

WARREN COUNTY SCHOOL DISTRICT

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: STEM - Medical Detectives

Course Number: 00757

Course Prerequisites: None

Course Description: In the Medical Detectives unit, students play the role of real-life medical detectives as they collect and analyze medical data to diagnose disease. They solve medical mysteries through hands-on projects and labs, measure and interpret vital signs, dissect a sheep brain, investigate disease outbreaks, and explore how a breakdown within the human body can lead to dysfunction.

Suggested Grade Level: Grades 6-8

Length of Course: One Nine-Week Marking Period

Units of Credit: .5

PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:

CSPG 32, CSPG 54, CSPG 65

To find the CSPG information, go to [CSPG](#)

Certification verified by the WCSD Human Resources Department: ☒ Yes ☐ No

WCSD STUDENT DATA SYSTEM INFORMATION

Course Level: Academic

Mark Types: Check all that apply.

☒ F – Final Average ☒ MP – Marking Period ☐ EXM – Final Exam

GPA Type: ☐ GPAEL-GPA Elementary ☒ GPAML-GPA for Middle Level ☐ NHS-National Honor Society

☐ UGPA-Non-Weighted Grade Point Average ☐ GPA-Weighted Grade Point Average

State Course Code: 03068

To find the State Course Code, go to [State Course Code](#), download the Excel file for SCED, click on SCED 6.0 tab, and chose the correct code that corresponds with the course.

TEXTBOOKS AND SUPPLEMENTAL MATERIALS

Board Approved Textbooks, Software, and Materials:

Title: Project Lead the Way Durable and Consumable Resources
Publisher: ISBN #:
Copyright Date:
WCSD Board Approval Date:

Supplemental Materials:

Curriculum Document

WCSD Board Approval:

Date Finalized: 8/28/2018
Date Approved: 10/8/2018
Date(s) Revised: 3/11/2019, 4/8/2019, 1/11/21
Implementation Year: 2018-2019

SPECIAL EDUCATION, 504, and GIFTED REQUIREMENTS

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (IEP), Chapter 15 Section 504 Plan (504), and/or Gifted Individual Education Plan (GIEP).

ASSESSMENTS

PSSA Academic Standards, Assessment Anchors, and Eligible Content: The teacher must be knowledgeable of the PDE Academic Standards, Assessment Anchors, and Eligible Content and incorporate them regularly into planned instruction.

Formative Assessments: The teacher will utilize a variety of assessment methods to conduct in-process evaluations of student learning.

Effective formative assessments for this course include: Teacher questioning, classroom discussions, evaluations of student learning

Summative Assessments: The teacher will utilize a variety of assessment methods to evaluate student learning at the end of an instructional task, lesson, and/or unit.

Effective summative assessments for this course include: Hands on projects, labs, tests, and quizzes

Project Lead the Way – Medical Detectives – Course Outline

Become medical detectives and solve medical mysteries!

Apply experimental design, creative thinking, and problem solving to investigate the inner-workings of the human body, diagnose disease, and improve human health.

In the Medical Detectives unit, students play the role of real-life medical detectives as they collect and analyze medical data to diagnose disease. They solve medical mysteries through hands-on projects and labs, measure and interpret vital signs, dissect a sheep brain, investigate disease outbreaks, and explore how a breakdown within the human body can lead to dysfunction.

Medical Detectives Lesson Summary

Lesson 1	Disease Detectives
Lesson 2	Mysteries of the Human Body
Lesson 3	Outbreak!

Lesson 1: Disease Detectives

Students discover how healthcare professionals act as medical detectives to identify, treat, and prevent illness in their patients. Students collect and interpret vital signs to evaluate patient health, explore different infectious disease agents, and design and conduct experiments to test the effectiveness of antibiotics on bacteria. In the end-of-lesson project, students collect and analyze medical data to diagnose a patient with a mystery illness.

Lesson 2: Mysteries of the Human Body

This lesson introduces the human body as a collection of body systems, with a focus on the nervous system. Students investigate how the nervous system collects information from the outside world, moves this information through neurons, processes this information in the brain, and initiates the body's response accordingly. Students create neuron models and perform a sheep brain dissection. They use their knowledge to explore symptoms as they relate to specific nervous system dysfunction and analyze evidence to identify the cause of the dysfunction. In the end-of-lesson project, students create educational resources to help their patient understand the medical condition.

Lesson 3: Outbreak!

A mysterious toxin is endangering the health of a community. Using their understandings of human body systems, students describe how the suspected toxin has impacted the health of the patient. Students analyze patient symptoms and perform lab analyses of patient samples to identify the culprit and determine how it's spreading. In the end-of-unit problem, students locate the source of the toxin using a map of the community, patient histories, and lab data, then present their findings to help community leaders mitigate the situation.

PLTW Medical Detectives

Lesson 1

Common Core State Standards for English Language Arts 7th Grade

7.RI.4—Reading Informational

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.

7.W.1—Writing

Write arguments to support claims with clear reasons and relevant evidence.

7.W.1.b—Writing

Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.

7.W.1.c—Writing

Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.

7.W.1.e—Writing

Provide a concluding statement or section that follows from and supports the argument presented.

7.W.2.d—Writing

Use precise language and domain-specific vocabulary to inform about or explain the topic.

7.W.2.f—Writing

Provide a concluding statement or section that follows from and supports the information or explanation presented.

7.W.4—Writing

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

7.SL.1—Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

7.SL.6—Speaking and Listening

Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

7.L.1—Language

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

7.L.2—Language

Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

7.L.2.b—Language

Spell correctly.

7.L.3—Language

Use knowledge of language and its conventions when writing, speaking, reading, or listening.

7.L.4—Language

Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 7 reading and content, choosing flexibly from a range of strategies.

7.L.4.a—Language

Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

7.L.6—Language

Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

PLTW Medical Detectives

Lesson 1

Common Core State Standards for English Language Arts 8th Grade

8.RI.4—Reading Informational

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.

8.W.1—Writing

Write arguments to support claims with clear reasons and relevant evidence.

8.W.1.b—Writing

Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.

8.W.1.c—Writing

Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.

8.W.1.e—Writing

Provide a concluding statement or section that follows from and supports the argument presented.

8.W.2.d—Writing

Use precise language and domain-specific vocabulary to inform about or explain the topic.

8.W.2.f—Writing

Provide a concluding statement or section that follows from and supports the information or explanation presented.

8.W.4—Writing

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

8.SL.1—Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

8.SL.6—Speaking and Listening

Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

8.L.1—Language

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

8.L.2—Language

Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

8.L.2.c—Language

Spell correctly.

8.L.3—Language

Use knowledge of language and its conventions when writing, speaking, reading, or listening.

8.L.4—Language

Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on grade 8 reading and content, choosing flexibly from a range of strategies.

8.L.4.a—Language

Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

8.L.6—Language

Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

PLTW Medical Detectives

Lesson 1

Common Core State Standards for English Language Arts Anchor Standards

AS.R.10—Reading

Read and comprehend complex literary and informational texts independently and proficiently.

AS.W.2—Writing

Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

AS.W.4—Writing

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

AS.SL.1—Speaking and Listening

Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

AS.SL.2—Speaking and Listening

Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

AS.SL.4—Speaking and Listening

Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

AS.SL.6—Speaking and Listening

Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

AS.L.1—Language

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

AS.L.2—Language

Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

AS.L.3—Language

Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

AS.L.4—Language

Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

AS.L.5—Language

Demonstrate understanding of word relationships and nuances in word meanings.

AS.L.6—Language

Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

PLTW Medical Detectives

Lesson 1

Common Core State Standards for English Language Arts 6-8 Literacy Standards for History/Social Studies, Science, and Technical Subjects

6-8.RST.2—Reading Science/Technical

Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

6-8.RST.3—Reading Science/Technical

Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

6-8.RST.4—Reading Science/Technical

Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.

6-8.RST.10—Reading Science/Technical

By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.

6-8.WHST.1—Writing HS/S/T

Write arguments focused on discipline-specific content.

6-8.WHST.1.b—Writing HS/S/T

Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

6-8.WHST.2—Writing HS/S/T

Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

6-8.WHST.2.d—Writing HS/S/T

Use precise language and domain-specific vocabulary to inform about or explain the topic.

6-8.WHST.2.f—Writing HS/S/T

Provide a concluding statement or section that follows from and supports the information or explanation presented.

6-8.WHST.4—Writing HS/S/T

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

PLTW Medical Detectives

Lesson 1

Common Core State Standards for Mathematics

6.SP.5.a—Statistics And Probability Reporting
the number of observations.

6.SP.5.b—Statistics And Probability

Describing the nature of the attribute under investigation, including how it was
measured and its units of measurement.

PLTW Medical Detectives

Lesson 1

National Health Science Standards

1.11—Foundation Standard 1: Academic Foundation: Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

Identify basic levels of organization of the human body

- a. Chemical
- b. Cellular
- c. Tissue
- d. Organs
- e. Systems
- f. Organism

1.13—Foundation Standard 1: Academic Foundation Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

Analyze basic structures and functions of human body systems (skeletal, muscular, integumentary, cardiovascular, lymphatic, respiratory, nervous, special senses, endocrine, digestive, urinary, and reproductive).

- a. Skeletal (bone anatomy, axial and appendicular skeletal bones, functions of bones, ligaments, types of joints)
- b. Muscular (microscopic anatomy of muscle tissue, types of muscle, locations of skeletal muscles, functions of muscles, tendons, directional movements)
- c. Integumentary (layers, structures and functions of skin)
- d. Cardiovascular (components of blood, structures and functions of blood components, structures and functions of the cardiovascular system, conduction system of the heart, cardiac cycle)
- e. Lymphatic (structures and functions of lymphatic system, movement of lymph fluid)
- f. Respiratory (structures and functions of respiratory system, physiology of respiration)
- g. Nervous (structures and functions of nervous tissue and system, organization of nervous system)
- h. Special senses (structures and functions of eye, ear, nose and tongue; identify senses for sight, hearing, smell, taste, touch)
- i. Endocrine (endocrine versus exocrine, structures and functions of endocrine system,

hormones, regulation of hormones)

j. Digestive (structures and functions of gastrointestinal tract, chemical and mechanical digestion, structures and functions of accessory organs)

k. Urinary (structures and functions of urinary system, gross and microscopic anatomy, process of urine formation, urine composition, homeostatic balance)

l. Reproductive (structures and functions of male and female reproductive systems, formation of gametes, hormone production and effects, menstrual cycle, and conception)

1.21—Foundation: Standard 1: Academic Foundation: Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

Describe common diseases and disorders of each body system (such as: cancer, diabetes, dementia, stroke, heart disease, tuberculosis, hepatitis, COPD, kidney disease, arthritis, ulcers).

a. Etiology

b. Pathology

c. Diagnosis

d. Treatment

e. Prevention

1.32—Foundation: Standard 1: Academic Foundation: Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results.

2.11—Foundation Standard 2: Communications: Demonstrate methods of delivering and obtaining information, while communicating effectively.

Model verbal and nonverbal communication.

2.15—Foundation Standard 2: Communications: Demonstrate methods of delivering and obtaining information, while communicating effectively.

Practice speaking and active listening skills.

2.16—Foundation Standard 2: Communications: Demonstrate methods of delivering and obtaining information, while communicating effectively.

Modify communication to meet the needs of the patient/client and be appropriate to the situation.

2.31—Foundation Standard 2: Communications: Demonstrate methods of delivering and obtaining information, while communicating effectively.

Utilize proper elements of written and electronic communication (spelling, grammar, and formatting).

2.32—Foundation Standard 2: Communications: Demonstrate methods of delivering and obtaining information, while communicating effectively.

Prepare examples of technical, informative, and creative writing.

4.32—Foundation Standard 4: Employability Skills: Utilize employability skills to enhance employment opportunities and job satisfaction.

Distinguish differences among careers within health science pathways (diagnostic services, therapeutic services, health informatics, support services, or biotechnology research and development).

7.11—Foundation Standard 7: Safety Practices: Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.

Explain principles of infection control.

a. Chain of infection

b. Mode of transmission (direct, indirect, vectors, common vehicle [air, food, water], healthcare-associated infections [nosocomial], opportunistic)

c. Microorganisms (non-pathogenic, pathogenic, aerobic, anaerobic)

d. Classifications (bacteria, protozoa, fungi, viruses, parasites)

7.12—Foundation Standard 7: Safety Practices: Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.

Differentiate methods of controlling the spread and growth of microorganisms.

a. Aseptic control (antisepsis, disinfection, sterilization, sterile technique)

b. Standard precautions

c. Isolation precautions

d. Blood borne pathogen precautions

e. Vaccinations

7.21—Foundation Standard 7: Safety Practices: Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.

Apply personal safety procedures based on Occupational Safety and Health Administration (OSHA) and Centers for Disease Control (CDC) regulations.

8.12—Foundation Standard 8: Teamwork: Identify roles and responsibilities of individual members as part of the healthcare team.

Identify characteristics of effective teams.

a. Active participation

b. Commitment

c. Common goals

- d. Cultural sensitivity
- e. Flexibility
- f. Open to feedback
- g. Positive attitude
- h. Reliability
- i. Trust
- j. Value individual contributions

10.11—Foundation Standard 10: Technical Skills: Apply technical skills required for all career specialties and demonstrate skills and knowledge as appropriate.

Apply procedures for measuring and recording vital signs including the normal ranges (temperature, pulse, respirations, blood pressure, and pain).

PLTW Medical Detectives

Lesson 1

Next Generation Science Standards

NGSS.P1—Science and Engineering Practices

Asking questions (for science) and defining problems (for engineering)

NGSS.P3—Science and Engineering Practices

Planning and carrying out investigations

NGSS.P4—Science and Engineering Practices

Analyzing and interpreting data

NGSS.P6—Science and Engineering Practices

Constructing explanations (for science) and designing solutions (for engineering)

NGSS.P7—Science and Engineering Practices

Engaging in argument from evidence

NGSS.P8—Science and Engineering Practices

Obtaining, evaluating, and communicating information

PLTW Medical Detectives

Lesson 1

Standards for Technological Literacy

9.6-8.G—Students will develop an understanding of engineering design.

Brainstorming is a group problem-solving design process in which each person in the group presents his or her ideas in an open forum.

12.6-8.J—Students will develop the abilities to use and maintain technological products and systems.

Use computers and calculators in various applications.

14.6-8.G—Students will develop an understanding of and be able to select and use medical technologies.

Advances and innovations in medical technologies are used to improve healthcare.

14.6-8.H—Students will develop an understanding of and be able to select and use medical technologies.

Sanitation processes used in the disposal of medical products help to protect people from harmful organisms and disease, and shape the ethics of medical safety.

17.6-8.K—Students will develop an understanding of and be able to select and use information and communication technologies.

The use of symbols, measurements, and drawings promotes a clear communication by providing a common language to express ideas

PLTW Medical Detectives

Lesson 2

Common Core State Standards for English Language Arts 7th Grade

7.RI.4—Reading Informational

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.

7.W.1—Writing

Write arguments to support claims with clear reasons and relevant evidence.

7.W.1.b—Writing

Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.

7.W.1.c—Writing

Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.

7.W.1.e—Writing

Provide a concluding statement or section that follows from and supports the argument presented.

7.W.2.d—Writing

Use precise language and domain-specific vocabulary to inform about or explain the topic.

7.W.2.f—Writing

Provide a concluding statement or section that follows from and supports the information or explanation presented.

7.W.4—Writing

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

7.SL.1—Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

7.SL.6—Speaking and Listening

Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

7.L.1—Language

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

7.L.2—Language

Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

7.L.2.b—Language

Spell correctly.

7.L.3—Language

Use knowledge of language and its conventions when writing, speaking, reading, or listening.

7.L.4—Language

Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 7 reading and content, choosing flexibly from a range of strategies.

7.L.4.a—Language

Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

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Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

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Common Core State Standards for English Language Arts 8th Grade

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PLTW Medical Detectives

Lesson 2

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AS.SL.2—Speaking and Listening

Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

AS.SL.4—Speaking and Listening

Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

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Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

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Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

AS.L.5—Language

Demonstrate understanding of word relationships and nuances in word meanings.

AS.L.6—Language

Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

PLTW Medical Detectives

Lesson 2

Common Core State Standards for English Language Arts 6–8 Literacy Standards for History/Social Studies, Science, and Technical Subjects

6-8.RST.2—Reading Science/Technical

Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

6-8.RST.3—Reading Science/Technical

Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

6-8.RST.4—Reading Science/Technical

Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.

6-8.RST.10—Reading Science/Technical

By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.

6-8.WHST.1—Writing HS/S/T

Write arguments focused on discipline-specific content.

6-8.WHST.1.b—Writing HS/S/T

Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

6-8.WHST.2—Writing HS/S/T

Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

6-8.WHST.2.d—Writing HS/S/T

Use precise language and domain-specific vocabulary to inform about or explain the topic.

6-8.WHST.2.f—Writing HS/S/T

Provide a concluding statement or section that follows from and supports the information or explanation presented.

6-8.WHST.4—Writing HS/S/T

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

PLTW Medical Detectives

Lesson 2

Common Core State Standards for Mathematics

6.SP.5.a—Statistics and Probability Reporting the
number of observations.

6.SP.5.b—Statistics and Probability

Describing the nature of the attribute under investigation, including how it was
measured and its units of measurement.

PLTW Medical Detectives

Lesson 2

National Health Science Standards

1.11—Foundation Standard 1: Academic Foundation: Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

Identify basic levels of organization of the human body

- a. Chemical
- b. Cellular
- c. Tissue
- d. Organs
- e. Systems
- f. Organism

1.13—Foundation Standard 1: Academic Foundation: Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

Analyze basic structures and functions of human body systems (skeletal, muscular, integumentary, cardiovascular, lymphatic, respiratory, nervous, special senses, endocrine, digestive, urinary, and reproductive).

- a. Skeletal (bone anatomy, axial and appendicular skeletal bones, functions of bones, ligaments, types of joints)
- b. Muscular (microscopic anatomy of muscle tissue, types of muscle, locations of skeletal muscles, functions of muscles, tendons, directional movements)
- c. Integumentary (layers, structures and functions of skin)
- d. Cardiovascular (components of blood, structures and functions of blood components, structures and functions of the cardiovascular system, conduction system of the heart, cardiac cycle)
- e. Lymphatic (structures and functions of lymphatic system, movement of lymph fluid)
- f. Respiratory (structures and functions of respiratory system, physiology of respiration)
- g. Nervous (structures and functions of nervous tissue and system, organization of nervous system)
- h. Special senses (structures and functions of eye, ear, nose and tongue; identify senses for sight, hearing, smell, taste, touch)

- i. Endocrine (endocrine versus exocrine, structures and functions of endocrine system, hormones, regulation of hormones)
- j. Digestive (structures and functions of gastrointestinal tract, chemical and mechanical digestion, structures and functions of accessory organs)
- k. Urinary (structures and functions of urinary system, gross and microscopic anatomy, process of urine formation, urine composition, homeostatic balance)
- l. Reproductive (structures and functions of male and female reproductive systems, formation of gametes, hormone production and effects, menstrual cycle, and conception)

1.21—Foundation: Standard 1: Academic Foundation: Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

Describe common diseases and disorders of each body system (such as cancer, diabetes, dementia, stroke, heart disease, tuberculosis, hepatitis, COPD, kidney disease, arthritis, ulcers).

- a. Etiology
- b. Pathology
- c. Diagnosis
- d. Treatment
- e. Prevention

1.32—Foundation: Standard 1: Academic Foundation: Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results.

2.11—Foundation Standard 2: Communications: Demonstrate methods of delivering and obtaining information while communicating effectively.

Model verbal and nonverbal communication.

2.15—Foundation Standard 2: Communications: Demonstrate methods of delivering and obtaining information while communicating effectively.

Practice speaking and active listening skills.

2.16—Foundation Standard 2: Communications: Demonstrate methods of delivering and obtaining information while communicating effectively.

Modify communication to meet the needs of the patient/client and be appropriate to the situation.

2.31—Foundation Standard 2: Communications: Demonstrate methods of delivering and obtaining information while communicating effectively.

Utilize proper elements of written and electronic communication (spelling, grammar, and formatting).

2.32—Foundation Standard 2: Communications: Demonstrate methods of delivering and obtaining information while communicating effectively.

Prepare examples of technical, informative, and creative writing.

4.32—Foundation Standard 4: Employability Skills: Utilize employability skills to enhance employment opportunities and job satisfaction.

Distinguish differences among careers within health science pathways (diagnostic services, therapeutic services, health informatics, support services, or biotechnology research and development).

7.11—Foundation Standard 7: Safety Practices: Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.

Explain principles of infection control.

a. Chain of infection

b. Mode of transmission (direct, indirect, vectors, common vehicle [air, food, water], healthcare-associated infections [nosocomial], opportunistic)

c. Microorganisms (non-pathogenic, pathogenic, aerobic, anaerobic)

d. Classifications (bacteria, protozoa, fungi, viruses, parasites)

7.12—Foundation Standard 7: Safety Practices: Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.

Differentiate methods of controlling the spread and growth of microorganisms.

a. Aseptic control (antisepsis, disinfection, sterilization, sterile technique)

b. Standard precautions

c. Isolation precautions

d. Blood borne pathogen precautions

e. Vaccinations

7.21—Foundation Standard 7: Safety Practices: Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.

Apply personal safety procedures based on Occupational Safety and Health Administration (OSHA) and Centers for Disease Control (CDC) regulations.

8.12 —Foundation Standard 8: Teamwork: Identify roles and responsibilities of individual members as part of the healthcare team.

Identify characteristics of effective teams.

a. Active participation

b. Commitment

c. Common goals

- d. Cultural sensitivity
- e. Flexibility
- f. Open to feedback
- g. Positive attitude
- h. Reliability
- i. Trust
- j. Value individual contributions

10.11—Foundation Standard 10: Technical Skills: Apply technical skills required for all career specialties and demonstrate skills and knowledge as appropriate.

Apply procedures for measuring and recording vital signs including the normal ranges (temperature, pulse, respirations, blood pressure, and pain).

PLTW Medical Detectives

Lesson 2

Next Generation Science Standards

NGSS.MS-LS1-3—From Molecules to Organisms: Structures and Processes

Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

NGSS.MS-LS1-8—From Molecules to Organisms: Structures and Processes

Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

NGSS.P1—Science and Engineering Practices

Asking questions (for science) and defining problems (for engineering)

NGSS.P2—Science and Engineering Practices

Developing and using models NGSS.P3—

Science and Engineering Practices

Planning and carrying out investigations

NGSS.P4—Science and Engineering Practices

Analyzing and interpreting data

NGSS.P6—Science and Engineering Practices

Constructing explanations (for science) and designing solutions (for engineering)

NGSS.P7—Science and Engineering Practices

Engaging in argument from evidence

NGSS.P8—Science and Engineering Practices

Obtaining, evaluating, and communicating information

PLTW Medical Detectives

Lesson 2

Standards for Technological Literacy

9.6-8.G—Students will develop an understanding of engineering design.

Brainstorming is a group problem-solving design process in which each person in the group presents his or her ideas in an open forum.

12.6-8.J—Students will develop the abilities to use and maintain technological products and systems.

Use computers and calculators in various applications.

14.6-8.G—Students will develop an understanding of and be able to select and use medical technologies.

Advances and innovations in medical technologies are used to improve healthcare.

14.6-8.H—Students will develop an understanding of and be able to select and use medical technologies.

Sanitation processes used in the disposal of medical products help to protect people from harmful organisms and disease, and shape the ethics of medical safety.

17.6-8.K—Students will develop an understanding of and be able to select and use information and communication technologies.

The use of symbols, measurements, and drawings promotes a clear communication by providing a common language to express ideas.

PLTW Medical Detectives

Lesson 3

Common Core State Standards for English Language Arts 7th Grade

7.RI.4—Reading Informational

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.

7.W.1—Writing

Write arguments to support claims with clear reasons and relevant evidence.

7.W.1.b—Writing

Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.

7.W.1.c—Writing

Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.

7.W.1.e—Writing

Provide a concluding statement or section that follows from and supports the argument presented.

7.W.2.d—Writing

Use precise language and domain-specific vocabulary to inform about or explain the topic.

7.W.2.f—Writing

Provide a concluding statement or section that follows from and supports the information or explanation presented.

7.W.4—Writing

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

7.SL.1—Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

7.SL.6—Speaking and Listening

Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

7.L.1—Language

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

7.L.2—Language

Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

7.L.2.b—Language

Spell correctly.

7.L.3—Language

Use knowledge of language and its conventions when writing, speaking, reading, or listening.

7.L.4—Language

Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 7 reading and content, choosing flexibly from a range of strategies.

7.L.4.a—Language

Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

7.L.6—Language

Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

PLTW Medical Detectives

Lesson 3

Common Core State Standards for English Language Arts 8th Grade

8.RI.4—Reading Informational

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.

8.W.1—Writing

Write arguments to support claims with clear reasons and relevant evidence.

8.W.1.b—Writing

Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.

8.W.1.c—Writing

Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.

8.W.1.e—Writing

Provide a concluding statement or section that follows from and supports the argument presented.

8.W.2.d—Writing

Use precise language and domain-specific vocabulary to inform about or explain the topic.

8.W.2.f—Writing

Provide a concluding statement or section that follows from and supports the information or explanation presented.

8.W.4—Writing

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

8.SL.1—Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

8.SL.6—Speaking and Listening

Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

8.L.1—Language

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

8.L.2—Language

Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

8.L.2.c—Language

Spell correctly.

8.L.3—Language

Use knowledge of language and its conventions when writing, speaking, reading, or listening.

8.L.4—Language

Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on grade 8 reading and content, choosing flexibly from a range of strategies.

8.L.4.a—Language

Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

8.L.6—Language

Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

PLTW Medical Detectives

Lesson 3

Common Core State Standards for English Language Arts Anchor Standards

AS.R.10—Reading

Read and comprehend complex literary and informational texts independently and proficiently.

AS.W.2—Writing

Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

AS.W.4—Writing

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

AS.SL.1—Speaking and Listening

Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

AS.SL.2—Speaking and Listening

Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

AS.SL.4—Speaking and Listening

Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

AS.SL.6—Speaking and Listening

Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

AS.L.1—Language

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

AS.L.2—Language

Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

AS.L.3—Language

Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

AS.L.4—Language

Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

AS.L.5—Language

Demonstrate understanding of word relationships and nuances in word meanings.

AS.L.6—Language

Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

PLTW Medical Detectives

Lesson 3

Common Core State Standards for English Language Arts 6–8 Literacy Standards for History/Social Studies, Science, and Technical Subjects

6-8.RST.2—Reading Science/Technical

Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

6-8.RST.3—Reading Science/Technical

Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

6-8.RST.4—Reading Science/Technical

Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.

6-8.RST.10—Reading Science/Technical

By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.

6-8.WHST.1—Writing HS/S/T

Write arguments focused on discipline-specific content.

6-8.WHST.1.b—Writing HS/S/T

Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

6-8.WHST.2.d—Writing HS/S/T

Use precise language and domain-specific vocabulary to inform about or explain the topic.

6-8.WHST.2.f—Writing HS/S/T

Provide a concluding statement or section that follows from and supports the information or explanation presented.

6-8.WHST.4—Writing HS/S/T

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

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Lesson 3

Common Core State Standards for Mathematics

6.RP.3—Ratios And Proportional Relationships

Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

6.RP.3.c—Ratios And Proportional Relationships

Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $30/100$ times the quantity); solve problems involving finding the whole, given a part and the percent.

6.NS.2—The Number System

Fluently divide multi-digit numbers using the standard algorithm.

7.NS.2.b—The Number System

Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.

PLTW Medical Detectives

Lesson 3

National Health Science Standards

1.11—Foundation Standard 1: Academic Foundation: Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

Identify basic levels of organization of the human body

- a. Chemical
- b. Cellular
- c. Tissue
- d. Organs
- e. Systems
- f. Organism

1.13—Foundation Standard 1: Academic Foundation: Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

Analyze basic structures and functions of human body systems (skeletal, muscular, integumentary, cardiovascular, lymphatic, respiratory, nervous, special senses, endocrine, digestive, urinary, and reproductive).

- a. Skeletal (bone anatomy, axial and appendicular skeletal bones, functions of bones, ligaments, types of joints)
- b. Muscular (microscopic anatomy of muscle tissue, types of muscle, locations of skeletal muscles, functions of muscles, tendons, directional movements)
- c. Integumentary (layers, structures and functions of skin)
- d. Cardiovascular (components of blood, structures and functions of blood components, structures and functions of the cardiovascular system, conduction system of the heart, cardiac cycle)
- e. Lymphatic (structures and functions of lymphatic system, movement of lymph fluid)
- f. Respiratory (structures and functions of respiratory system, physiology of respiration)
- g. Nervous (structures and functions of nervous tissue and system, organization of nervous system)
- h. Special senses (structures and functions of eye, ear, nose and tongue; identify senses for sight, hearing, smell, taste, touch)

- i. Endocrine (endocrine versus exocrine, structures and functions of endocrine system, hormones, regulation of hormones)
 - j. Digestive (structures and functions of gastrointestinal tract, chemical and mechanical digestion, structures and functions of accessory organs)
 - k. Urinary (structures and functions of urinary system, gross and microscopic anatomy, process of urine formation, urine composition, homeostatic balance)
 - l. Reproductive (structures and functions of male and female reproductive systems, formation of gametes, hormone production and effects, menstrual cycle, and conception)
- 1.21—Foundation: Standard 1: Academic Foundation: Understand human anatomy, physiology, common diseases and disorders, and medical math principles.
- Describe common diseases and disorders of each body system (such as cancer, diabetes, dementia, stroke, heart disease, tuberculosis, hepatitis, COPD, kidney disease, arthritis, ulcers).
- a. Etiology
 - b. Pathology
 - c. Diagnosis
 - d. Treatment
 - e. Prevention
- 1.32—Foundation: Standard 1: Academic Foundation: Understand human anatomy, physiology, common diseases and disorders, and medical math principles.
- Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results.
- 2.11—Foundation Standard 2: Communications: Demonstrate methods of delivering and obtaining information while communicating effectively.
- Model verbal and nonverbal communication.
- 2.15—Foundation Standard 2: Communications: Demonstrate methods of delivering and obtaining information while communicating effectively.
- Practice speaking and active listening skills.
- 2.16—Foundation Standard 2: Communications: Demonstrate methods of delivering and obtaining information while communicating effectively.
- Modify communication to meet the needs of the patient/client and be appropriate to the situation.
- 2.31—Foundation Standard 2: Communications: Demonstrate methods of delivering and obtaining information while communicating effectively.
- Utilize proper elements of written and electronic communication (spelling, grammar, and formatting).

- 2.32—Foundation Standard 2: Communications: Demonstrate methods of delivering and obtaining information while communicating effectively.

Prepare examples of technical, informative, and creative writing.

- 4.32—Foundation Standard 4: Employability Skills: Utilize employability skills to enhance employment opportunities and job satisfaction.

Distinguish differences among careers within health science pathways (diagnostic services, therapeutic services, health informatics, support services, or biotechnology research and development).

- 7.12—Foundation Standard 7: Safety Practices: Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.

Differentiate methods of controlling the spread and growth of microorganisms.

- a. Aseptic control (antisepsis, disinfection, sterilization, sterile technique)
- b. Standard precautions
- c. Isolation precautions
- d. Blood borne pathogen precautions
- e. Vaccinations

- 7.21—Foundation Standard 7: Safety Practices: Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.

Apply personal safety procedures based on Occupational Safety and Health Administration (OSHA) and Centers for Disease Control (CDC) regulations.

- 8.12—Foundation Standard 8: Teamwork: Identify roles and responsibilities of individual members as part of the healthcare team.

Identify characteristics of effective teams.

- a. Active participation
- b. Commitment
- c. Common goals
- d. Cultural sensitivity
- e. Flexibility
- f. Open to feedback
- g. Positive attitude
- h. Reliability
- i. Trust
- j. Value individual contributions

PLTW Medical Detectives

Lesson 3

Next Generation Science Standards

NGSS.MS-LS1-8—From Molecules to Organisms: Structures and Processes

Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

NGSS.P1—Science and Engineering Practices

Asking questions (for science) and defining problems (for engineering)

NGSS.P3—Science and Engineering Practices

Planning and carrying out investigations

NGSS.P4—Science and Engineering Practices

Analyzing and interpreting data

NGSS.P5—Science and Engineering Practices

Using mathematics and computational thinking

NGSS.P6—Science and Engineering Practices

Constructing explanations (for science) and designing solutions (for engineering)

NGSS.P7—Science and Engineering Practices

Engaging in argument from evidence

NGSS.P8—Science and Engineering Practices

Obtaining, evaluating, and communicating information

PLTW Medical Detectives

Lesson 3

Standards for Technological Literacy

9.6-8.G—Students will develop an understanding of engineering design.

Brainstorming is a group problem-solving design process in which each person in the group presents his or her ideas in an open forum.

12.6-8.J—Students will develop the abilities to use and maintain technological products and systems.

Use computers and calculators in various applications.

14.6-8.H—Students will develop an understanding of and be able to select and use medical technologies.

Sanitation processes used in the disposal of medical products help to protect people from harmful organisms and disease, and shape the ethics of medical safety.