

PLTW MEDICAL DETECTIVES**CURRICULUM/CONTENT AREA***Health Science & Wellness***COURSE LENGTH***Semester, Alternating Days (45 days)***GRADE LEVEL***7 and 8***DATE LAST REVIEWED***2022***PREREQUISITE(s) if applicable****BOARD APPROVAL DATE***11/15/2022***PRIMARY RESOURCE if applicable***PLTW Medical Detectives Course***DESIRED RESULTS****COURSE DESCRIPTION AND PURPOSE**

In the Medical Detectives (MD) 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. This course is not repeatable.

ENDURING UNDERSTANDINGS*Students will understand that...*

Creativity, innovation, and critical thinking are essential for success in a technologically advanced world.

The ability to communicate and collaborate with people with diverse backgrounds and perspectives is key to participation in a global economic society.

Career and technical education provides pathways to high-demand, high-wage career opportunities, and personal fulfillment.

ESSENTIAL QUESTIONS*Students will keep considering...*

Why is creativity and innovation important? How is creativity and innovation used in [name of career pathway]?

How do teams efficiently and effectively solve problems in an increasingly complex world?

What strategies and processes can I use to become a more effective creator, thinker and problem solver?

Why is communication and collaboration important? How do positive work behaviors and personal qualities impact communication and collaboration?

What is effective teamwork? What strategies can I use/teams use to work better together? How can perspectives and experiences of a diverse group develop innovative solutions to a given problem?

Why is career and life readiness important? What jobs and careers are available to meet individual and societal needs locally, regionally, and nationally?

How might technical knowledge and skills influence one's employability and advancement opportunities within various work settings?

What are employability skills? How do I prepare myself for a career that is in demand now and in 5, 10, or 20 years from now?

PRIORITY CAREER & TECHNICAL STANDARDS*Students will be skilled at...***Creativity, Critical Thinking, Communication and Collaboration****4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills.**

a: I develop effective resolutions for a given problem, decision or opportunity using available information.

b: I develop and implement a resolution for a new situation using personal knowledge and experience.

Career Development**CD4: Students will identify and apply employability skills.**

a: I identify and demonstrate positive work behaviors and personal qualities needed to be employable.

b: I demonstrate skills related to seeking and applying for employment to find and obtain a desired job.

c: I identify and exhibit traits for retaining employment.

d: I develop positive relationships with others.

Information, Media, Technology

IMT1: Students will access, interpret and evaluate information from a variety of sources in order to inform and support premises, arguments, decisions, ideas and initiatives.

- a: I choose appropriate sources of data and information for a given purpose.
- b: I determine the relevance, validity and timeliness of data and information.
- c: I select relevant information necessary for making decisions and solving problems
- d: I apply data and information to communicate ideas and create new opportunities.

PRIORITY CONTENT STANDARDS (goal: 4-6)

Students will know...

Standard: PAS1: Students will use the reasoning process, individually and collaboratively, to take responsible action in families, workplaces and communities.

Standard: CCLC1: Students will integrate multiple life roles and responsibilities in family, work and community settings.

Standard: CS1: Students will integrate knowledge, skills and practices needed for a career in consumer services.

Unit 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.		
STAGE 1: Desired Unit Results What will students understand as a result of the unit?		STAGE 2: Assessment Evidence By what criteria will performances of understanding be assessed? Through what authentic performance tasks will students demonstrate the desired unit results?
ESSENTIAL QUESTION (s) What thought-provoking questions will foster inquiry, understanding, and transfer of learning?		Success Criteria with Standards The criteria for evaluating performance on standards is constant.
Why is communication and collaboration important? How do positive work behaviors and personal qualities impact communication and collaboration?		CTE standards-based Rubric: Throughout the course, students and teachers use the rubric for communication of success criteria, reflection, goal setting, and feedback.
What strategies and processes can I use to become a more effective creator, thinker and problem solver?		In their portfolio/evidence journal, students will reflect on the essential questions through a quick write, constructed response.
PRIORITY CAREER & TECHNICAL STANDARDS & Learning Targets		Performance Tasks Options/ Assessment Strategies by Standard Students may be given options to show their learning in varied ways.
Creativity, Critical Thinking, Communication and Collaboration 4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills.		
a: I develop effective resolutions for a given problem, decision or opportunity using available information.	4C2.a.5.m: I can analyze symptoms to identify the root cause of a problem.	1.5 Diagnostic Detectives- Interview Patients and Diagnosis them with information gathered from interview 1.1 Vital signs- Students will collect vital signs to draw conclusions
	C2.a.9.m: I can explain how different resolutions may be appropriate under different circumstances.	1.3 Disease Agents- Diagnosing Patient with explanation of proper treatment
Career Development CD4: Students will identify and apply employability skills.		
	CD4.a.4.m: I can demonstrate flexibility and willingness to learn new knowledge and skills.	1.2 Experimental Design - Use experimental design to design an experiment to lower a patient's heart rate
c: I identify and exhibit traits for retaining employment.	CD4.c.2.m: I can demonstrate the behavior and etiquette appropriate to interactions with adults.	1.4 Disease diagnosis- Interview patients (possible teachers/ staff?)
PRIORITY CONTENT STANDARDS & Learning Targets		Performance Tasks Options/ Assessment Strategies by Standard Students may be given options to show their learning in varied ways.
Standard: PAS1: Students will use the reasoning process, individually and collaboratively, to take responsible action in families, workplaces and communities.	PAS1.e: I can demonstrate scientific inquiry and reasoning to gain factual knowledge and test theories on which to base judgments for action.	Students are given scenarios to apply their reasoning process and key knowledge and then determine a potential response/solution. Strategies may include short answer/constructed response and/or think/pair/share. (resource- PLTW interim and end of unit assessments.
Standard: CS1: Students will integrate knowledge, skills and practices needed for a career in consumer services.	CS1.a: I can analyze career paths within consumer service industries.	
Stage 3: Learning Activities A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unfold in a natural flow?		
GUIDING UNIT QUESTIONS	STRATEGIES/ACTIVITIES	RESOURCES/MATERIALS
Using Costas' Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of	What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills. make	This includes an applicable textbooks, software, industry recognized certification software/tools, subscriptions (such asPLTW), etc.

<p>Activity 1.1 Think about professional athletes and their expected performance levels. Why is it important to check their vital signs before a game or match? What clues can vital signs tell you about your own health? How do being inquisitive, enjoying mysteries, and solving problems help medical professionals in their careers? What other careers are these traits useful in?</p>	<p>LEVEL 1 COSTAS</p>	<p>PLTW MEDICAL DETECTIVES curricular resources</p>
<p>Activity 1.2 How can you use what you learned in this activity to explore and investigate techniques to lower anxiety? Think about a situation when you received confusing directions. What made the directions confusing? How can you improve your procedure-writing skills? In addition to scientists, what other professionals or fields use experimental design in their work?</p>	<ul style="list-style-type: none"> • Identify the 3 most common causes of disease. 	<p>Defined Learning/Defined Careers</p>
<p>Activity 1.3 You have not been feeling well the past couple of days. How can recording and observing your vital signs and symptoms help guide your medical decisions and when to seek treatment? How can you apply what you learned in this activity to your daily life? Describe a challenge or task that you had to solve step by step. How did working on the challenge or task one step at a time help you? How can understanding infectious disease agents help you better understand what could be making you sick?</p>	<ul style="list-style-type: none"> • Locate The Disease Dictionary. Where can you determine the type of disease it is (fungus, bacteria, or virus?) 	
<p>Activity 1.4 Think about your experience working in a team and what worked well or did not work well. From your experience, identify two rules for working effectively in a team. For example, "We will listen to each other without interrupting." What skills do medical professionals need to successfully diagnose a patient? How can these same skills be used in other careers? Why do medical professionals need more than one piece of information to accurately diagnose a patient? How is failure a part of solving a problem? How can failure</p>	<ul style="list-style-type: none"> • List the common symptoms of a virus... 	
<p>Activity 1.3 (continued) How can you apply what you learned in this activity to your daily life? Describe a challenge or task that you had to solve step by step. How did working on the challenge or task one step at a time help you? How can understanding infectious disease agents help you better understand what could be making you sick?</p>	<ul style="list-style-type: none"> • What occurs when you take antibiotics to treat a virus? 	
<p>Activity 1.3 (continued) How can you apply what you learned in this activity to your daily life? Describe a challenge or task that you had to solve step by step. How did working on the challenge or task one step at a time help you? How can understanding infectious disease agents help you better understand what could be making you sick?</p>	<ul style="list-style-type: none"> • Compare and contrast a bacterial infection, a virus, and a fungal infection. 	
<p>Activity 1.4 (continued) Think about your experience working in a team and what worked well or did not work well. From your experience, identify two rules for working effectively in a team. For example, "We will listen to each other without interrupting." What skills do medical professionals need to successfully diagnose a patient? How can these same skills be used in other careers? Why do medical professionals need more than one piece of information to accurately diagnose a patient? How is failure a part of solving a problem? How can failure</p>	<ul style="list-style-type: none"> • Describe the events that might occur if a doctor misdiagnosed a patient... 	
<p>Activity 1.4 (continued) Think about your experience working in a team and what worked well or did not work well. From your experience, identify two rules for working effectively in a team. For example, "We will listen to each other without interrupting." What skills do medical professionals need to successfully diagnose a patient? How can these same skills be used in other careers? Why do medical professionals need more than one piece of information to accurately diagnose a patient? How is failure a part of solving a problem? How can failure</p>		
<p>Activity 1.4 (continued) Think about your experience working in a team and what worked well or did not work well. From your experience, identify two rules for working effectively in a team. For example, "We will listen to each other without interrupting." What skills do medical professionals need to successfully diagnose a patient? How can these same skills be used in other careers? Why do medical professionals need more than one piece of information to accurately diagnose a patient? How is failure a part of solving a problem? How can failure</p>		

Unit 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.

STAGE 1: Desired Unit Results

What will students understand as a result of the unit?

STAGE 2: Assessment Evidence

By what criteria will performances of understanding be assessed? Through what authentic performance tasks will students demonstrate understanding?

ESSENTIAL QUESTION (s)

What thought-provoking questions will foster inquiry, understanding, and transfer of learning?

Success Criteria with Standards

The criteria for evaluating performance on standards is constant.

Why is creativity and innovation important? How is creativity and innovation used in [name of career pathway]?

CTE standards-based Rubric: Throughout the course, students and teachers use the rubric for communication of success criteria, reflection, goal setting, and feedback.

Why is career and life readiness important? What jobs and careers are available to meet individual and societal needs locally, regionally, and nationally?

In their portfolio/evidence journal, students will reflect on the essential questions through a quick write, constructed response.

PRIORITY CAREER & TECHNICAL STANDARDS & Learning Targets

Performance Tasks Options/ Assessment Strategies by Standard

Students may be given options to show their learning in varied ways.

Creativity, Critical Thinking, Communication and Collaboration

4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills.

4C2.a.6.m: I can develop multiple resolutions for a given problem, decision or opportunity.

2.3 Mysterious Miscommunications- treatment plan in pamphlet w/ patient w/ tumor **2.2 Smart Signals-** structure and function of neurons

4C2.b.4.m: I can analyze a problem to determine how it relates to existing knowledge.

2.5 Mysterious Disease- Brain MRI w/ tumor. **2.4 The Control Center-** Labeling of sheep brain

Information, Media, Technology

IMT1: Students will access, interpret and evaluate information from a variety of sources in order to inform and support premises, arguments, decisions, ideas and initiatives.

IMT1.b.5.m: I can demonstrate ability to gather information from electronic and non-electronic sources.

2.3 Mysterious Miscommunications- diagnostic test slideshow

IMT1.b.6.m: I can analyze various sources of data and information for relevance, validity and timeliness.

2.3 Mysterious Miscommunications- treatment plan in pamphlet w/ patient w/ tumor

PRIORITY CONTENT STANDARDS & Learning Targets

Performance Tasks Options/ Assessment Strategies by Standard

Students may be given options to show their learning in varied ways.

Standard: PAS1: Students will use the reasoning process, individually and collaboratively, to take responsible action in families, workplaces and communities.

PAS1.e: I can demonstrate scientific inquiry and reasoning to gain factual knowledge and test theories on which to base judgments for action.

Students are given scenarios to apply their reasoning process and key knowledge and then determine a potential response/solution. Strategies may include short answer/constructed response and/or think/pair/share. (resource- PLTW interim and end of unit assessments.

Standard: CS1: Students will integrate knowledge, skills and practices needed for a career in consumer services.

CS1.a: I can analyze career paths within consumer service industries.

Stage 3: Learning Activities

A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unfold in a natural flow?

GUIDING UNIT QUESTIONS

Using Costas' Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the unit's essential questions?

STRATEGIES/ACTIVITIES

What learning strategies and experiences will authentically engage students so that they gain understanding the desired learning outcomes?

RESOURCES/MATERIALS

This includes an applicable textbooks, software, industry recognized certification software/tools, subscriptions (such asPLTW), etc.

Activity 2.1
How is the nervous system in a person similar to a computer?
How can understanding the nervous system help improve the lives of people who have sensory processing sensitivities or disorders?
How does better understanding the body help you to build empathy toward others who are experiencing medical challenges?
In this activity, you used diagrams to illustrate the path of input and output signals in the nervous system.
How might you use diagrams to communicate information in your daily life?
How might you use diagrams to communicate information in

Make a map of The Human Nervous System.

PLTW MEDICAL DETECTIVES curricular resources

Create and label a model of a neuron

Defined Learning/Defined Careers

Dissect the sheeps brain, label anatomy

Describe the symptoms that would lead to a specific diagnosis (refer to the patient's profile

Unit 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.		
STAGE 1: Desired Unit Results What will students understand as a result of the unit?	STAGE 2: Assessment Evidence By what criteria will performances of understanding be assessed? Through what authentic performance tasks will students demonstrate the desired unit results?	
ESSENTIAL QUESTION (s) What thought-provoking questions will foster inquiry, understanding, and transfer of learning?		Success Criteria with Standards The criteria for evaluating performance on standards is constant.
What is effective teamwork? What strategies can I use/teams use to work better together? How can perspectives and experiences of a diverse group develop innovative solutions to a given problem?		CTE standards-based Rubric: Throughout the course, students and teachers use the rubric for communication of success criteria, reflection, goal setting, and feedback.
How do teams efficiently and effectively solve problems in an increasingly complex world?		In their portfolio/evidence journal, students will reflect on the essential questions through a quick write, constructed response.
PRIORITY CAREER & TECHNICAL STANDARDS & Learning Targets		Performance Tasks Options/ Assessment Strategies by Standard Students may be given options to show their learning in varied ways.
Creativity, Critical Thinking, Communication and Collaboration 4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills.		
b: I develop and implement a resolution for a new situation using personal knowledge and experience.	4C2.b.3.m: I can analyze problems to determine what past experiences might be related and relevant.	3.2 Disease Detectives- Using past knowledge from units 1 and 2 to solve a foodborne illness outbreak
Career Development CD4: Students will identify and apply employability skills.		
a: I identify and demonstrate positive work behaviors and personal qualities needed to be employable.	CD4.a.3.m: I can demonstrate self-discipline, self-worth, positive attitude and integrity.	3.2 Disease Detectives- Designating Roles in the Outbreak!
d: I develop positive relationships with others.	CD4.d.3.m: I can interact with others in a respectful and non-judgmental manner.	3.2 Disease Detectives- Teamwork in Outbreak!
Information, Media, Technology IMT1: Students will access, interpret and evaluate information from a variety of sources in order to inform and support premises, arguments, decisions, ideas and initiatives.		
	IMT1.d.5.m: I can apply a system for tracking and accessing data and information from multiple sources.	3.2 Disease Detectives- Restaurants, meals eaten from patients, case files
PRIORITY CONTENT STANDARDS & Learning Targets		Performance Tasks Options/ Assessment Strategies by Standard Students may be given options to show their learning in varied ways.
Standard: PAS1: Students will use the reasoning process, individually and collaboratively, to take responsible action in families, workplaces and communities.	PAS1.e: I can demonstrate scientific inquiry and reasoning to gain factual knowledge and test theories on which to base judgments for action.	Students are given scenarios to apply their reasoning process and key knowledge and then determine a potential response/solution. Strategies may include short answer/constructed response and/or think/pair/share. (resource- PLTW interim and end of unit assessments.
Standard: CS1: Students will integrate knowledge, skills and practices needed for a career in consumer services.	CS1.a: I can analyze career paths within consumer service industries.	
Stage 3: Learning Activities		
A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unfold in a natural flow?		
GUIDING UNIT QUESTIONS Using Costas' Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning	STRATEGIES/ACTIVITIES What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.	RESOURCES/MATERIALS This includes an applicable textbooks, software, industry recognized certification software/tools, subscriptions (such asPLTW), etc.
• What events led to this outbreak? How could it have been prevented?	LEVEL 3 COSTAS	PLTW MEDICAL DETECTIVES curricular resources
• What would happen if you did not use the patient case files to help determine the cause of illness?	• Design a _____	Defined Learning/Defined Careers
Activity 3.1 How might health professionals use attack rate to create public guidelines during a disease outbreak? In this activity, you analyzed data and looked for patterns. How do career fields other than medicine and public health use data and patterns to help make decisions? How can you apply what you learned in this activity to your daily life?	to show... • Write a new ending to the text. • Describe the events that might occur if noone looked into the cause of what is making people of Montgomery Hills sick?	
	• Add something new of your own that was not in the text. • Pretend you are... • What would the world be like if...?	
	• Pretend you are the restaurant owner that ahs caused the outbreak. What are you going to do now?	
	in the text. Rewrite the	

	episode from your point of view.	
	• What do you think will happen to _____?	
	Why?	
	• What is most compelling to you in this _____?	
	Why?	
	• Could this text have really happened? Why or why not?	
	• If you were there, would you...?	
	• How would you solve this problem in your life?	

Priority Standards	Unit 1	Unit 2	Unit 3
Creativity, Critical Thinking, Communication and Collaboration 4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills. a: I develop effective resolutions for a given problem, decision or opportunity using available information. b: I develop and implement a resolution for a new situation using personal knowledge and experience.	4C2.a.5.m; C2.a.9.m	4C2.a.6.m; 4C2.b.4.m	4C2.b.3;
Career Development CD4: Students will identify and apply employability skills. a: I identify and demonstrate positive work behaviors and personal qualities needed to be employable. b: I demonstrate skills related to seeking and applying for employment to find and obtain a desired job. c: I identify and exhibit traits for retaining employment. d: I develop positive relationships with others.	CD4.a.4.m; CD4.c.2.m		CD4.a.3.m; CD4.d.3.m
Information, Media, Technology IMT1: Students will access, interpret and evaluate information from a variety of sources in order to inform and support premises, arguments, decisions, ideas and initiatives. a: I choose appropriate sources of data and information for a given purpose. b: I determine the relevance, validity and timeliness of data and information. c: I select relevant information necessary for making decisions and solving problems d: I apply data and information to communicate ideas and create new opportunities.		IMT1.b.5.m; IMT1.b.6.m	IMT1.d.5.m
Standard: PAS1: Students will use the reasoning process, individually and collaboratively, to take responsible action in families, workplaces and communities.	x	x	x
Standard: CCLC1: Students will integrate multiple life roles and responsibilities in family, work and community settings.			
Standard: CS1: Students will integrate knowledge, skills and practices needed for a career in consumer services.	x	x	x