

Lesson 4.16: Life Science – Health: Disease Prevention

Weekly Focus: Reading Comprehension
Weekly Skill: Reading Informational Text & Graphs

Lesson Summary: This week students will continue to explore health with a concentration on disease prevention. Students have a reading to introduce them to basic disease prevention: the common cold. It is followed by a second passage that will allow students to practice reading and interpreting informational texts and graphs.

Note: Some students in class may be particularly sensitive to discussions on chronic diseases. Please refer to **Classroom Routine Handout 5** on how to work with controversial or sensitive subject matter.

Materials Needed:

- Comprehension Reading **Unit 4.16 Handout 1** (6-way Paragraphs, Introductory Level, #7, pages 14 – 15)
- Reading Informational Texts and Graphs **Unit 4.16 Handout 2**
- Extra Work/Homework: **Unit 4.16 Handout 3** (6-way Paragraphs, Advanced Level, #38, pages 76 – 77)

Objectives: Students will be able to...

- Read comprehension passages with vocabulary related to disease prevention
- Practice effective communication skills with reading and interpreting informational text

College and Career Readiness Standards: RI, RST, WHST

ACES Skills Addressed: EC, LS, ALS, CT, SM, N

Notes: Please review and be familiar with classroom routine notes for: reading for fluency strategies (**Routine 2**), 6-way Paragraph reading techniques (**Routine 3**) summarizing techniques (**Routine 4**), self-management skills (**Routine 1**). The notes for the different activities will help with making a smooth transition to each activity. If needed, review how to work with controversial subject matter (**Routine 5**).

GED 2014 Science Test Overview – For Teachers and Students

The GED Science Test will be 90 minutes long and include approximately 34 questions with a total score value of 40. The questions will have focus on three content areas: life science (~40%), physical science (~40%), and Earth and space science (~20%). Students may be asked to read, analyze, understand, and extract information from a scientific reading, a news brief, a diagram, graph, table, or other material with scientific data and concepts or ideas.

The online test may consist of multiple choice, drop down menu, and fill-in-the-blank questions. There will also be two short answer questions (suggested 10 each) where students may have to design an experiment

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or identify errors in a conducted experiment, summarize, find evidence (supporting details), and reason or make a conclusion from the information (data) presented.

The work students are doing in class will help them with the GED Science Test. They are also learning skills that will help in many other areas of their lives.

Activities:

Warm-Up: Top Five Chronic Diseases in US - List

Time: 10 - 15 minutes

- As students enter the class, have the following written on the board or overhead: **“According to some government agencies, as a nation, 75% of our health care dollars goes to treatment of chronic diseases. What do you think are the most common or prevalent chronic diseases in the United States today?”**
- (For follow-up: According to the CDC, they are: high blood pressure, lung conditions, heart conditions, diabetes, and cancer. In 2008, 36% of Americans reported as living with one of these five conditions and 13% say they are living with two or more.)

Activity 1: Comprehension Reading (Unit 4.16 Handout 1)

Time: 40 - 45 minutes

- Hand out **Unit 4.16 Handout 1** to students.
- Explain to students they will be continuing to study health, specifically disease prevention this week. This information is important foundational knowledge for questions that may be on the 2014 GED Science module.
- Discuss with students that when reading for comprehension, there are many strategies to use: read the title to predict what the reading is about; look at the subheadings to get a better idea of what each section is about; if there are images, look at them to gain understanding; while reading remember to ask “What is this all about?”
- Use Routine 3 for examples on how to use the 6-Way Paragraphs reading passages in class.
- Have students read the passages independently while answering the questions at the end.
- Circulate class while they are reading to make sure they understand the information presented and see if there are any questions.
- Review answers as a whole class. Ask students to point to the evidence from the reading passage that helped them determine the answer(s).
- If there is time, students can read for fluency in pairs and/or summarize the reading or paraphrase (write in their own words) the main idea.

Break: 10 minutes

Activity 2: Interpret Informational Texts (Unit 4.16 Handout 2)

Time: 35 - 40 minutes

- Discuss with students that much of the 2014 GED test will require them to read informational (non-literary) and graphic (charts & graphs) texts. Activity 2 will require them to interpret two fact sheets from government offices, the Center for Disease Control and Prevention (CDC) and the American Public Health Association (APHA).
- Students should look over the material and graphs to make sure they understand the information

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- presented in each of the fact sheets.
- 3)** Discuss with students that when reading for comprehension, there are many strategies to use: read the title to predict what the reading is about; look at the subheadings to get a better idea of what each section is about; if there are images, look at them to gain understanding; while reading remember to ask “What is this all about?”
 - 4)** Point out to students the steps to reading a graph:
 1. Identify what the graph represents (look at titles and keys)
 2. Check the scale (if listed) for each element
 3. Locate the graph element you want information on
 4. Read directly “up” to find the point on the graph
 - 5)** Have students read the fact sheets independently while answering the questions at the end.
 - 6)** Circulate class while they are reading to make sure they understand the information presented and see if there are any questions.
 - 7)** Review answers as a whole class.

Wrap-Up: Summarize	Time: 5 minutes
<p>Have students turn to a partner (or write in their journals) about what they have learned today about the chronic diseases and their prevention. Ask them to tell a partner one thing they learned today in one or two sentences. <i>Note: Use Routine 4 Handout</i></p>	

Extra Work/Homework: Unit 4.16 Handout 3	Time: 30 - 45 minutes outside of class
<p>Students can continue to read about disease prevention with a 6-way Paragraph reading passage on achieving cardiovascular fitness. This is a great extension of today's topic.</p>	

Differentiated Instruction/ELL Accommodation Suggestions	Activity
<p>If some students finish early, they can turn their paper over and summarize the reading passage.</p> <p>Students should also be encouraged to challenge themselves and try to summary each of the informational texts. This is a workplace skill, a post-secondary educational skill, as well as an activity that may be needed on 2014 GED test modules.</p>	<p>Activity 1</p> <p>&</p> <p>Activity 2</p>
<p>Teachers should be aware that ELLs could have some difficulty with some of the vocabulary encountered in the handouts for Activity 1 & 2. Encourage them to look for context clues in the reading that will help them with interpreting the main idea of each reading passage.</p>	<p>Activity 1</p> <p>& 2</p>

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Online Resources:

If students have Internet connection, or if you can get to some of these sites in class, it may help to understand some of the data collection from the Centers for Disease Control and Prevention (CDC):

<http://www.cdc.gov/chronicdisease/>

To find out more information on adults living with chronic diseases:

<http://www.pewinternet.org/2010/03/24/adults-living-with-chronic-disease/>

The CDC has many links to prevention tips for various chronic diseases:

<http://www.cdc.gov/nccdphp/dch/programs/healthycommunitiesprogram/overview/diseasesandrisks.htm>

Suggested Teacher Readings:

- GED Testing Service – GED Science Item Sample (to get an idea of what the test may be like)

<http://www.gedtestingservice.com/itemsamplerscience/>

- Assessment Guide for Educators: A guide to the 2014 assessment content from GED Testing Service:

<http://www.riaepdc.org/Documents/ALALBAASSESSMENT%20GUIDE%20CHAPTER%203.pdf>

- Minnesota is getting ready for the 2014 GED test – website with updated information on the professional development in Minnesota regarding the 2014 GED.

http://abe.mpls.k12.mn.us/ged_2014_2

- Essential Education's 2014 GED Test Curriculum Blueprint (PDF)

<http://www.passged.com/media/pdf/educators/curriculum-blueprint.pdf>

Unit 4.16 Handout 1

TEACHER ANSWER KEY

Main Idea:

1. a. **B**road Idea
 b. **M**ain Idea
 c. **N**arrow Idea
2. D
3. B
4. C
5. A
6. A

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4.16 Handout 2 – total 5 pages

Get The Facts

Public Health and Chronic Disease

Cost Savings and Return on Investment

Chronic diseases are the leading cause of death and disability in the U.S. and among the most costly and preventable.

Public health—the practice of preventing disease and promoting health—effectively targets environmental factors and health behaviors that contribute to chronic conditions. The health risk factors of physical inactivity, tobacco use and exposure and poor nutrition are the leading causes of chronic disease. With even a small reduction in the prevalence of chronic disease, the combined health and productivity cost savings of prevention lead to a positive return on investment within a short time.¹

Get the Facts

Population Burden

- **Almost one out of every two U.S. adults—107 million people—reported having at least one of six chronic illnesses—cardiovascular disease, cancer, chronic obstructive pulmonary disease, asthma, diabetes or arthritis—in 2008.**²
- Seven out of 10 deaths among Americans each year are from chronic diseases. Heart disease, cancer and stroke account for more than 50% of all yearly deaths.³
- Diabetes is the leading cause of kidney failure, non-injury lower-limb amputations and blindness among 20 to 74 year-olds.³
- About 13.6 million adults have been diagnosed with COPD, and an equal number remain undiagnosed.⁴
- One in three U.S. adults—63 million people—have hypertension or high blood pressure. Nearly 70% of first heart attacks and 77% of first strokes occur in people with hypertension.⁵

Economic Cost

- Obesity, which can lead to heart disease, stroke, type 2 diabetes and cancer, costs the U.S. \$147 billion annually in 2008 dollars.⁶ By 2030, medical costs associated with obesity are expected to increase by at least \$48 billion annually, with the annual loss in economic productivity totaling \$390 billion to \$580 billion.⁷
- From 2000 to 2004, smoking cost the U.S. about \$193 billion—nearly \$96 billion in direct medical costs and \$97 billion in lost productivity. Smoking causes lung diseases such as COPD, cancer, heart disease and stroke.⁸
- **The five most costly and preventable chronic conditions cost the U.S. nearly \$347 billion—30% of total health spending—in 2010.**⁹

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Chronic Condition	Health Care Costs ⁹	Lost Productivity Costs
Heart conditions	over \$107 billion	nearly \$95 billion ¹⁰
Cancer	nearly \$82 billion	nearly \$135 billion ¹¹
COPD/Asthma	nearly \$64 billion	over \$14 billion ¹⁰
Diabetes	over \$51 billion	\$69 billion ¹²
Hypertension	nearly \$43 billion	\$25 billion ¹³

⁺ 2010 data ⁺⁺ 2008 data ⁺⁺⁺ 2005 data ⁺⁺⁺⁺ 2012 data

Potential Cost Savings and Return on Investment

Effective public health interventions and policies that target chronic diseases lead to a healthier population with lower health care spending, less school and workplace absenteeism, increased economic productivity and an improved quality of life. By investing in prevention and treatment of the most common chronic diseases, the U.S. could decrease treatment costs by \$218 billion per year and reduce the economic impact of disease by \$1.1 trillion annually.¹⁴ Data supports making an investment in prevention:

- By improving preventive screening and implementing programs that reduce risk factors, the U.S. could save \$26 billion in lost productivity costs from colorectal cancer deaths by 2020.¹⁵
- For every \$1 invested in the truth[®] anti-smoking campaign, the U.S. saved more than \$6.80.¹⁶ The truth[®] campaign decreased youth smoking by 22% from 1999 to 2002 and averted \$1.9 billion in future health care costs.¹⁷
- Every \$1 spent on evidence-based programs that increase physical activity, improve nutrition and prevent tobacco use saves \$5.60 in health spending within five years and up to \$6.20 within 10 years.¹⁸
- For every \$1 spent on tobacco cessation programs, the average return is \$1.26. In one year, the U.S. could save more than \$711 million.¹⁹
- Every \$1 spent on workplace wellness, decreases medical costs by about \$3.27 and increases productivity, with absenteeism costs decreasing by about \$2.37.²⁰
- Making all workplaces smokefree would save almost \$60 million in direct medical costs, generate about 1.3 million new quitters in one year and prevent about 1,500 heart attacks and 350 strokes.²¹

¹Urban Institute, *The Role of Prevention in Bending the Cost Curve*, 2011 ~ ²Healthy People 2020, *General Health Status, 2011* ~ ³Centers for Disease Control and Prevention (CDC), *Chronic Diseases and Health Promotion, 2012* ~ ⁴Healthy People 2020, *Respiratory Diseases Overview, 2012* ~ ⁵CDC, *High Blood Pressure Facts, 2012* ~ ⁶CDC, *Overweight and Obesity Facts, 2012* ~ ⁷Trust for America's Health (TFAH), *F as in Fat: How Obesity Threatens America's Future 2012, 2012* ~ ⁸CDC, *Morbidity and Mortality Weekly Report, Smoking-Attributable Mortality, Years of Potential Life Lost, and Productivity Losses—United States, 2000-2004, 2008* ~ ⁹Agency for Healthcare Research and Quality, *Medical Expenditure Panel Survey—Table of Total Expenses, 2010* ~ ¹⁰National Institutes of Health, *Morbidity & Mortality: 2012 Chart Book on Cardiovascular, Lung, and Blood Diseases, 2012* ~ ¹¹National Cancer Institute, *Costs of Cancer Care, 2012* ~ ¹²American Diabetes Association, *The Cost of Diabetes, 2012* ~ ¹³Heidenreich, PA, et al., *Forecasting the Future of Cardiovascular Disease in the U.S.: A Policy Statement from the American Heart Association, Circulation, 123(8):933-44, 2011* ~ ¹⁴Milken Institute, *An Unhealthy America: Economic Burden of Chronic Disease, 2007* ~ ¹⁵Bradley, CJ, et al., *Productivity Savings from Colorectal Cancer Prevention and Control Strategies, American Journal of Preventive Medicine, 41(2):e5-e14, 2011* ~ ¹⁶P.R. Newswire, *truth[®] Campaign Can Save Half a Million Lives and Billions of Dollars, 2009* ~ ¹⁷Holtgrave, D, et al., *Cost-Utility Analysis of the National truth[®] Campaign to Prevent Youth Smoking, American Journal of Preventive Medicine, 36(5):385-8, 2009* ~ ¹⁸TFAH, *Prevention for a Healthier America: Investments in Disease Prevention Yield Significant Savings, Stronger Communities, 2009* ~ ¹⁹American Lung Association, *Smoking Cessation: The Economic Benefits, 2013* ~ ²⁰Altamir Institute, *Enabling Employee Wellness: What Do We Know About What Works?, 2011* ~ ²¹Ong, MK, & Glantz, SA, *Cardiovascular Health and Economic Effects of Smoke-free Workplaces, American Journal of Medicine, 117(1): 32-38, 2004*



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The Burden of Chronic Diseases

Chronic diseases – such as heart disease, stroke, cancer, and diabetes – are among the most prevalent, costly, and preventable of all health problems. Leading a healthy lifestyle (avoiding tobacco use, being physically active, and eating well) greatly reduces a person’s risk for developing chronic disease. Access to high-quality and affordable prevention measures (including screening and appropriate follow-up) are essential steps in saving lives, reducing disability and lowering costs for medical care.

Heart Disease and Stroke

Heart disease and stroke, the first and third leading causes of death in the United States, are the most common cardiovascular diseases.

- Heart disease accounted for 21% of deaths in Minnesota in 2005, while stroke caused 6% of deaths.
- In 2007, 21% of adults in Minnesota reported having high blood pressure (hypertension) and 32% of those screened reported having high blood cholesterol, which puts them at greater risk for developing heart disease and stroke.

Cancer

- Cancer is the second leading cause of death in the United States, accounting for almost one in every four deaths.
- 24% of all deaths in Minnesota in 2005 were due to cancer.
- The American Cancer Society estimates that 25,420 new cases of cancer were diagnosed in Minnesota in 2007, including 2,650 new cases of colorectal cancer and 3,240 new cases of breast cancer in women.

Diabetes

In 2005, diabetes was the sixth leading cause of death in the U.S. Likely to be underreported as a cause of death, the risk of death among people with diabetes is about twice that of people without diabetes of similar age.

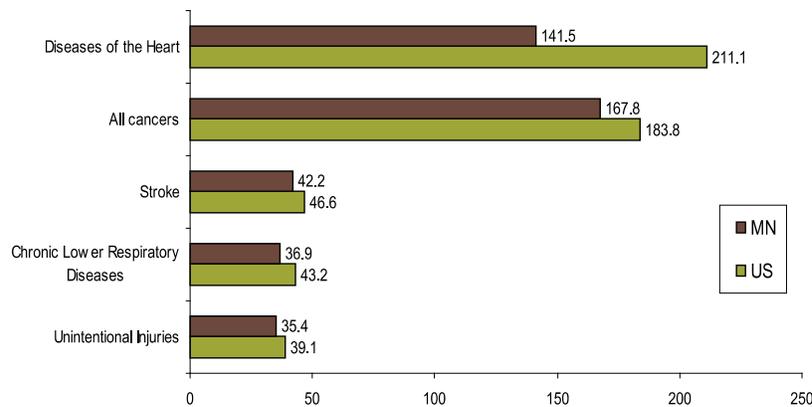
- 1,258 adults in Minnesota died from diabetes mellitus in 2005.
- In 2007, 6% of adults in Minnesota reported being diagnosed with non-pregnancy related diabetes.⁹

Arthritis

Arthritis is the most common cause of disability in the U.S., affecting more than 46 million Americans.

- In 2007, 23% of adults in Minnesota reported being diagnosed with arthritis.

5 Most Common Causes of Death, Minnesota Compared with United States, 2005



⁹ At minimum, two-year averages were used to improve the precision of the annual estimates.

Rate per 100,000 population
Age adjusted to 2000 total U.S. population

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Minnesota: Risk Factors and Preventive Services

Tobacco Use

Tobacco use is the single most preventable cause of death and disease in the United States. Each year, an estimated 438,000 people in the U.S. die prematurely from smoking or exposure to second hand smoke, and another 8.6 million have a serious illness caused by smoking. For every person who dies from smoking, 20 more people suffer from at least one serious tobacco-related illness.

- In 2007, 17% of adults in Minnesota reported being current smokers.

Nutrition, Physical Activity, and Overweight/Obesity

In the past 30 years, the prevalence of overweight and obesity has increased sharply for both adults and children. Physical inactivity and unhealthy eating contribute to overweight and obesity and a number of chronic diseases, including some cancers, cardiovascular disease, and diabetes.

- In 2007, 62% of adults in Minnesota were overweight or obese, based on self-reported height and weight.
- 81% of adults in Minnesota consumed fewer than 5 fruits and vegetables per day.
- 51% of adults in Minnesota were not engaged in sufficient moderate or vigorous physical activity.

Early Detection

Mammography is a screening method that has been shown to reduce mortality due to breast cancer by approximately 20-25% over 10 years among woman aged 40 years and over.

- In 2006, 19% of women in Minnesota aged 40 years or older, reported not having had a mammogram within the last 2 years.

Up to 60 percent of deaths from colorectal cancer could be prevented if persons aged 50 and older were screened regularly. Colorectal cancer can be prevented by removing precancerous polyps or abnormal growths, which can be identified during a fecal occult blood test, sigmoidoscopy or colonoscopy.

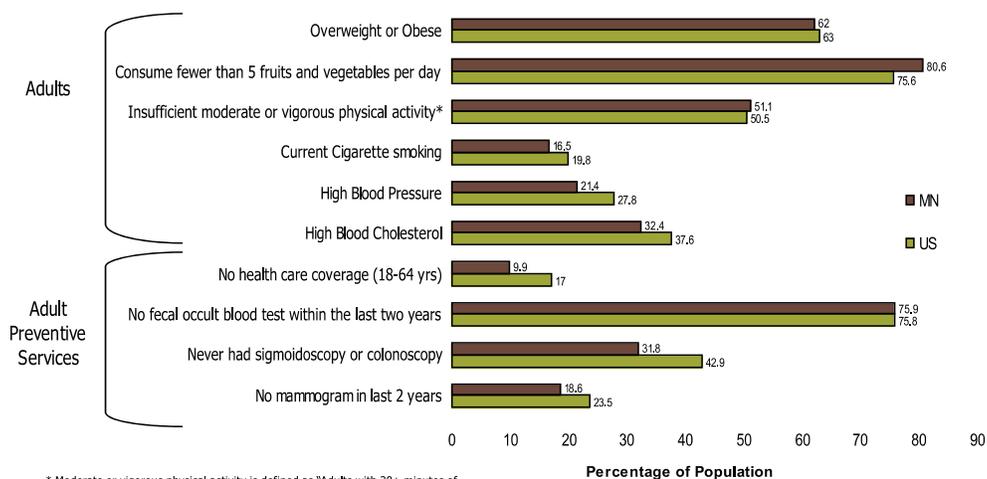
- In 2006, among adults in Minnesota aged 50 years or older, 32% reported never having had a sigmoidoscopy or colonoscopy.
- 76% reported not having had a fecal occult blood test within the past two years.

No Health Care Coverage

With the U.S. health care system changing rapidly, health care plans (e.g. health insurance, HMOs and Medicaid/Medicare) need to ensure that all Americans have access to affordable, high-quality preventive services.

- In 2007, 10% of adults aged 18-64 in Minnesota reported having no health care coverage.

Preventive Services and Risk Factors, Minnesota Compared with United States



* Moderate or vigorous physical activity is defined as "Adults with 30+ minutes of moderate physical activity five or more days per week, or vigorous physical activity for 20+ minutes three or more days per week."

^ Statistics presented are from the most recent year available

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Paraphrase, or write in your own words, the information from the texts to answer the following questions from information found in the Chronic Disease Fact Sheets.

1. What is public health?

2. What does the American Public Health Association (APHA) state as health risk factors that are instrumental to chronic health conditions?

3. What are the three chronic diseases that contribute to more than half of all deaths each year?

4. Obesity can contribute to which chronic diseases?

5. If all workplaces were smoke free, how much could be saved in direct medical costs?

6. According to the CDC, what are three activities of leading a healthy lifestyle that can prevent chronic diseases?

7. What is the percent of deaths in Minnesota from colorectal cancer that could possibly be prevented from regular screening?

8. What is the percentage of adults in Minnesota who report being smokers?

9. What does the CDC state as the single most preventable cause of death and disease in the United States?

10. Why do you think the rate of diseases of the heart is fewer in Minnesota than in the total US population?

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TEACHER ANSWER KEY

1. What is public health?
Public health is defined in the reading as “the practice of preventing disease and promoting health”.
2. What does the American Public Health Association (APHA) state as health risk factors that are instrumental to chronic health conditions?
According to the APHA, the health risk characteristics of physical inactivity, tobacco use and exposure, and poor nutrition are the most significant of chronic diseases
3. What are the three chronic diseases that contribute to more than half of all deaths each year?
The three chronic diseases are heart disease, cancer, and stroke.
4. Obesity can contribute to which chronic diseases?
Obesity can contribute to heart disease, stroke, type-2 diabetes, and cancer.
5. If all workplaces were smoke free, how much could be saved in direct medical costs?
As much as 60 million dollars could be saved in direct medical costs if workplaces were smoke free.
6. According to the CDC, what are three activities of leading a healthy lifestyle that can prevent chronic diseases?
Leading a healthy lifestyle includes not using tobacco, being physically active, and healthy eating.
7. What is the percent of deaths in Minnesota from colorectal cancer that could possibly be prevented from regular screening?
According to the CDC, up to 60 percent of deaths from colorectal cancer could be avoided with regular screening.
8. What is the percentage of adults in Minnesota who report being smokers?
According to the CDC, 17% (or 16.5% in graph) of adults in Minnesota said they smoked.
9. What does the CDC state as the single most preventable cause of death and disease in the United States?
According to the CDC, tobacco use is the number one cause of death and disease in the US that can be prevented.
10. Why do you think the rate of diseases of the heart are fewer in Minnesota than in the total US population?
Answers may vary: suggested answer – People in Minnesota may use less tobacco, be more physically active, and eat better than the average US population. (The graphs support this information)

Unit 4.16 Handout 3

TEACHER ANSWER KEY

Main Idea:

1. a. **B**road Idea
 b. **M**ain Idea
 c. **N**arrow Idea
2. D
3. A
4. B
5. D
6. C