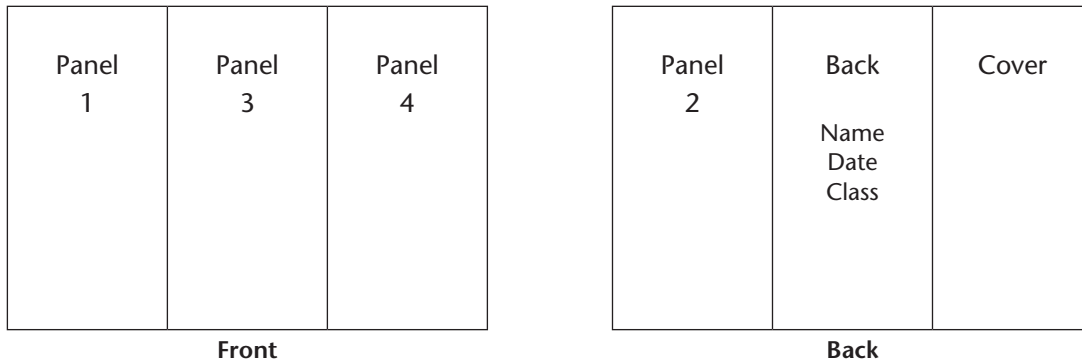
Be a Quitter Brochure

Brochures are a quick way to inform, educate, and persuade. Many times, people do not have the time to read longer explanations and simply want an overview of important information.

Your assignment is to create an informational brochure about one of the antismoking treatments. The brochure is not an in-depth study of the treatment, but it should provide smokers trying to quit with all relevant information about the benefits and disadvantages of that particular treatment. The brochure also needs to grab and keep the reader's interest from start to finish, so your graphics and layout decisions are important, as well.

In general, a brochure may cover a broad topic, but it shouldn't contain so much information that it overwhelms the reader. Choose two to three key points to describe. If there are other important elements, consider putting them in a simple bullet list or chart somewhere in your brochure.

In addition to deciding what your brochure says, you must determine the best format to present your information. The format that works best will depend on how much text and how many graphics are included. You'll need to find the format that best suits your information. Use the general layout shown below so that your brochure can be folded properly.



Items that **must** be included in the brochure:

- On the cover panel:
 - Name of the treatment
 - Graphic
- Interior panels:
 - Description of treatment
 - Action mechanism (how it works)
 - Advantages/disadvantages compared to other treatments
 - How to receive the treatment
 - Where to get more information
- On the back panel:
 - Names of all group members
 - Date
 - Class period

Smoke and Mirrors

SUBUNIT 3 OVERVIEW

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Subunit Goals

Subunit 3 provides an in-depth look at advertising techniques in relation to the tobacco industry. Students examine tobacco and other product advertisements to identify the persuasive methods used and the possibly misleading messages conveyed. They then enhance their persuasive writing and presentation skills by creating truthful advertisements about smoking and its effects. Finally, students look at the history of niche marketing in the tobacco industry and discuss how cigarette manufacturers target specific audiences for their products.

Subunit Key Questions

- How is tobacco effectively advertised by the industry? What persuasive techniques do advertisers use in the media? (English Language Arts)
- Why would the tobacco industry choose to target specific groups in society for their advertisements? What specific writing and layout techniques do they use in their niche advertising? (English Language Arts)
- How is tobacco advertising intentionally misleading? What would the industry's advertisements look like if they were as truthful as possible? (English Language Arts or Visual Arts)

Lesson Summaries

Lesson	Subject	Description
3.1	English Language Arts	<i>The Power of Advertising</i> Students learn the persuasive techniques of advertising campaigns and analyze tobacco advertisements to identify intended messages that are potentially misleading.
3.2	English Language Arts or Visual Arts	<i>Truth in Advertising</i> Students use their analysis from the previous lesson to create more truthful advertisements about smoking and tobacco use.
3.3	English Language Arts	<i>Niche Marketing</i> Students analyze controversial tobacco advertisements aimed at niche markets and discuss the appropriateness of this kind of marketing strategy.

The Power of Advertising

LESSON 3.1

ENGLISH LANGUAGE ARTS

Time

90 minutes

Materials

Equipment

- Computer lab (optional)
- Overhead projector (optional)

Resources

- Advertising Techniques worksheet
- An advertisement for a product that is popular with teenagers
- Variety of current magazines with advertisements for tobacco products or Internet access to view advertisements
- Ad-Busting worksheet
- Vintage Tobacco advertisements from a website, such as <http://www.AdClassix.com>

Prior Student Learning

Students should have a basic understanding that writing style and techniques are altered depending on the content, purpose, and audience.

Students should have experience in writing persuasive essays and using evidence to support claims.

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Objectives

After completing this lesson, students will be able to

- Identify and describe persuasive writing techniques used in advertising.
- Recognize strategies used in media to inform and persuade various audiences.
- Analyze the persuasive elements and language present in tobacco advertisements.
- Interpret and evaluate the presentation of potentially misleading advertising content.

Lesson Activities

Lesson Springboard

Ask the class what is the absolute “must-have” accessory right now: shoes, clothes, iPods, whatever. Ask students to try to explain why they want this object so much. When did they first start thinking about having this product? Can they think of an advertisement promoting the product? Have one or two students describe the advertising campaign for one or two particularly compelling products. If possible, identify the advertising technique(s) used in the campaign.

Lesson Development

Tell students that companies use advertising to convince consumers to buy products that they might not otherwise want to have, and that effective advertising uses a set of standard techniques that they will learn about in class today.

Begin by showing students an advertisement of a product popular with young people and point out the various strategies being used in your example. Ideally, you should select an ad with a reasonable amount of text. If possible, project a large copy of the advertisement in front of the classroom using a transparency or an LCD projector so that students can see the details of the text in the ad.

These techniques are very similar to propaganda techniques that students may have studied in a Social Studies class in the past. Pass out the Advertising Techniques worksheet. Following the worksheet, introduce and define the various strategies for the class. You may wish to use a blank worksheet and have students record the definitions for themselves. For each technique, have

Classroom Management

In the event that students are unable to come up with an example, you may wish to make a list of examples from popular current ads prior to the start of class.

The Power of Advertising

LESSON 3.1

the class try to identify a current example of the strategy in use. Remember, many ads use multiple strategies simultaneously.

Alternatively, you may wish to begin by giving only the name of each strategy. Have students speculate on what each strategy might entail before providing the definition.

Strategy	Definition
Bandwagon	Suggests that “everyone” is using the product and the consumer should use the product to be part of the group
Nostalgia	Suggests that the product is practical and use of the product will return the consumer to “the good old days”
Facts and Figures	Uses facts and statistical figures to “prove” the superiority of the product
Star Power/ Testimonial	Uses a celebrity to promote or endorse the product
Heartstrings	Plays on emotions and makes the consumer feel part of the story
Wit and Humor	Uses humorous situations to attract the consumer
Hidden Fears	Suggests that use of the product can protect the consumer from harm or danger
Weasel Words	Uses words to suggest a positive meaning when in fact the words are vague and make no guarantee (e.g., <i>virtually</i> , <i>mostly</i> , <i>almost</i> , etc.)
Patriotism	Suggests that use of the product shows love for the country
Snob Appeal	Suggests that use of the product makes you better or more desirable than those who don’t use the product

Support Strategy
Have pairs of students analyze an advertisement together or analyze a single advertisement together in class.

You may also have students attempt to identify advertising strategies not covered by this list. Other common advertising strategies that students might recognize include the following:

- Glittering Generalities
- Avant-garde
- Magic Ingredients
- Diversion
- Transfer
- Bribery
- Card Stacking

Next, pass out the Ad-Busting worksheet and a variety of recent print tobacco advertisements from popular magazines. Have each student select an advertisement for analysis. Have students answer the questions from the Ad-Busting worksheet using their advertisement.

The Power of Advertising

LESSON 3.1

Lesson Closure

Students may need to finish their advertisement analysis for **homework**. Have students present a summary of their analysis of the advertisement to a fellow student.

Student Assessment Artifacts

Completed Ad-Busting worksheet analysis
Vintage and contemporary ad comparison (optional)

Possible Prior Misconceptions

Some students may believe that advertisements that appear in print, on TV, or on the Internet have been reviewed or approved for accuracy by some government or other agency.

Variations and Extensions

Have students compare vintage and contemporary tobacco advertisements by analyzing an ad from one of the websites that offer examples of tobacco advertisements, such as <http://www.adclassix.com>. Or, distribute a vintage ad that you have selected from one of the websites. Have students attempt to identify the advertising strategies used in the vintage ads. The same strategies have been in use for many years. The health claims common to vintage tobacco advertising may seem strange to students. See if they notice the lack of the Surgeon General's warnings. Have students discuss these differences in class and what might account for them.

National and State Academic Standards

NATIONAL NCTE Standards for the English Language Arts

- Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language, and genre to create, critique, and discuss print and non-print texts.

STATE List your state-specific standards in the space below.

Name _____ Date _____ Period _____

Advertising Techniques

Advertising techniques are tools used to attract attention, engage minds, trigger emotions, and change what people think, usually to make a sale.

Strategy	Definition	Example
Bandwagon	Suggests that “everyone” is using the product and the consumer should use the product to be part of the group	
Nostalgia	Suggests that the product is practical and use of the product will return the consumer to “the good old days”	
Facts and Figures	Uses facts and statistical figures to “prove” the superiority of the product	
Star Power or Testimonial	Uses a celebrity to promote or endorse the product	
Heartstrings	Plays on emotions and makes the consumer feel part of the story	
Wit and Humor	Uses humorous situations to attract the consumer	
Hidden Fears	Suggests that use of the product can protect the consumer from harm or danger	
Weasel Words	Uses words to suggest a positive meaning, when in fact the words are vague and make no guarantee (e.g., <i>virtually</i> , <i>mostly</i> , <i>almost</i> , etc.)	
Patriotism	Suggests that use of the product shows love for the country	
Snob Appeal	Suggests that use of the product makes you better or more desirable than those who don’t use the product	

Can you think of other examples of techniques used in advertisements?

Name _____ Date _____ Period _____

Ad-Busting

Uncovering the Truth in Advertising

The language and design used in advertising are carefully chosen to evoke specific feelings and emotions in the viewer. Being aware of the strategies advertisers use to manipulate consumers is the first step to uncovering the truth in advertising.

1. Name of the product advertised

2. Examine the **visual** aspects of the advertisement.

What colors are used?	What is happening in the ad?	What kinds of facial expressions do you see?	What type of body language is expressed in the ad?	What overall impression do the visual elements create?

3. Examine the **written** aspects of the advertisement.

What is the slogan?	What key words are used?	What adjectives and adverbs are used?	What kinds of claims are being made?

4. Examine the **layout** of the advertisement.

How do the words relate to the images?	What is the central focus of the advertisement?	Where is the logo located?	What impression do the font and logo create?

5. Examine the **magazine** where the advertisement is placed.

What type of magazine is this?	Who is the target audience for this magazine?	Is there a connection between the magazine's subject and the product?

Truth in Advertising

LESSON 3.2

ENGLISH LANGUAGE ARTS or VISUAL ARTS

Time

50 minutes

Materials

Equipment

- Poster paper
- Art supplies (colored pencils, markers, etc.)
- Computer lab equipped with graphics program (optional)

Resources

- Truth in Advertising worksheet
- Welcome to BADvertising Country website (<http://www.badvertising.org/>)

Prior Student Learning

Students should have a basic understanding of techniques used in persuasive writing such as advertising copy (see Lesson 3.1).

Support Strategy

Allow students to create their ads in pairs or groups.

Classroom Management

Select students to do a presentation while circulating through the class. You may wish to warn students you will be calling on them to present ahead of time.

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Objectives

After completing this lesson, students will be able to

- Understand and identify persuasive techniques used in advertising.
- Use persuasive writing techniques to create an antitobacco advertisement.
- Analyze the impact of their own persuasive writing.

Lesson Activities

Lesson Springboard

Have students take out their tobacco advertisements and analysis from Lesson 3.1. Based on question #11 from the handout, have students share some ideas about how they would “bust” the advertisement they analyzed—that is, change it in some way to reveal the truth about the product.

Lesson Development

Pass out the Truth in Advertising worksheet. To show students an example of ad “busting,” distribute a before-and-after version of a “busted” tobacco advertisement from the Welcome to BADvertising Country website, <http://www.advertising.org/>.

Discuss with the class their reaction to the altered advertisement. What is the message of the alteration? What is the tone of the change: funny, shocking, something else? Do the students find it to be effective? Can the class think of different directions the artist could have taken with this advertisement? Are traditional advertising techniques at work in the new ad? Are there any different techniques at work?

If the class has access to a computer lab, direct the students to the BADvertising Country website where they can see many examples of advertisements that have been altered to reflect the physical effects of tobacco use. Students may refer to these examples when they work on their worksheets.

Have students discuss ideas for honest tobacco advertisements in pairs or small groups. Using the Truth in Advertising worksheet, have students create their own advertisement. Their work should employ the same strategies and techniques as professional advertisers, but demonstrate the true effects and consequences of tobacco use. Have students post their completed advertisements around the classroom or around the school.

Subunit 3—Smoke and Mirrors
Truth in Advertising

LESSON 3.2

Lesson Closure

Have students do a mini-analysis of each other's "busted" advertisement using their notes and the Advertising Techniques handout from the previous lesson. If time allows, select several students to share their advertisements with the class. Students should identify the advertising techniques they have used, explain why they chose them, and describe their intended impact on the audience.

Student Assessment Artifacts

Antitobacco advertisement with analysis

Possible Prior Misconceptions

None

Variations and Extensions

Broadcast television is another effective advertising medium. Although tobacco is no longer advertised on television, antismoking ads are allowed. Rather than design print ads, have students work in small groups to script and film an antismoking commercial.

National and State Academic Standards

NATIONAL

NCTE Standards for the English Language Arts

4. Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.
5. Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.
6. Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language, and genre to create, critique, and discuss print and non-print texts.
12. Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).

STATE

List your state-specific standards in the space below.

Name _____ Date _____ Period _____

Truth in Advertising

Editing an advertisement to reflect the real potential consequences of using a product is sometimes called *counter-advertising*, *BADvertising*, or *ad-busting*. You can find several examples of counter-advertising for tobacco products at Welcome to BADvertising Country, <http://www.badvertising.org/>.

After viewing these examples, create your own “honest” tobacco advertisement, using the techniques and strategies of the advertising industry. You may alter the ad you analyzed in the ad-busting assignment, or you may choose to come up with an entirely new design. Use at least three strategies in your ad and record them here when your advertisement is complete.

Strategy	How I Used it in My Advertisement	Intended Effect
1.		
2.		
3.		

Subunit 3—Smoke and Mirrors

Niche Marketing

LESSON 3.3

ENGLISH LANGUAGE ARTS

Time

50 minutes

Materials

Equipment

- Magazines with tobacco ads (optional) or
- Internet access to view ads (optional)

Resources

- Advertising Techniques handout
- Ad-Busting worksheet
- NAAAPI Tobacco Gallery (<http://www.naaapi.org/gallery/gallery1.asp>)
- Tobacco Company Marketing to African Americans (<http://tobaccofreekids.org/research/factsheets/pdf/0208.pdf>)
- Tobacco Advertising Gallery (<http://tobaccofreekids.org/adgallery>)
- The American College of Chest Physicians Speakers Kit: Brief History of Tobacco Advertising to Women (<http://speakerskit.chestnet.org/wgtlc/pres-history.php>)

Prior Student Learning

Students should have a basic understanding of persuasion and advertising techniques and strategies.

Essential Question for This Unit

How should we make decisions about regulating smoking in public places?

Objectives

After completing this lesson, students will be able to

- Distinguish among various persuasive techniques used in advertising.
- Recognize strategies used to persuade specific audiences.

Lesson Activities

Lesson Springboard

Niche marketing finds potentially profitable subgroups within a market and provides them with custom products or services. Subgroups within the tobacco market can include specific age groups, genders, ethnic groups, or even smokers trying to quit.

In 2004, Brown and Williamson (B&W) was ordered to shut down its House of Menthol website, halt its DJ competitions, and stop giving away promotional items and employing other parts of its “Kool MIXX” marketing campaign for its mentholated cigarettes. The campaign was focused on hip-hop music and its culture—a culture mainly supported by African American youth—and in violation of the master settlement agreement that prohibits tobacco companies from marketing to minors.

Many cigarette products and advertising campaigns have also been targeted specifically toward women, such as Virginia Slims and their “You’ve Come a Long Way, Baby” slogan. Then there were flavored cigarettes like “Caribbean Chill” and “Mocha Mint,” which tobacco-control advocates claimed were aimed at children. Now people are questioning the target of “Snus,” one of the newest tobacco products, a tea bag–like tobacco sack that can be placed under the tongue. A *Portland Tribune* article titled “Green Eggs and Spitless Tobacco?” questions whether the product is aimed at kids because of its Dr. Seuss–like rhyming ad: “Use in a car, in a house, in a bar.” Or is “Snus” aimed at those trying smokeless tobacco products in response to smoking bans? Or is it aimed at those looking for a safer alternative or who may be trying to quit?

With certain demographic groups displaying brand loyalty to particular products, how are advertising strategies used within marketing campaigns to target specific niches?

Lesson Development

Class Discussion

Ask students to list the names of tobacco brands that they know and make a list of their responses on the chalkboard. Many students will name the same heavily advertised (or used) brands, such as Marlboro,

Subunit 3—Smoke and Mirrors
Niche Marketing

LESSON 3.3

Newport, Camel, Winston, and Salem. A few may mention cigar brands such as Swisher Sweets or Black & Mild. Tell students that there are over 40 brands of cigarettes. Ask why they are familiar with the brands listed. Ask them if they remember any ads—more specifically, which ads and what was memorable about them? Also, are there similarities in the ads they remember? And do the ads show people smoking or using the tobacco products?

Distribute copies of advertisements from at least two of the controversial tobacco-marketing campaigns directed at women, youth, or minorities (from magazines, newspapers, or from online sources such as <http://tobaccofreekids.org/>).

Have each student select two ads: one each from two different campaigns or directed at different niche markets within a single campaign (such as the 1999 Virginia Slims “My Voice” campaign, which made unique ads for women in different ethnic groups). Distribute two copies of the Ad-Busting worksheet to each student and have the student answer the questions for each ad.

Lesson Closure

Explain to students that marketing to specific market subgroups is often extremely effective, especially when brand loyalty is established among consumers.

Many advertisements for menthol cigarettes have specifically targeted African Americans. The American Lung Association reports that mentholated cigarettes are used by three out of four African American smokers and that 61.3% of African American teens prefer the brand Newport, a mentholated cigarette known for its high tar and high nicotine content and its advertising targeted toward young adults.

Possible Prior Misconceptions

Menthol is an ingredient used in lip balms and in medicines like cough drops and topical analgesics. It is also used in cigarettes and is reported to produce a soothing or cooling effect that allows the user to pull in more smoke and inhale longer, providing more exposure to the addictive and carcinogenic materials. It is also asserted that menthol affects nicotine synthesis.

Student Assessment Artifacts

Ad-Busting worksheet
Advertisements analyzed

Variations and Extensions

Have each student write a one- to two-page summary of what technique(s) he or she would use to market a product to teenagers (or a specific subset of teenagers). Students should explain what qualities the ad would target, and how and why. They should also describe what medium they would use and where they would place their ads.

National and State Academic Standards

NATIONAL

NCTE Standards for the English Language Arts

6. Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language, and genre to create, critique, and discuss print and non-print texts.

STATE

List your state-specific standards in the space below.

Name _____ Date _____ Period _____

Advertising Techniques

Advertising techniques are tools used to attract attention, engage minds, trigger emotions, and change what people think, usually to make a sale.

Strategy	Definition	Example
Bandwagon	Suggests that “everyone” is using the product, and the consumer should use the product to be part of the group	
Nostalgia	Suggests that the product is practical, and use of the product will return the consumer to “the good old days”	
Facts and Figures	Uses facts and statistical figures to prove the superiority of the product	
Star Power/Testimonials	Uses a celebrity to promote or endorse the product	
Heartstrings	Plays on emotions and makes the consumer feel part of the story	
Wit and Humor	Uses humorous situations to attract the consumer	
Hidden Fears	Suggests that use of the product can protect the consumer from harm or danger	
Weasel Words	Uses words to suggest a positive meaning, when in fact the words are vague and promise no guarantee (e.g., <i>virtually</i> , <i>mostly</i> , <i>almost</i> , etc.)	
Patriotism	Suggests that use of the product shows love for the country	
Snob Appeal	Suggests that use of the product makes you better or more desirable than those who don’t use the product	

Can you think of other examples of techniques used in advertisements?

Name _____ Date _____ Period _____

Ad-Busting

Uncovering the Truth in Advertising

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2. Examine the *visual* aspects of the advertisement.

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3. Examine the *written* aspects of the advertisement.

What is the slogan?	What key words are used?	What adjectives and adverbs are used?	What kinds of claims are being made?

4. Examine the *layout* of the advertisement.

How do the words relate to the images?	What is the central focus of the advertisement?	Where is the logo located?	What impression do the font and logo create?

5. Examine the *magazine* where the advertisement is placed.

What type of magazine is this?	Who is the target audience for this magazine?	Is there a connection between the magazine's subject and the product?

Name _____ Date _____ Period _____

6. What is the overall message of the advertisement? What social or cultural attitudes or beliefs are indirectly reflected in the advertisement?

7. What types of techniques and strategies are being used to promote this message?

8. Who is the target audience for the advertisement? Men or women? Young or old? A specific race-ethnic group? What are the indicators that the advertisement is directed at this niche market?

9. Is the advertisement biased in some way? How? For example, what is *not* being said? List information you feel is misleading or misrepresentative.

10. What qualities does the ad characterize? Does it portray “coolness,” adulthood, culture, independence, status, attractiveness, a certain body image, or any other quality?

11. Is this a compelling advertisement? Is someone likely to be convinced to purchase this product? Why or why not?

12. Would this advertisement be effective in other subsets of the market? Why or why not?