

**CKSD Curriculum**  
**Unit/Lesson 1**  
**STEAM 8 – PLTW Medical Detectives**  
**Suggested Length of Unit – 17 Days**  
**Instructor: Sarah Gates**

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*Disease Detectives (Lesson 1)*

- 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.

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*Major Academic Standards Addressed*

**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

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Concepts – Content — **What students should know**

- Devise and execute a plan to solve a problem.
- Analyze data and evidence to craft a conclusion supported by evidence.
- Determine investigative questions for a case.
- Interpret medical information to draw conclusions about a patient's health.
- Identify the classes of pathogens that cause disease.
- Describe the manners of disease transmission.
- Illustrate successful collaboration through effective communication and constructive feedback.

- Apply team norms to encourage productivity and define how a team will function and measure its success.
- Identify and evaluate positive and negative behaviors that impact the team's effectiveness.
- Communicate to meet the needs of the audience and be appropriate to the situation.
- Document a process, including findings or solutions, in a notebook.

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Objectives – also called competencies in the SAS

**What students should be able to do as a result of the instruction**

- Solve a problem using analytical and critical thinking skills.
- Collect and analyze medical evidence to draw conclusions.
- Analyze health and disease data to identify the source of a disease outbreak.
- Collaborate effectively on a diverse and multi-disciplinary team.
- Communicate effectively for specific purposes and settings.

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*Essential Questions – meant to challenge study to ponder, question and query*

- What can patient signs and symptoms tell us about what is happening in the human body?
- How do medical detectives investigate their cases?
- What does effective teamwork look like?

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Assessments- Assessments should be directly related to the objectives identified for students in this unit.

- Students will be assessed with:
  - Formative assessments
  - Project-based assessments (graded with rubrics)

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**Best Instructional Practice(s):** *Describe what you believe are the best instructional approaches you would employ in order to help students obtain proficiency on the standards identified in the unit. Develop this descriptor so that a student could understand the process. This can be a narrative.*

- Independent work – assuring each student is proficient with each skill
- Collaborative work – assuring students understand the importance of working as a unit to complete a large task

**CKSD Curriculum  
Unit/Lesson 2  
STEAM 8 – PLTW Medical Detectives  
Suggested Length of Unit – 13 Days  
Instructor: Sarah Gates**

*Mysteries of the Human Body (Lesson 2)*

- 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 dissection. They use their knowledge to explore symptoms as they relate to specific nervous system dysfunctions and analyze evidence to identify the cause of dysfunction. In the end-of-lesson project, students create educational resources to help their patient understand the medical condition.

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*Major Academic Standards Addressed*

**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-LS 1-8:** 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.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

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**Concepts – Content —What students should know**

- Create a model to describe the structures and function of the central and peripheral nervous system.
- Explain how the nervous system passes signals to and from the brain and spinal cord.
- Communicate to meet the needs of the audience and be appropriate to the situation.
- Illustrate successful collaboration through effective communication and constructive feedback.
- Analyze data and evidence to craft a conclusion supported by evidence.
- Interpret medical information to draw conclusions about the patient’s health.
- Explore a variety of career related to engineering, biomedical sciences, and computer science.
- Match regions of the brain with their primary function in the human body.
- Devise and execute a plan to solve a problem.
- Explain how solutions for complex problems can require interdisciplinary collaboration to incorporate a wide range of perspectives and skills.
- Determine investigative questions for a case.
- Interpret medical information to draw conclusions about a patient’s health.
- Apply team norms to encourage productivity and define how a team will function and measure its success.
- Identify and evaluate positive and negative behaviors that impact the team’s effectiveness.
- Communicate to meet the needs of the audience and be appropriate to the situation.
- Document a process, including findings or solutions, in a notebook.

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Objectives – also called competencies in the SAS

**What students should be able to do as a result of the instruction**

- Interpret how a breakdown in communication in the nervous system would impact the function of the human body.
- Communicate effectively for specific purposes and settings.
- Collaborate effectively on a diverse and multi-disciplinary team.
- Solve a problem using analytical and critical thinking skills.
- Collect and analyze medical evidence to draw conclusions.
- Identify the variety of careers related to engineering, biomedical sciences, and computer science.

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*Essential Questions – meant to challenge study to ponder, question and query*

- What can patient signs and symptoms tell us about what is happening in the human body?
- How do medical detectives investigate their cases?
- What does effective teamwork look like?
- How does the nervous system allow our bodies to interact with the outside world?

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**Assessments**- Assessments should be directly related to the objectives identified for students in this unit.

- Students will be assessed with:
  - Formative assessments
  - Project-based assessments (graded with rubrics)

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***Best Instructional Practice(s):*** Describe what you believe are the best instructional approaches you would employ in order to help students obtain proficiency on the standards identified in the unit. Develop this descriptor so that a student could understand the process. This can be a narrative.

- Independent work – assuring each student is proficient with each skill
- Collaborative work – assuring students understand the importance of working as a unit to complete a large task

**CKSD Curriculum**  
**Unit/Lesson 3**  
**STEAM 8 – PLTW Medical Detectives**  
**Suggested Length of Unit – 12 Days**  
**Instructor: Sarah Gates**

Outbreak! (Lesson 3)

- 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.

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Major Academic Standards Addressed

Next Generation Science Standards

**NGSS.MS-LS 1-8:** 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

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**NGSS.P7:** Science and Engineering Practices

Engaging in argument from evidence

**NGSS.P8:** Science and Engineering Practices

Obtaining, evaluating, and communicating information

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Concepts – Content — **What students should know**

- Explain how the nervous system passes signals to and from the brain and spinal cord.
- Communicate to meet the needs of the audience and be appropriate to the situation.
- Illustrate successful collaboration through effective communication and constructive feedback.
- Analyze data and evidence to craft a conclusion supported by evidence.
- Interpret medical information to draw conclusions about the patient's health.
- Explore a variety of career related to engineering, biomedical sciences, and computer science.
- Match regions of the brain with their primary function in the human body.
- Devise and execute a plan to solve a problem.
- Explain how solutions for complex problems can require interdisciplinary collaboration to incorporate a wide range of perspectives and skills.
- Determine investigative questions for a case.
- Interpret medical information to draw conclusions about a patient's health.
- Apply team norms to encourage productivity and define how a team will function and measure its success.
- Identify and evaluate positive and negative behaviors that impact the team's effectiveness.
- Communicate to meet the needs of the audience and be appropriate to the situation.
- Document a process, including findings or solutions, in a notebook.
- Perform necessary data calculations and draw logical conclusions from experimental data.
- Describe the manners of disease transmission.
- Analyze connections between individuals in a disease outbreak.
- Calculate measures of risk used to demonstrate a possible association between a risk factor and a disease.

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Objectives – also called competencies in the SAS

**What students should be able to do as a result of the instruction**

- Solve a problem using analytical and critical thinking skills.
- Design and conduct an experiment that investigates a question.
- Collect and analyze medical evidence to draw conclusions.
- Interpret how a breakdown in communication in the nervous system would impact the function of the human body.
- Analyze health and disease data to identify the source of a disease outbreak.
- Collaborate effectively on a diverse and multi-disciplinary team.
- Communicate effectively for specific purpose and settings.

- Identify the variety of careers related to engineering, biomedical sciences, and computer science.

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*Essential Questions – meant to challenge study to ponder, question and query*

- What can patient signs and symptoms tell us about what’s happening in the human body?
- How do medical detectives investigate their cases?
- What does effective teamwork look like?
- How does the nervous system allow our bodies to interact with the outside world?

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- Independent work – assuring each student is proficient with each skill
- Collaborative work – assuring students understand the importance of working as a unit to complete a large task