



Implementing Interdisciplinary, Integrated Curriculum Units for a Health Science and Biomedical Program of Study



List of Curriculum Units

Career Explorations—Health Science Careers

Catch the Fever—Communicable Diseases

Crime Scene Investigation—Forensics

Do No Harm—Bioethics

Global Health Summit—HIV/AIDS

Good Eats—Nutrition and Health

Risky Business—Health Insurance

Safety First—Workplace Injuries

Second Opinion—Complementary and Alternative Medicine

Waiting to Inhale—Tobacco and Smoking

Career Explorations

INTEGRATED
CURRICULUM UNIT ON
HEALTH SCIENCE
CAREERS



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Career Explorations

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Career Explorations

UNIT OVERVIEW

Essential Question for This Unit

What is the place for me in the health and biomedical sciences?

Unit Summary

In this unit, students will investigate the varied career opportunities available within the health and biomedical sciences. They will conduct research on possible career paths and investigate the skills needed for each one. This unit will also give students an opportunity to learn about typical activities in various jobs and help them identify potential careers that match their interests, strengths, and goals. In addition, students will explore the broader social and economic impact of their career choices, while reviewing the historical origins of various health-related careers and their significance to the welfare of humankind.

In Subunit 1, students will be introduced to the field of health and biomedical sciences through a survey of the many, often hidden, careers that exist within this industry sector. They will investigate the field's future prospects by analyzing society's growing demand for biomedical research and healthcare services. In one lesson, students will construct pyramid graphs to illustrate current and past population data for the United States. They will also calculate a population growth model and make projections to the year 2050. Next, students will compare projected demand for health and biomedical science workers with current supply. Subunit 1 will conclude with an introduction to the research process that continues throughout the unit.

In Subunit 2, students will identify and investigate several careers that interest them. They will begin by conducting a self-analysis of their interests, skills, strengths, and weaknesses. Using a variety of career resources, students will then identify individual careers and/or career sectors that match their interests and compile detailed information about these careers. In this subunit, students will also learn about many influential biomedical researchers and healthcare visionaries and the impact of their discoveries and contributions to science and society.

In Subunit 3, after concluding their research, students will analyze the benefits and drawbacks of their career choices. This comparison will include an analysis of projected earnings compared with financial and time outlays for education and training. Students will report on their work in a formal research paper and present their findings to their peers in an oral presentation.

Culminating Event

Several culminating events are appropriate for this unit. For example, students could hold a job fair for the school to share what they have learned about conducting education and career planning and about health and biomedical sciences career opportunities. Another possibility would be to have students summarize their research in one-page, career-specific informational pamphlets and compile a class resource binder for future students to use. Students could also be encouraged to make a personal connection with a professional in the career of their choice, do a "job shadow" or interview, and write-up results of their experience. Alternatively, the unit's research paper on a historical medical figure could lead to a series of presentations that would serve as the culminating event.

Key Questions/Issues

- Exactly what is health and biomedical science? What kinds of careers are there, and which ones might be interesting to me? (Health Science I)
- What does the future look like in this industry sector? What will the employment picture look like when I graduate (from high school and from various types of postsecondary programs) and want to enter the workforce? (Algebra I)
- How is our country's population growing and changing? What will our population be like 10, 20, and 50 years from now? How will our country meet the challenges of a growing senior population? (Health Science I and Algebra I)
- How can I learn to make thoughtful decisions about my future education and career goals? What social or economic issues might affect my

Career Explorations

UNIT OVERVIEW

choice? How can I obtain information on careers that interest me? (English Language Arts)

- What are my interests and abilities? What are my strengths and weaknesses? What careers are best suited for me? (Health Science I)
- How do the various careers that interest me compare? Which careers have the best salary and job prospects? How do the educational and/or training requirements of the various careers compare? (Algebra I)
- What are the key qualities of major historical figures in biomedical research and healthcare? What events influenced them? How does their vision continue to affect us today? (World History)

Learning Scenario to Kick Off the Unit

Starting high school often signals students to start thinking about their first real job. Some of your friends want to work so they can help their family; some are looking forward to getting some cash to spend. No matter the reason, this is finally the chance to make your own money.

The burger joint down the street is a popular place to get a job. It has flexible hours, which allows students

to work after school. But this restaurant pays only minimum wage. That seemed like a lot of money when you started, but some of your older co-workers complain that working full-time at minimum wage really doesn't pay the bills. Maybe it's time for you to start thinking about what kind of long-term career you'd like to have and what kind of education it will take for you to reach that goal. There are probably a lot of options you don't know about. How will you find out what is right for you?

Biomedical/Healthcare and Education Partner Roles

- The school librarian or media specialist can assist the Health Sciences and English instructors with teaching research skills, particularly in the use of print and other media resources.
- Career counselors from the school or local post-secondary institutions can visit to discuss career opportunities in health and biomedical sciences and their education requirements.
- Employees from various local biomedical research facilities or healthcare providers can be invited to speak to students in greater detail about their careers, either individually or as a panel.

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

Subunit 1 <i>A Growth Industry</i>	Subunit 2 <i>Taking a Closer Look</i>	Subunit 3 <i>Finding a Good Match</i>
HEALTH SCIENCE I · ALGEBRA I · ENGLISH LANGUAGE ARTS	HEALTH SCIENCE I · ENGLISH LANGUAGE ARTS · WORLD HISTORY	ALGEBRA I · ENGLISH LANGUAGE ARTS
<ul style="list-style-type: none"> • Survey of career pathways and opportunities within health and biomedical sciences • Percentages and percent change calculations • Single variable equations • Construction and interpretation of population graphs • Needs analysis • Purpose and format of research papers 	<ul style="list-style-type: none"> • Developing clear research questions • Conduct research on several health and biomedical science careers using a variety of media resources • Synthesis of information from multiple media sources Integrate quotes and citations into written text • Social, economic, and cultural impact of major developments in biomedical research and healthcare • Contextual history and contributions of significant figures in the field 	<ul style="list-style-type: none"> • Reading, interpreting, and graphing data • Single variable equations • Cost-reward analysis of various careers based on salary and training • Write research reports, including a coherent thesis, accurate background information from multiple sources, and development of an argument using evidence in support of a thesis or related claims • Delivery of formal oral presentation, including descriptive, expository, and persuasive rhetorical techniques

Catch the Fever

INTEGRATED
CURRICULUM UNIT
ON COMMUNICABLE
DISEASES



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Catch the Fever

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Catch the Fever

UNIT OVERVIEW

Essential Question for This Unit

How has the development of society influenced the evolution of microorganisms?

Unit Summary

In this unit, students will explore the emergence and impact of communicable diseases on society. Students will investigate the role of microorganisms in causing disease. They will study the impact of a public health infrastructure, along with medical and pharmaceutical advances, on the evolution of microorganisms.

In Subunit 1, students learn about the emergence of disease in a population. In Health Science I, students learn how microorganisms are transmitted, and how to avoid infection. They also examine their surroundings and possessions to discover that microorganisms can be found everywhere. In Biology, students learn about specific disease-causing pathogens, and how they can be treated. Students also explore how treatments can give rise to more dangerous forms of pathogens. Finally, students examine a mathematical model of disease in action and discuss how a more deadly pathogen does not equal the most successful pathogen.

Subunit 2 focuses on how society deals with the presence of communicable diseases. In Health Science I, students participate in simulations in which they role-play the symptoms and diagnosis of common diseases while learning about and practicing common healthcare procedures. Students also examine the importance of vaccination and explore the concept of vaccinating populations. In Algebra I, they make calculations needed to manage the production of medications, and to administer medications to adult and pediatric patients. Finally, students research how various countries address the subject of communicable disease.

Detailed accounts of an epidemic can be a fascinating and informational resource. Students begin Subunit 3 by reading excerpts of *The Hot Zone*, an account of the 1989 Ebola outbreak in Virginia. Students also learn about the events contributing to past epidemics around the world, as well as the public reaction. Students conclude the unit by engaging in an in-depth research project on a specific infectious disease of their choice.

Culminating Event

Society has recently experienced several communicable disease scares: Avian Flu, SARS, resistant tuberculosis, and the list goes on. It seems a rare year when a new disease doesn't emerge on the world stage. Working in teams, students can research the background and impact of a specific communicable disease on human society and prepare a presentation. Students can also prepare a plan for their school or community to respond to an epidemic, including researching, evaluating, and revising existing plans, if any.

Key Questions/Issues

- What causes people to get ill? How can illness be prevented, how is it spread, and what can be done to treat it? (Biology and Health Science I)
- What makes a successful virus? Why don't viruses evolve to be as deadly as possible? (Algebra I)
- How do healthcare practices influence the natural selection of microorganisms? How have public health efforts dealt with constantly changing humans and microorganisms? (Biology and Health Science I)
- Do children receive different amounts of medication than adults? How can you figure out what is the right dosage? (Algebra I)
- Given constraints (e.g., production time and cost), how are optimization decisions made regarding the production of yearly vaccines? (Algebra I or Algebra II)
- What are some of the cures, remedies, or alternative, nontraditional healing practices found within Hispanic cultures? (Spanish I)
- If everyone else is vaccinated, why is it important for me to be vaccinated as well? (Health Science I)
- What major pandemics have occurred in the past? What events or circumstances contributed to these outbreaks? What could have been done differently in response to these pandemics? (English Language Arts and World History)

Catch the Fever

UNIT OVERVIEW

Learning Scenario to Kick Off the Unit

Every year without fail, it seems like there is a cold or flu virus that goes around the school. When the weather starts getting colder, someone gets sick, and soon all the teachers and students are sniffing and sneezing. As often as not, you (or one of your siblings) will carry the virus home and your parents will get sick as well. It wouldn't so bad, except that your dad hates being sick. At the first sign of sniffles, he is off to the doctor. The doctor diagnoses your dad with a cold, and tells him to go home, drink lots of fluids, and he'll be feeling better in 5 or 6 days. Your dad wants a prescription for medication. The doctor tells him antibiotics won't do any good for a cold and sends him home. Two days later, still under the weather, your dad goes back to the doctor, insisting on medication. He argues that maybe the antibiotics will help, and even if they don't, at least they won't do any harm. Exasperated with your dad's persis-

tence, the doctor writes him a prescription and your dad leaves happy. Four days later, he's feeling better, and he says it's all due to the prescription. Is your dad correct? Should the doctor have written him the prescription? Why or why not?

Biomedical/Healthcare and Education Partner Roles

- A school librarian/media specialist can assist the Biology, Health Science I, and/or English Language Arts instructors with teaching research skills, particularly in the use of print and other media resources.
- Invited speakers, such as public health specialists, epidemiologists, and/or microbiologists, can meet with students to discuss microorganism mutation and adaptation and the progression of disease-causing pathogens.

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

Subunit 1 *Emergence of Disease*

BIOLOGY · ALGEBRA I ·
HEALTH SCIENCE I

- Infectious disease transmission
- Characteristics of viruses vs. bacteria and their role in infectious disease
- Mutation, genetic variation, and natural selection
- Co-evolution of organisms
- Artificial selection of microorganisms resulting from advances in medical treatment
- Direct and indirect relationships
- Rational expressions

Subunit 2 *Dealing With Disease*

HEALTH SCIENCE I · ALGEBRA I OR II ·
SPANISH I · BIOLOGY

- Calculating percentages
- Setting up and solving single-variable equations from word problems
- Using linear programming to optimize a specific function within certain constraints
- Clinical epidemiology: identifying symptoms of infectious disease
- Vaccination and herd immunity
- Habits and behaviors contributing to the spread of disease
- Alternative medical practices in Spanish cultures

Subunit 3 *Epidemic*

ENGLISH LANGUAGE ARTS · WORLD
HISTORY

- Analysis of literature as a reflection of current societal issues
- Use of multimedia strategies for research on specific pathogen transmission and effects in the human body and general population
- Causes and impact of pandemics around the world
- Persuasive essay composition presenting a clear, evidence-supported perspective
- Composition and delivery of oral presentations for specific audiences



INTEGRATED
CURRICULUM UNIT
ON FORENSICS

Crime Scene Investigation

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Crime Scene Investigation

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Crime Scene Investigation

UNIT OVERVIEW

Essential Question for This Unit

What are the appropriate roles for scientific technology and human judgment in arriving at verdicts in criminal cases?

Unit Summary

In this unit, students take on the role of crime scene investigators to solve a murder that has occurred at the school. They will integrate math, science, and language arts into the study of forensic science and associated health science careers such as pathology, forensic science, and medical examination.

In Subunit 1, students are introduced to the unit and the task of crime scene investigation. They will read and analyze a classic mystery, *The Blue Carbuncle*. Students will also learn about the techniques of various branches of forensic science and how advances in biotechnology have helped to solve crimes.

In Subunit 2, students will learn and apply the various techniques used during a crime scene investigation, including what types of evidence to collect and how that evidence can be used to deduce information about the crime and/or perpetrator. In this unit, students will learn such investigative strategies as measuring stride length from footprints left at the scene to calculate height; using the victim's temperature to estimate the time of death; and collecting blood and other DNA samples from the scene in order to conduct a variety of biological tests—including blood typing and DNA fingerprinting that can match a suspect to the crime.

In Subunit 3, students examine the results of forensic science. In World History, they examine how forensic science has been used not only to solve individual crimes, but also to shed light on crimes against humanity. In English Language Arts, students interview professionals engaged in various aspects of forensic science. They also will marshal the evidence from their own investigations into a case against the primary suspect. Students will write up their arguments, as well as present them orally.

Culminating Event

Because this unit focuses on solving a crime, the most logical culminating event would be to conduct a trial. Some students can assume the role of lawyers, preparing opening and closing statements that summarize the strengths and weaknesses of the case and the evidence. Other students can assume the role of police officers and scientific experts called as witnesses to testify.

Key Questions/Issues

- What tales can dead men tell? What can you learn about a crime by examining the victim? (Health Science I, Biology, Algebra I and II, Geometry)
- What kinds of clues and evidence can be gleaned from a crime scene? What types of evidence are left behind? (Health Science I)
- What factors and evidence should be used to determine a person's guilt? Is some evidence better or worse than others? (Health Science I, English Language Arts)
- Should circumstantial evidence play a role? Why or why not? (English Language Arts, Health Science I, World History)
- Why take the temperature of a dead body? (Algebra II)
- How have advances in DNA technology helped to ensure justice is being served? (Biology)
- Should juries rely solely on DNA evidence in determining the guilt of accused individuals in capital murder cases? How reliable is DNA evidence? (English Language Arts, Health Science I)

Learning Scenario to Kick Off the Unit

A young man has been found dead in an unused classroom with a knife stuck in his chest. A group of three students found the body this morning. The deceased was on his back when discovered, and the room was in a little bit of disarray, chairs turned over and desks shoved out of place. Bloody footprints and the murder weapon were left at the scene!

Crime Scene Investigation

UNIT OVERVIEW

Everyone in school is shocked and wondering what happened. When the name of the victim is released, it turns out that he was a former student who graduated last year, and not a very popular one at that! He had a history of trouble with teachers, administrators, and other students—probably with others as well—so the list of suspects might be very long. When the police arrive, the crime scene investigators go to take a look at the scene. What will the police be doing to solve the crime and to ensure that they have the right perpetrator?

Biomedical/Healthcare and Education Partner Roles

- Forensic scientists from the local community can be invited to speak to students in greater depth about their job and training.
- Students can visit local hospitals or other medical facilities with pathology labs.

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

Subunit 1 *Murder Most Foul*

HEALTH SCIENCE I · ENGLISH LANGUAGE ARTS

- Careers in forensic science
- Techniques of forensic science
- Literary analysis including identifying or inferring the central idea, purpose, or theme and identifying literary devices and techniques, particularly those associated with mysteries
- Reasoning and problem solving

Subunit 2 *Crime Scene Investigations*

ALGEBRA I · ALGEBRA II · BIOLOGY · GEOMETRY · HEALTH SCIENCE I

- Ratios and proportions
- Linear equations
- Graphing the equation of a circle
- Deriving from the distance formula
- Logarithmic equations—Newton's Law of Cooling
- DNA structure and purpose
- Blood typing
- DNA fingerprinting
- Gel electrophoresis

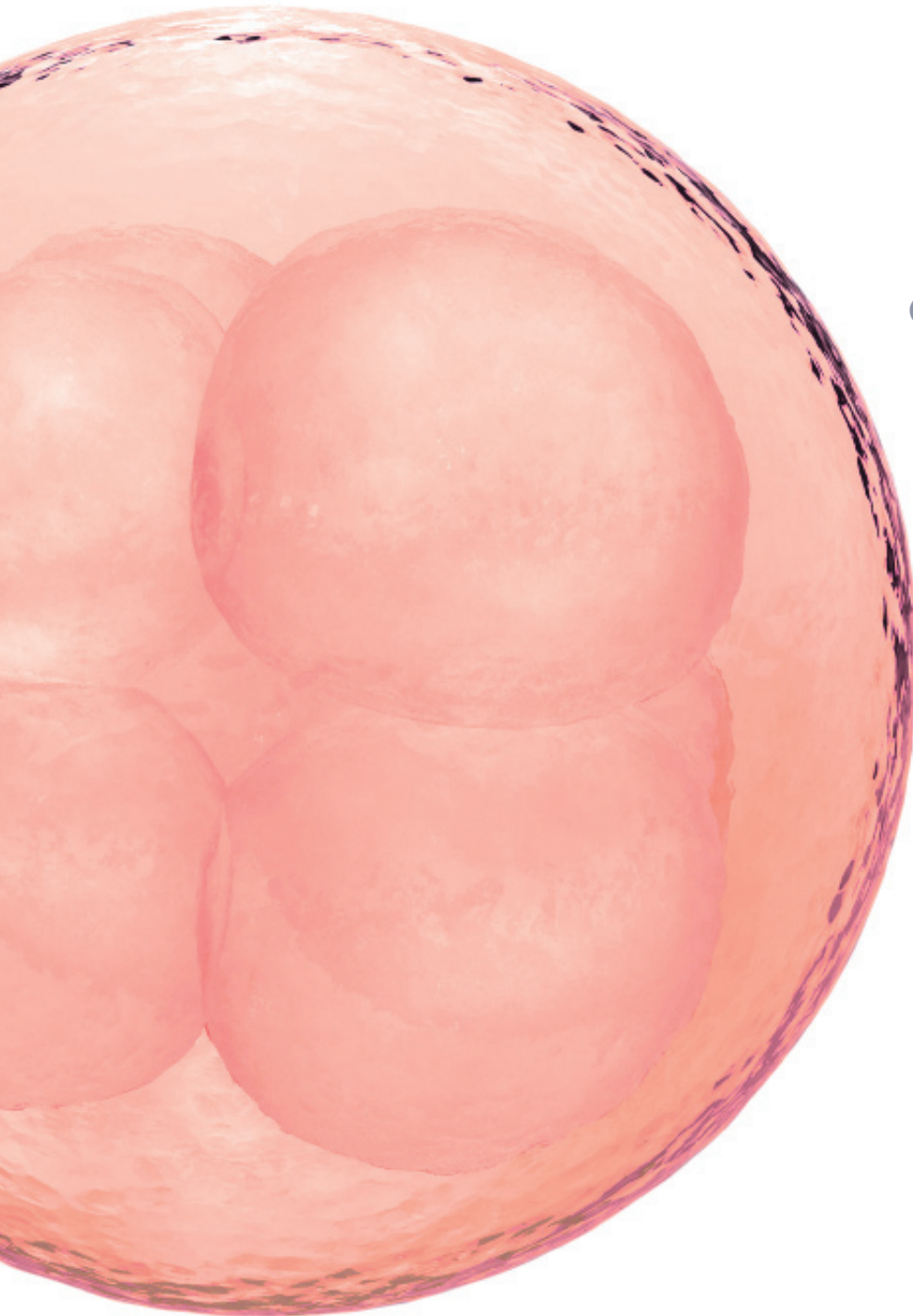
Subunit 3 *Convincing the Jury*

ENGLISH LANGUAGE ARTS · WORLD HISTORY

- Investigation of war crimes and crimes against humanity
- Aftermath of World War II and the Nuremberg Trials
- Persuasive composition writing with structured arguments
- Delivery of persuasive arguments using rhetorical devices to support assertions

Do No Harm

INTEGRATED
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Do No Harm

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Do No Harm

UNIT OVERVIEW

Essential Question for This Unit

What is the right government role in medical decisions that affect the lives of individuals?

Unit Summary

In this unit, students will learn about the roles government plays in setting policy and supporting and regulating various aspects of the healthcare industry, and about the impact these activities have on the lives of ordinary citizens. The unit will focus on three areas in which federal or state governments have influenced biomedical research and healthcare practice: stem cell research (Subunit 1), pharmaceutical advertising (Subunit 2), and vaccination against communicable disease (Subunit 3).

In Subunit 1, students will begin to study the multiple roles of the government in biomedical research by focusing on stem cell research. They will learn how biomedical research is funded and how it is conducted by federal agencies (such as the National Institutes of Health), universities, and private companies. Students will explore the science behind stem cell research by investigating normal and abnormal cell division and differentiation. These processes serve as foundation knowledge for understanding the potential of stem cell therapy. By understanding stem cell research and the federal legislation surrounding it, students can explore how government policy and funding decisions shape the path of biomedical research. In this subunit, students will also explore another important role of government in medical research—protecting the rights of citizens. They will learn how the history of human experimentation in the United States and other countries has evolved and led to the principle of informed consent that guides all ethical medical research today.

In Subunit 2, students will consider the history of pharmaceutical advertising and its impact on the public. As with biomedical research, the federal government regulates the marketing of medical products. Advertising materials provide students with a rich medium to analyze the characteristics and various rhetorical devices of persuasive writing. Students will compare pharmaceutical advertising from the

1920s to the present, characterize changes in advertising strategies, and analyze the role of regulations in producing these changes. A culminating event for the subunit will be a project to design an advertisement for a fictional pharmaceutical product.

Subunit 3 focuses on the balance between individual rights and the public good. Students will learn that government actions have implications at the individual level, where decisions about certain types of medical procedures are subject to legislation. This subunit centers on requiring vaccination for enrollment in the public schools. Recent FDA approval of a cervical cancer vaccine has prompted heated discussion over whether vaccination should be mandated by the government or should remain a private decision made by parents. To fully engage in this debate, students will investigate the physical structure of viruses and explore pathways of viral infection. Students will also learn how vaccination protects against infectious disease. They will review past cases of government intervention in medical treatment, particularly for minors, and examine the sometimes conflicting positions of various stakeholders in this issue.

Culminating Event

Any of the three subunits can be the foundation of a culminating event that will lead students to answer the unit's essential question: What is the right government role in medical decisions that affect the lives of individuals? For example, they can debate the pros and cons of embryonic and adult stem cell research, current pharmaceutical advertising to the public, or mandated vaccinations for children or adults. They can write research papers supporting various positions on one of these issues and conduct a research symposium attended by outside experts. Or they can prepare draft regulations or legislation on one of these issues based on the results of their research and deliberations.

Key Questions/Issues

- What is the controversy surrounding stem cell research? What are the positions and arguments of the various interested parties? If someone you loved had a fatal illness and a potential cure was

invented, what lengths would you go to in order to secure treatment? (Health Science I, Biology and U.S. History)

- Many serious medical conditions, including heart disease, are potential candidates for stem cell therapy. Heart disease alone, the number one cause of death in the United States, affects 24.7 million Americans. What is the government's responsibility to support relevant research? What other, sometimes competing, responsibilities do we rely on government to fulfill? (U.S. History or U.S. Government)
- How is concern for individual rights balanced against the public good? What are the limits of research that can be done "in the name of science"? (U.S. History or U.S. Government)
- Have you ever been swayed by a commercial? What writing techniques are used in effective advertising? How is advertising used to inform healthcare professionals and the public about advances in healthcare? Why is this important? How can advertising be used to manipulate public opinion and actions? How has advertising changed over the years? Would you consider vintage medical advertisements unethical? (English Language Arts)
- Should parents have the right to refuse life-saving medical treatment for their children on the grounds of their personal beliefs? Should the government be allowed to mandate medical treatments? Who should decide? (U.S. History or U.S. Government)

Learning Scenario to Kick Off the Unit

In June 2006, the FDA announced approval for Gardasil, the first vaccine for cervical cancer, for use on females ages 9 to 26. Shortly thereafter, parents (in a hypothetical school district) received letters indicating that the new vaccine would be required for all girls before they enrolled for school this fall. Some parents did not think much of the new rule; the school district already requires many vaccines for students. To enroll in public school, a student must be vaccinated against measles, mumps, rubella, polio, hepatitis B, and several other diseases. This new vaccine seemed like just one more.

The vaccine's action mechanism is to protect women against strains of the human papillomavirus (HPV),

which can cause cancerous lesions on the cervix. Health officials and some parents applauded the school rule as an important advance in public health for their daughters. Cervical cancer affects 10,000 women every year, and tests indicate that the vaccine is almost 100% effective against two of the most common cancer-causing HPV strains.

However, other parents were not happy at all. The new vaccine had been approved by the FDA in only 6 months. Even though all the tests conducted indicate that the new vaccine is safe, not everyone is convinced that enough testing has been conducted. And there is another problem. HPV is well known as a sexually transmitted disease. Some parents worry that allowing their daughters to get the vaccine will send a subtle message encouraging risky premarital sexual activity. They argue that HPV is not a readily transmitted disease, like measles, and as parents, they should be able to decide for themselves if their daughters should be vaccinated. Officials argue that school mandates are the most effective way to increase immunization rates, and it is illogical not to vaccinate girls if there is a safe vaccine available. What do you think? How should school districts balance the risks to public health against the individual rights of parents to make this medical decision?

Biomedical/Healthcare and Education Partner Roles

- Local biomedical research institutes can provide students with opportunities to observe and participate in the lab activities involved in cancer, viral, and stem cell research.
- Independent review board (IRB) members from partner universities can provide speakers to discuss the process for obtaining government funding and approval for research involving human subjects.
- Local businesses—including pharmacies, pharmaceutical companies, and healthcare providers—can provide advertising copywriters to speak to students about the process of developing an effective advertising campaign and the ethical considerations and legal regulations and codes that guide their work.

Do No Harm

UNIT OVERVIEW

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

Subunit 1

Biomedical Research

HEALTH SCIENCE I · BIOLOGY ·
U.S. HISTORY · ENGLISH LANGUAGE ARTS

- Role and powers of the executive and legislative branches of U.S. government
- Roles of government and the private sector in funding scientific and medical research
- History of human experimentation in the United States and key events in the evolution of modern medical research ethics, from the Nuremberg Code (1947) to the federal policy on the protection of human subjects, 45 CFR 46 (“The Common Rule” 1991)
- Processes of cell division and differentiation
- Cancerous cell growth
- Function and characteristics of embryonic vs. adult stem cells

Subunit 2

Pharmaceutical Advertising

ENGLISH LANGUAGE ARTS · U.S. HISTORY
U.S. GOVERNMENT

- Analysis of advertising print materials for direction and misdirection in informational content, including audience manipulation
- Comparison of advertising in various decades of the 20th century
- Changes in governmental regulation of advertising
- Consumerism in the 1920s and its historical growth

Subunit 3

Medical Decisions

BIOLOGY · ENGLISH LANGUAGE ARTS ·
ALGEBRA I · U.S. HISTORY ·
U.S. GOVERNMENT

- Processes of viral infection and replication
- Treatment and prevention of viral infection
- Function and processes of the immune system
- Governmental evaluation and regulation of mandatory medical treatments
- Freedom of religion and parental rights vs. the public interest

Global Health Summit

INTEGRATED
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Global Health Summit

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Global Health Summit

UNIT OVERVIEW

Essential Question for This Unit

What is the responsibility of the United States to address health crises in the developing world?

Unit Summary

This unit focuses on the impact that HIV/AIDS continues to have around the world. Students look at the biology of the disease and then delve into the social and personal implications of addressing a deadly pandemic.

In Subunit 1, students come to understand how widespread and devastating the disease is by reading and discussing personal accounts of HIV-positive and AIDS patients from different regions of the world. After learning about the structure and action mechanisms of HIV in biology class, students map the infection rates of nations throughout the world to get a clear picture of the magnitude of the problem.

The second subunit emphasizes current methods of prevention and treatment of AIDS in the individual, as well as research in the field of HIV/AIDS. Students learn about the paths of HIV transmission and discuss the best prevention methods for these paths. They then investigate the biology of antiretroviral drugs and the reasoning behind taking several drugs at once to combat AIDS. The last lesson in the subunit asks students to consider the ethical issues surrounding drug trials in developing nations.

Subunit 3 teaches students about the current large-scale efforts to combat the AIDS pandemic. The subunit starts by examining how much developed nations have donated to help combat the problem through individual donor nation contributions or participation in international aid organizations. Students are then asked to research developing nations to find out what national and local programs are already in place and whether they are working. They will put this information to use when creating the best plan for a country that they have researched, which is the culminating experience of this unit.

Culminating Event

World leaders have convened a summit to discuss better solutions to the AIDS pandemic, especially in the hardest hit areas of the developing world. The country that students researched in Lesson 3.2 has asked for a proposal to create an HIV/AIDS program targeted toward its needs. Students are asked to write a report including background information and the current HIV/AIDS situation of that country, as well as provide a plan that would best handle AIDS education, prevention, and treatment. Students will share their proposal with the class during a PowerPoint presentation and will create a sample pamphlet for one of the proposed intervention programs.

Key Questions/Issues

- What does it feel like to have AIDS? How are AIDS patients treated around the world? (English Language Arts)
- How does HIV infect the body? (Biology)
- What is the difference between being HIV positive and having AIDS? How does HIV make you sick? (Biology)
- How widespread is AIDS around the world? Which areas are hit the hardest by the disease? (World Geography)
- What are the ways that HIV is spread? (Health Science I)
- How can HIV infection be prevented? (Health Science I)
- What is the current best practice for treating AIDS? How does it work? (Biology or Health Science I)
- How are drug trials conducted ethically in developing nations? (English Language Arts or Health Science I)
- What are wealthy nations currently doing to help the developing world combat AIDS? How does donated money get to the places that need it the most? (English Language Arts)

- What is the developing world currently doing in their own countries to combat AIDS? (World Geography)
- What are the barriers hindering the prevention and treatment of AIDS in the developing world? (World Geography)
- What is the best plan for combating AIDS in specific countries? (English Language Arts)

Learning Scenario to Kick Off the Unit

Your cousin, who has just graduated from college, has decided to spend the summer traveling through South Africa. To your great excitement, she invites you to join her for a travel adventure. When you broach the subject with your parents, they have two conditions that you must meet in order to get their permission. First, your parents are very concerned about the high HIV/AIDS incidence rates in sub-Saharan nations. They want assurances that you know how HIV is transmitted and that you won't put yourself at risk. Second, your parents want you to be more than a tourist. They want you to give back to the country you are visiting, either by volunteering or making a substantial donation to an AIDS organization of your choosing. They want proof that you put a lot of thought into choosing the organization, and that the organization's programs work effectively.

What do you tell your parents about HIV/AIDS?
What is the best thing you can do to help with the AIDS crisis in the developing world?

Biomedical/Healthcare and Education Partner Roles

- A school librarian/media specialist can assist the English Language Arts and World Geography instructors with teaching research skills, particularly in using print and other media resources.
- A computer technology or graphic arts instructor can assist with the layout and production of reports, PowerPoint slides, and flyers.
- Possible invited speakers to discuss the impact of AIDS in the local and global community include international aid organization representatives, local AIDS activists, someone who is HIV positive or has AIDS, public health educators and policymakers, elected officials, and AIDS researchers.

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

Subunit 1 <i>A Serious Situation</i>	Subunit 2 <i>Treating the Problem</i>	Subunit 3 <i>Finding the Right Solution</i>
ENGLISH LANGUAGE ARTS · BIOLOGY · WORLD GEOGRAPHY	HEALTH SCIENCE I · BIOLOGY · ENGLISH LANGUAGE ARTS	ENGLISH LANGUAGE ARTS · WORLD GEOGRAPHY
<ul style="list-style-type: none"> • Personal narratives of AIDS patients from around the world • Structure and life cycle of HIV • Mapping HIV infection rates • Social impact of HIV/AIDS 	<ul style="list-style-type: none"> • Paths of HIV transmission • HIV/AIDS prevention strategies • Current HIV/AIDS treatment strategies and how they work • Ethics of HIV/AIDS treatment testing in developing nations • Writing reasoned arguments on ethical issues 	<ul style="list-style-type: none"> • Current contributions of developed nations to the fight against the global AIDS crisis • Barriers against successful prevention and treatment of HIV/AIDS in developing nations • Researching and evaluating current HIV/AIDS programs in specific developing nations • Creating the best possible HIV/AIDS program for a specific country

Good Eats

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Nutrition and Health

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Nutrition and Health

UNIT OVERVIEW

Essential Question for This Unit

Should we care about what we eat? Why?

Unit Summary

In this unit, students will learn about the connection between nutrition and health. Through interdisciplinary study in Biology, Health Science, Interpersonal Relations, English Language Arts, Mathematics, and World History, they will explore the questions of why we should care about what we eat and how food is produced. Students will explore concepts ranging from the body's physical requirements in terms of calories and nutrients to the physiological and psychological outcomes resulting from various levels of nutrition and health. They will be introduced to cellular respiration, recombinant DNA technology, and ethical issues raised by using—or withholding the use of—biotechnology to increase food production.

The students will examine the issue of adequate nutrition at both the individual and societal levels, reflecting on their own diet and health status and the importance of making good choices. They will also analyze issues connecting nutrition and food production to the welfare of the global community—by exploring the impact of recent famines in Africa—and apply this research to decisions about their own roles.

In this year-long curriculum unit, classroom work and homework include

- A long-term experiment with laboratory animals on the physiological and behavioral effects of varying caloric intake; work will include setting up and conducting the experiment and collecting, graphing, and analyzing experimental data. (Biology and Statistics)
- A biometrics lab to analyze body types and fitness, including assignments on calculating basal metabolic rates (BMR) and body mass index (BMI) scores. (Biology, Algebra I, and Statistics)
- Collaborative research on nutrition issues in a global context, including examining the historical and contemporary effects of large-scale famines and agricultural innovations (from artificial selec-

tion to genetic engineering) on health and nutrition status and population parameters. (English Language Arts and World History)

In addition to laboratory work and cooperative group learning, this unit will also include direct instruction and classroom discussion. In the Health Science course, students will explore many of the key questions addressed in their academic courses. The Health Science course and academic courses will introduce students to a wide range of careers in the health and biomedical sciences. This will be accomplished through classroom instruction; presentations by nutrition scientists, demographers, and science writers; and work-based learning activities.

Throughout the instructional period, students will reflect on their findings and synthesize their acquired knowledge. At various points, they will present conclusions to their peers and to biomedical and healthcare professionals who will visit their school. Students will demonstrate both their academic and technical learning in a variety of ways, including expository essays, PowerPoint presentations, collages, speeches, and other written and applied work.

Culminating Event

Working in teams, students will participate in a culminating activity that will serve as a multi-disciplinary, performance-based assessment. Possible culminating activities include conducting a session of the United Nations General Assembly, requesting foundation funding for research on a nutrition-related intervention in a Third World country, or launching a healthy-nutrition campaign at a high school.

Key Questions/Issues

- What is “good” nutrition and why is it important? (Biology, English Language Arts, and Interpersonal Relations)
- What is a healthy weight and how is it measured? (Biology and Algebra I)
- Are there statistical differences in weight (and other health indicators) among different populations around the world? What factors might

Nutrition and Health

UNIT OVERVIEW

contribute to those differences? How have perspectives on desirable body weight and size changed over the course of history, and why? (Statistics, Biology, and World History)

- What are the physical, behavioral, and psychological effects of a healthy diet and a “junk food” diet on humans and other animals (such as laboratory rats)? (Biology and Algebra I)
- How is research on laboratory animals used to inform our understanding of human nutrition and health? What are the issues/limitations of using small mammals to model human biochemical responses and how can they be addressed? What are the ethical issues involved in conducting research on animals? (Biology and Algebra I)
- Is good nutrition solely a personal issue, or do we have a larger obligation to the community? To the world? (English Language Arts and Interpersonal Relations)
- How has historical food production in different regions shaped the world we live in today? How has scientific research influenced production capacity, and what are the costs and benefits of such advances? (World History and Biology)

Learning Scenario to Kick Off the Unit

News of state funding for the new football stadium made the front page of the newspaper today. Owen Valley High School would finally have the new facility everyone had been waiting for. Students, teachers, and members of the community should have been happy, but controversy broke out almost immediately. The President of Crispy Munchy Snacks announced that he would pay for new uniforms for the football team—and all other school sports—for the next 5 years in exchange for naming rights to the new stadium. The school district really needs these funds and would be pleased to name the new facility for a major corporate donor. But there is a catch. To receive this money for uniforms, the high school will have to sell Crispy Munchy potato chips and other snacks at all sporting events and in school vending machines. This will create a problem. Last year, the school district removed Crispy Munchy products, other fried snacks, and sweetened beverages from the campus as part of a Healthy Nutrition Campaign. What should be done? School leaders have decided to leave the decision about accepting the donation, using the Crispy Munchy name, and continuing or modifying the Nutrition Campaign up to a vote by students.

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

Subunit 1 <i>Nutrition and You</i>	Subunit 2 <i>Nutrition and Society</i>	Subunit 3 <i>Nutrition in the World</i>
ALGEBRA I · BIOLOGY · CHEMISTRY · ENGLISH LANGUAGE ARTS · STATISTICS · HEALTH SCIENCE I	ENGLISH LANGUAGE ARTS · HEALTH SCIENCE I · SPANISH I · INTERPERSONAL RELATIONS · U.S. GOVERNMENT	ALGEBRA I · BIOLOGY · ENGLISH LANGUAGE ARTS · WORLD HISTORY · GEOGRAPHY
<ul style="list-style-type: none"> • Function and processes of the digestive system • Composition and role of biological macromolecules in nutrition • Biochemical metabolism • Single-variable linear equations • Nonlinear relationships • Descriptive statistics (mean, median, and mode) • Scientific writing • Line graphs 	<ul style="list-style-type: none"> • Healthy eating habits • Human development and puberty • Factors influencing self-image • Cultural perspectives on nutrition • Food production and distribution in the United States • Oral presentation skills 	<ul style="list-style-type: none"> • Perspectives on hunger from various countries • Genetic engineering in agriculture • Multiple causes of hunger and famine throughout the world • Exponential functions

Risky Business

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Risky Business

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Risky Business

UNIT OVERVIEW

Essential Question for This Unit

How can we balance personal freedoms and society's need to provide accessible, affordable healthcare?

Unit Summary

Students will learn about lifestyle and genetic influences on health status and about the health insurance system in the United States. They will imagine a future healthcare environment in which technology has greatly advanced, treatment costs have escalated, and individual lifestyle and medical data are widely available to insurers. In this scenario, insurance companies routinely use this kind of information to create programs aimed at improving health outcomes, set insurance rates, approve or deny applications for health insurance, and reduce healthcare expenses.

In Subunit 1, students learn about the importance of having health insurance. They are introduced to the various types of medical insurance plans, learn how insurance covers the costs of medical treatment, and study how the industry has evolved in the United States. Working in small groups, students form their own insurance companies.

In Subunit 2, students research the influence of high-risk behaviors and inherited factors on health outcomes, focusing heavily on the heritability of various diseases and the effects of modifying high-risk behaviors on health outcomes.

In Subunit 3, acting as officers of their insurance companies, students evaluate hypothetical profiles of insurance applicants that include medical histories and data concerning high-risk behaviors. They use this information to decide whether to approve applicants for health insurance coverage and to determine the premiums they will be charged. Students also propose steps that their insurance companies and applicants can take to reduce rates of illness and injury and mortality from high-risk behaviors and inherited influences on health status.

Culminating Event

Student participation in the unit could culminate with a schoolwide health fair. As representatives of their fictitious insurance companies, groups of students will create and display a presentation detailing their decisions to approve or deny medical insurance and to set insurance rates. Presentations will include research findings about relevant medical conditions and lifestyle factors and a risk analysis for hypothetical insurance applicants. They will also include letters sent by the insurance company to each applicant—detailing the company's decision—and marketing materials designed to promote the company's efforts to improve the health outcomes of policyholders and members of health systems.

Key Questions/Issues

- Why is healthcare so expensive, and where does the money go? Why do some people travel to Canada or Mexico to buy prescription drugs? What are the risks and benefits associated with buying medication abroad? (U.S. History, Health Science I, and Spanish I)
- What determines insurance rates? What makes insurance cost more for some individuals than for others? (Algebra I)
- How can individuals reduce their insurance and healthcare costs? (Health Science I and English Language Arts)
- Who should be responsible for paying for healthcare: individuals, businesses, and/or the government? What role might each play in promoting national health? (U.S. History)
- What rights do employers have to limit employees' personal activities? (U.S. History and Physical Education)
- How do genetics account for individual differences in various characteristics? That is, why do I look like/different from my parents and siblings, and why do I have similar/different health-related characteristics? (Biology)

- Are you destined to follow in your parents’ footsteps in terms of health? What factors are beyond individual control, and what factors can be manipulated? (Biology and Health Science I)
- What accounts for differences in life expectancy and infant mortality in various parts of the world? (Spanish I)
- What can social, government, and philanthropic programs do—and what are they doing—to improve public health? (U.S. History and Spanish I)

Learning Scenario to Kick Off the Unit

The Ski Club’s annual trip to Lake Tahoe is just around the corner. In a triumph of planning and lucky timing, the club has managed to schedule the trip on the very same weekend that Squaw Valley is offering a packaged workshop on extreme aerials by a member of the U.S. Olympic Ski Team. The members of the club are ecstatic. Enthusiasm had reached a fever pitch when, 2 days before the trip, the principal announced that participating in the aerials workshop was forbidden. Despite student protests, the principal explained that the district office had informed him that the school’s field trip liability insurance could not cover such a high-risk activity. If anything happened, the district’s insurance premiums would rise. He said that the district’s budget is already stretched

to the limit and they cannot afford additional insurance. It might be possible to pass the insurance costs on to individual students, but the trip is already very expensive and not everyone can afford to pay more. The club has been fund raising for weeks to cover all the costs, and coming up with more money at this late date seems unrealistic. The club president thinks the district is exaggerating the risk. A district official has agreed to meet with representatives of the club to discuss the situation. What should be done? What arguments can the club present that will convince a skittish district? Why has the district adopted their position?

Biomedical/Healthcare and Education Partner Roles

Representatives from local healthcare institutions and insurance companies will play key roles providing a real-world context. Speakers from various professions will be represented, including actuaries, benefits managers, health information technicians, and insurance processors.

Professionals from local healthcare partners will play key assessment roles, serving as evaluators for the culminating event.

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Subunit 1 <i>A Risky Business</i>	Subunit 2 <i>Knowing the Risks</i>	Subunit 3 <i>Making Decisions</i>
HEALTH SCIENCE I · U.S. HISTORY · ENGLISH LANGUAGE ARTS	BIOLOGY · ENGLISH LANGUAGE ARTS · SPANISH I · HEALTH SCIENCE I	ALGEBRA I · ENGLISH LANGUAGE ARTS · HEALTH SCIENCE I · PHYSICAL EDUCATION
<ul style="list-style-type: none"> • Health insurance options in the United States • Evolution of the health insurance industry • U.S. healthcare legislation and its impact on the healthcare and insurance systems • Determination of rates and fees in the healthcare system • Analysis of medical insurance payment options • Print and multimedia design 	<ul style="list-style-type: none"> • Inheritance and expression of physical traits, including such topics as dominant and recessive alleles, phenotype vs. genotype, genetic ratios and Punnett squares, autosomal vs. X-linked genetic disorders, and pedigree charting • Structural features of writing informational materials • Multimedia research and presentation skills • Healthcare systems and health status in Latin America, including comparisons and analyses of health status for various population groups in the United States 	<ul style="list-style-type: none"> • Human wellness and preventative measures • Qualitative cost vs. benefit lifestyle analysis • Quantitative insurance risk assessment analysis • Linear equations • Probability theory

Safety First

INTEGRATED
CURRICULUM UNIT
ON WORKPLACE
INJURIES



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Safety First

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Safety First

UNIT OVERVIEW

Essential Question for This Unit

How can workplace injuries be reduced, and who should be responsible for implementing reduction strategies?

Unit Summary

This unit focuses on the causes of workplace injuries and the consequences for workers, employers, and society as a whole. Students will investigate the biological and physical basis for injury on the job, regulations governing the work environment in the United States, and how public and government perception of who is responsible for work-related injuries has changed through history.

Subunit 1 focuses on the individual employee's perspective on workplace injuries. Students are introduced to common workplace injuries, and connect them to their previous knowledge of body systems. They discuss the effects of stress on the body and the physics of proper lifting techniques in their science or physical education classes. Students then expand their knowledge of strategies to prevent injuries under different conditions.

The obligations of the employer as related to workplace injuries are explored in Subunit 2. Students learn that federal and state regulations protect workers on the job, and translate the complicated language of government regulations into persuasive brochures on labor and health standards that are easy to understand. Math lessons investigate industrial applications—how cumulative noise level is calculated in decibels, and how to highlight trends in data by displaying information graphically. The subunit also includes an exploration of the variety of health professionals employees visit to be diagnosed, treated, and rehabilitated after injury.

In Subunit 3 students study the evolution of workplace injuries and views about responsibility for those injuries over the centuries. They learn how the Industrial Revolution changed the work environment and influenced types of workplace injuries. Then they survey the progression of regulations and judicial cases related to responsibility for workplace

injuries in the United States. The balance between social and personal responsibility for work accidents and the role of government regulation for adults and teens is discussed.

Culminating Event

In most companies, a company's Human Resources department is responsible for informing employees about the risks of injury in the work environment and the resources available when an employee is injured. For the culminating event, students select a company and take on the roles of various health and safety professionals that a Human Resources team would ask to research and report on common workplace injuries. Student work includes a PowerPoint presentation, a summary brochure, an in-depth safety manual, and an organized oral presentation. This activity is described in detail in Lesson 3.4 of the unit.

Key Questions/Issues

- What are the common workplace injuries in the United States? How are they best prevented and treated? (Health Science II, Biology, Physics)
- What rights and resources do workers have when they are injured on the job? What are the laws and regulations governing teen workers? How can one tell if a workplace is following OSHA safety regulations? (English Language Arts)
- How is noise a worker safety issue? How does a company calculate the cumulative amount of noise created by multiple machines, in order to see if a room is safe for workers? (Algebra II)
- What is the most effective way to display different types of trend data? (Algebra I)
- What are the healthcare and other professions that address individuals' workplace injuries? How do you become one of those professionals? (Health Science II)
- How did the Industrial Revolution change the workplace landscape? What were the implications for workplace injuries? (World History)
- How have views about the responsibility for work-

place injuries changed in the United States? (U.S. History or U.S. Government)

- What is the best way to inform an audience about the prevention, treatment, and legal requirements related to workplace injuries? (English Language Arts)

Learning Scenario to Kick Off the Unit

Jerry gets a new job as a delivery person at the local food manufacturing plant. Due to an old football injury from high school, he has a weakened back, and lifting more than 50 pounds would risk a new injury. He tells his employer his medical history, and the employer agrees to reduce his lifting responsibilities to loads that weigh 50 pounds or less, despite government guidelines that allow workers to lift heavier objects. If there is a load that is heavier, Jerry can have another person lift it or get assistance. One day, a box is accidentally mislabeled due to mechanical error. It weighs 65 pounds, still within government-allowed weight limits. Jerry lifts the box and suffers a slipped disk.

Who should pay for Jerry's medical care and lost productivity? Should it be Jerry, or his employer?

Biomedical/Healthcare and Education Partner Roles

- School librarian/media specialist can assist the Math, Health Science, and/or English Language Arts instructors with teaching research skills, particularly in the use of print and other media resources.
- A Computer Technology or Graphic Arts instructor can assist with the layout and production of brochures and flyers.
- Invited speakers can discuss the treatment of workplace injuries and related laws; possibilities include physical therapists, occupational therapists, human resources specialists, safety specialists, and OSHA inspectors.

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

Subunit 1 *Personal Injury*

BIOLOGY · HEALTH SCIENCE II · PHYSICS

- Introduction to workplace injuries
- Effects of stress on the body
- Science of lifting and proper body mechanics
- Strategies for preventing work-related injuries
- Fight-or-flight stress response

Subunit 2 *Workplace Safety*

HEALTH SCIENCE II · ALGEBRA I · ALGEBRA II · ENGLISH LANGUAGE ARTS

- Applications of logarithms and exponents
- Reading and understanding government and legal documents
- Creating clear graphical representations of data
- Creating persuasive flyers and brochures
- Persuasive techniques in propaganda and advertising
- Treatment and rehabilitation strategies for common workplace injuries
- Treatment- and rehabilitation-related occupations

Subunit 3 *Taking Responsibility*

WORLD HISTORY · U.S. HISTORY OR U.S. GOVERNMENT · ENGLISH LANGUAGE ARTS

- Public health issues during the Industrial Revolution
- History of workplace injury regulations and court cases from the early 19th century until present day
- Use of multimedia strategies for research on workplace injuries common to a specific company or industry sector
- Composition and delivery of oral presentations for specific audiences

Second Opinion

INTEGRATED
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ON COMPLEMENTARY
AND ALTERNATIVE
MEDICINE



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Second Opinion

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Second Opinion

UNIT OVERVIEW

Essential Question for This Unit

How can we ensure the safety and effectiveness of complementary and alternative medicine (CAM)?

Unit Summary

In this unit, students will explore the variety of medical practices that exist outside of conventional Western medicine. Complementary and alternative medicine, known as CAM, is becoming more widely accepted in the United States as our population becomes more diverse. At the same time, scrutiny of these practices, some of which are not subject to any regulatory oversight, is an issue that becomes increasingly pressing for the healthcare industry, healthcare workers, and the general public.

In Subunit 1, students are introduced to the various types of practices that fall within the description of CAM. Students discuss their own experiences with family-administered medical care and classify their practices into the five categories of CAM. They study the origins of CAM practices, both general and specific, in Geography, English Language Arts, and Spanish. Also, in Geography, students trace the means by which local medical knowledge and practices are dispersed to other regions of the world. As cultures mix, fundamental beliefs about healthcare can come into conflict. Students examine the importance of cultural sensitivity when providing healthcare for immigrant populations.

In Subunit 2, students examine how CAM is being integrated into the conventional Western medicine typically practiced in the United States. In Chemistry, students study a variety of herbal supplements, many of which share active ingredients with modern pharmaceuticals. An experiment with willow bark tea illustrates the variability of effectiveness of naturally occurring products. In Geometry, students examine how body size and shape can affect the absorption of drugs. Despite CAM's popularity, it is not always clear whether they have any beneficial health effects. Students research five controversial CAM practices, examine the claims made about them, evaluate the

evidence of their effectiveness, and discuss current and proposed efforts by the Food and Drug Administration (FDA) to regulate this burgeoning industry. Students conclude the unit by debating the level of regulation that the government should impose upon CAM.

Culminating Event

The debate on CAM regulation can be extended into a culminating event. Pairs of students can select a specific type of CAM and debate increasing or relaxing regulation of its manufacture, practice, and marketing. Another possible culminating effort for this unit would be for students to develop educational materials and/or presentations to inform healthcare workers about culturally sensitive care for individuals from various ethnicities. Groups of students would select an ethnic group, research its beliefs and attitudes about medical care, and explore its common folk healing practices that might come into conflict with conventional medicine. Students could deliver these presentations and materials to local healthcare agencies.

Key Questions/Issues

- What is CAM, and how does it differ from conventional medicine? (Health Science I)
- Where do CAM practices come from? How have they become popular in the United States? (World Geography)
- What medical diagnoses and treatments are addressed by practitioners of traditional Hispanic folk healing? How do those diagnoses and treatments compare to conventional medicine? (Spanish I)
- How are traditional, local medical practices spread to other regions of the world? How do they gain popularity in a new culture? (World Geography, English Language Arts)
- What medical beliefs are held by people from different cultures? Why is it important for healthcare workers to be aware of these beliefs? (English Language Arts, World Geography)

Second Opinion

UNIT OVERVIEW

- What conventional medical treatments used by doctors today have their origins in folk medicine? (Chemistry)
- What regulations are currently in existence for CAM? Are they adequate? How could they be improved? (Social Studies, English Language Arts)

Learning Scenario to Kick Off the Unit

When you get sick, a nice nap and some hot soup isn't a bad way to spend the day, but if you were really sick, your parents would take you to see a doctor. Not everyone agrees. When your friend, Jorge, is sick, sometimes his parents take him to see a *curandera*, or folk healer, instead. And he's not the only one. Natural remedies for every conceivable illness are just one Google search away. There are 656,000 hits for "natural remedy, muscle strain" and 2,180,000 hits for "natural remedy, cancer." If you don't have time or money to see a doctor, or if you don't trust

doctors, you have plenty of other options. Will they really help you to get better? Is it possible they might actually make your health worse?

Biomedical/Healthcare and Education Partner Roles

- School librarians/media specialists can assist the Health Sciences and/or English Language Arts instructors with teaching research skills, particularly in the use of print and other media resources.
- Career counselors from the school or local post-secondary institutions can be invited to discuss the educational opportunities available and relevant to practitioners of CAM.
- Employees from various local biomedical research facilities or health services providers can be invited to speak to students about integrating CAM into conventional care.

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

Subunit 1

Old Medicine, New Places

HEALTH SCIENCE I · WORLD GEOGRAPHY · SPANISH I · ENGLISH LANGUAGE ARTS

- Five divisions of CAM
- Geographic differences in medical knowledge and practice
- Transfer of knowledge between cultures as a result of human migration
- Hispanic folk healing beliefs and practices
- Using print and multimedia sources for research
- Writing research reports

Subunit 2

Merging Two Traditions

CHEMISTRY · GEOMETRY · ALGEBRA I · SOCIAL STUDIES · ENGLISH LANGUAGE ARTS

- Molecular structure diagrams
- Acids and bases
- Origin and chemical composition of aspirin
- Volume and surface area for cylinders and prisms
- Hypothesis testing including Type I and Type II errors
- FDA regulations regarding the health care industry
- Formal debate



Waiting to Inhale

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Waiting to Inhale

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Waiting to Inhale

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 *Smoking and Society*

ENGLISH LANGUAGE ARTS ·
WORLD HISTORY · U.S. GOVERNMENT ·
ALGEBRA I · ALGEBRA II

- 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

Subunit 2 *Smoke and Fire*

BIOLOGY · HEALTH SCIENCE I · ENGLISH
LANGUAGE ARTS

- 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

Subunit 3 *Smoke and Mirrors*

ENGLISH LANGUAGE ARTS · VISUAL ARTS

- 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