8HS

Syracuse City School District
Career and Technical Education Program
Course Syllabus
8th Grade CTE: Health Sciences

Course Description

Students will explore Health Sciences to discover what is public health and how professionals in this field collaborate. Students will have the opportunity to identify possible careers of interest. The vehicle for student learning is project-based learning. Project-based learning enables students to learn key skills as they work through a key question which guides their exploration as they design and develop a product or presentation to address the key question. Projects focus on what are current health issues and topics of concern, how can the spread of diseases be minimized, and how might artificial intelligence minimize bias. Integrated within each project is exploration of what careers, benefits, and responsibilities may be of interest to students. Key questions include:

- How might we influence our communities to be more health equitable?
- How can we develop and test a containment procedure for a viral outbreak in a community?
- How can we design an AI system to improve a healthcare or health -related process and minimize bias?

Key learning outcomes include:

- A variety of public health professionals work daily to solve local health problems to make our communities more equitable.
- Public health professionals work to solve health problems before they become problems.
- When there is a disease outbreak, health professionals and scientists work together to develop an action plan to contain the spread of disease.
- Artificial Intelligence Systems are powerful tools for examining large sets of data and making decisions.
- Bias can creep into an AI system based on the data collected.

The projects referenced in the resource may be presented to students in any sequence.

AVID (Advancement Via Individual Determination)

SCSD is an AVID school district. AVID is a college and career readiness system whose mission is to close the opportunity gap by preparing all students for college readiness and success in a global society. Part of the AVID system is focused on instruction which is centered around WICOR (Writing, Inquiry, Collaboration, Organization and Reading). WICOR strategies are designed to help students engage with content, take ownership of their learning, and become independent learners. WICOR strategies are incorporated into each unit.

Work-Based Learning

- Students will be exposed to a wide variety of opportunities and focus areas for health science careers.
- Students will interview working professionals from different careers and occupations demonstrating application of health sciences through Career Coaching.
- Students will participate in field trips to high school CTE Pathway programs and local workplaces to broaden their ideas about application of health sciences and potential opportunities for them.
- Students will be mentored by current high school CTE students and will create and maintain a portfolio of their work-based learning experiences throughout the course.

Course Objectives

Students will know and be able to do:

- Determine pressing health related problems in local community.
- Research possible solutions for identified health problems.
- Explain how diseases can spread within a population.

- Articulate an action plan to minimize spread of disease and develop a test to determine effectiveness.
- Explore integration of technology into health sciences.
- Develop a problem statement integrating end user needs to form the basis for an app.
- Identify local health agencies and careers.
- Present their learnings, ideas and designs to others using clear, concise communication.
- Demonstrate working as team in a collaborative and productive manner.
- Demonstrate creativity, collaboration, and perseverance.
- Demonstrate effective communication and teamwork skills.
- Assess and describe their own strengths and interests.

Equipment and Supplies

- **School will provide:** All required materials.
- **Student will provide:** NA

Textbook

N/A

Grading

40% Class Work Assignments, and Assessments
60% Projects, Presentations

Additional Course Policies

Students are expected to:

- Be on time for class.
- Produce their best work, including being prepared for in-class presentations.
- Participate in class including contributing to discussions and critiquing their own and others' work, as well as diligently working on their own projects during the class period.
- Seek help when needed.
- Be attentive during class, ask questions if they do not understand something, and offer their opinions.

Course Calendar

Quarter	Units of Study
1	• **Introduction to Course and Project #1** • **Defining Public Health** • **Health Issues in Local Community** • **Health Agencies and Activists** • **Logic Model to Support Action** • **Team Project Presentation** • **Career Exploration** • **Introduction to Project #2** • **Disease Transmission** • **Linear Scale** • **Presenting Data** • **Containment Measures** • **Team Project Presentation** • **Career Exploration** • **Introduction to Project #3** • **Artificial Intelligence in Healthcare** • **Machine Learning** • **Project Presentation**

8
HS

Syracuse City School District
Career and Technical Education Program
Scope and Sequence

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Possible Projects/Activities	CCTC and NYS Standards
Weeks 1-2 **Introduction to Course and Project** **Defining Public Health** **Health Issues in Local Community** **(Project #1 Launch and Task Analysis, and Ask and Empathize)**	• What are expectations for students? • What are career ready skills? • What is a team contract? • What is the design process and how does a journal document the process? • What are key questions for this project? • What is public health? • What is health equity? • How do a variety of health professionals work to solve local health problems to make communities more equitable? • How do public health professionals work to solve health problems before they become problems? • What is a current public health issue? • How does evidence from research support a position on a public health issue? • What is a problem statement?	• Articulate expectations for this course. • Identify career ready skills. • Explain the purpose of a team contract. • Develop a team contract. • Explain design process and documentation through a journal. • Analyze tasks and team skills for the project presented. • Define public health. • Identify common problems public health professional work toward solving. • Explain health equity. • Describe health initiatives within the local area. • Describe the work of community health professionals and agencies. • Research a public health issue. • Evaluate the credibility of an internet source. • Apply research from credible sources to provide evidence and data regarding a health-related problem and approach. • Develop an argument about a public health issue using evidence from research. • Identify a health-related problem to solve. • Develop a problem statement for a health-related problem.	**Written** • Assignments • Self-Assessment • Design Journal **Performance** • Class Presentations/Debate • Career Portfolio • Teacher Observation	• Unit 1: Community Health Plan (see attached project resource days 1-10)	**Career Ready Practices** CRP #1,4,5,7,11,12 **ELA** 8R 1,2,7,8,9 8W 1,5,6,7 8S&L 1,3,4,6 8L 1,2,3,4,5 **Literacy** 6-8 RST 1,2,4 6-8 WHST 2,5,6,7 **CSDF** 7-8.DL.3 7-8.CT.10
Week 3 **Health Agencies and Activists**	• How do activists develop and influence a health movement? • What reading strategies support understanding of	• Describe how activists can develop a health movement. • Evaluate strategies to support understanding of informational texts.	**Written** • Assignments • Self-Assessment • Design Journal **Performance**	• Unit 1: Community Health Plan (see attached project resource days 11-17)	**Career Ready Practices** CRP # 1,5,6,8,12 **ELA** 8R 1,2,8

8
HS

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Possible Projects/Activities	CCTC and NYS Standards
Logic Model to Support Action **(Project #1 Imagine, Plan, and Create)**	informational texts? ● How does brainstorming support problem solving? ● What is a logic model? ● How is a logic model used to solve a problem? ● How does a logic model translate into an action?	● Demonstrate brainstorming as a team to identify potential actions. ● Explain key components of a logic model. ● Demonstrate collaboration, communication, and teamwork to complete a logic model for an identified health issue/problem. ● Develop/create a product demonstrating application of an action from the team logic model to help solve the teams' health-related problem.	● Teacher Observation ● Teamwork according to contract		8W 2,5 8S&L 1,4,5,6 8L 1,2,3,4,5 **Literacy** 6-8 RST 1,2,4,5 6-8 WHST 2 **CSDF** 7-8.DL.3 7-8.CT.10 7-8.DL.2
Week 4 **Team Project Presentation** **Career Exploration** **(Project #1 Improve and Communicate)**	● What makes an effective presentation? ● How can feedback be used to improve a process or product? ● What are some public health career pathways? ● What career pathways introduced are of interest? ● How do public health professionals work together to solve community health problems?	● Identify effective communication and presentation skills. ● Demonstrate effective communication and presentation skills. ● Summarize and evaluate feedback from the presentation. ● Identify some public health career pathways. ● Assess personal interest in potential health career pathways. ● Explain how public health professionals work together to solve community health problems.	**Written** ● Assignments ● Research Project (careers) ● Self-Assessments ● Design Journal **Performance** ● Class Presentation ● Career Portfolio ● Teacher Observation ● Teamwork according to contract	● Unit 1: Community Health Plan (see attached project resource days 18-20)	**Career Ready Practices** CRP # 1,4,5,10,12 **ELA** 8R 1,2, 8W 2,5,6,7 8S&L 1,4,5,6 8L 1,2,3,4,5 **Literacy** 6-8 RST 1,2,4 6-8 WHST 2,6,7 **CSDF** 7-8.CT.10 7-8.DL.2
Week 5 **Introduction to Project #2** **Disease Transmission** **(Project #2 Launch and Task Analysis, Ask and Inquire)**	● What are key questions for this project? ● What are diseases? ● How are diseases transferred from one person to another? ● How can an experiment support understanding of disease transmission?	● Analyze tasks and team skills for the project presented. ● Describe various diseases. ● Explain how diseases can be transferred from one person to another. ● Demonstrate understanding of disease transmission through participation in an experiment.	**Written** ● Assignments ● Design Journal ● Self-Assessments **Performance** ● Class Presentation ● Teacher Observation ● Teamwork according to contract	● Unit 2: Outbreak (see attached project resource days 1-5)	**Career Ready Practices** CRP #1,12 **ELA** 8R 1,2, 8W 2,5 8S&L 1,4,5,6 8L 1,2,3,4,5 **Literacy** 6-8 RST 1,2,4 6-8 WHST 2 **CSDF** 7-8.DL.2
Week 6	● How are diseases most		**Written**	● Unit 2: Outbreak (see	**Career Ready Practices**

8
HS

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Possible Projects/Activities	CCTC and NYS Standards
Linear Scale **Presenting Data** **(Project #2 Imagine and Plan)**	likely to be transmitted for a given disease? ● What is a linear scale? ● How can information from a linear scale be used? ● What is the experimental design process? ● How is an experiment designed? ● How are findings from an experiment shared?	● Identify means of transference for different diseases. ● Create a linear scale from a qualitative data set. ● Apply information from linear scale to assign a quantitative number to qualitative data. ● Explain experimental design process. ● Create an experiment showing how pathogens are transferred and the variables affecting the amount of virus transferred by direct or indirect contact. ● Demonstrate clean and concise communication and presentation skills.	● Assignments ● Design Journal ● Self-Assessment **Performance** ● Class Presentation ● Teacher Observation ● Teamwork according to contract	attached project resource days 6-10)	CRP #1,2,4,12 **ELA** 8R 1,2, 8W 2,5, 8S&L 1,4,5,6 8L 1,2,3,4,5 **Literacy** 6-8 RST 1,2,4,6,7 6-8 WHST 2, **CSDF** 7-8.DL.2
Week 7 **Containment Measures** **(Project #2 Plan and Create)**	● What are containment measures for minimizing the transmission of diseases? ● What is the best containment measure for a specific disease? ● How is an action plan created from research? ● How can validity of a containment measure be tested?	● Identify means of containment of diseases. ● Evaluate containment measures for specific diseases. ● Develop an experiment to test a containment measure. ● Develop an action plan to contain the initial spread of a disease. ● Develop a communication tool to inform the public on measures to stop a spread of disease. ● Analyze experimental data to determine effectiveness.	**Written** ● Assignments ● Design Journal ● Self-Assessment **Performance** ● Class Presentation ● Teacher observation ● Teamwork according to contract	● Unit 2: Outbreak (see attached project resource days 11-16)	**Career Ready Practices** CRP #1,2,4,12 **ELA** 8R 1,2, 8W 2,5 8S&L 1,4,5,6 8L 1,2,3,4,5 **Literacy** 6-8 RST 1,2,4,8 6-8 WHST 2,5 **CSDF** 7-8.DL.3 7-8.CT.10 7-8.DL.2
Week 8 **Project Presentation** **Career Exploration** **(Project #2 Communicate)**	● How are research and experimental findings communicated? ● What is a healthcare career of interest? ● What skills, traits and education are necessary for a particular career? ● What are the benefits of a particular career?	● Demonstrate clear and concise communication and presentation skills. ● Identify health care careers of interest. ● Develop a presentation (infographic) to share key points regarding a career of interest.	**Written** ● Assignments ● Research Project on Career ● Self-Assessment **Performance** ● Class Presentation ● Teacher Observation ● Teamwork according to contract	● Unit 2: Outbreak (see attached project resource days 17-21)	**Career Ready Practices** CRP #1,4,10 **ELA** 8R 1,2, 8W 2,5,6,7 8S&L 1,4,5,6 8L 1,2,3,4,5 **Literacy** 6-8 RST 1,2,4 6-8 WHST 2,5

8
HS

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Possible Projects/Activities	CCTC and NYS Standards
					CSDF 7-8.DL.3 7-8.DL.2
Week 9 **Artificial Intelligence in Healthcare** **(Project #3 Launch and Task Analysis, and Imagine)**	• What are key questions for this project? • What is artificial intelligence? • How is artificial intelligence used in daily lives? • How is artificial intelligence (AI) used in the healthcare industry? • How might an AI system improve healthcare or health-related processes and minimize bias? • Who experiences the identified problem (either a newly defined problem or one from a previous project)? • How does an end-user experience the problem? • What might an end-user need from a solution to this problem? • What is a problem statement? • What is machine learning? • How do artificial intelligence systems become biased? • How can we minimize bias in our designs? • How do artificial intelligence systems use data to learn? • What data might we need to collect to help a machine learn? • Where are potential data sources found?	• Analyze key points needed for the project. • Define artificial intelligence. • Explain how artificial intelligence (AI) is used in daily life. • Explain how AI is used in the healthcare industry and how it might improve outcomes and minimize bias. • Develop relevant questions regarding the identified problem. • Identify an end-user and their needs. • Explain how individual needs are connected to the problem being addressed. • Develop a problem statement for a health-related problem. • Define machine learning. • Compare and contrast different methods of teaching an app or applying machine learning. • Describe a process for how data is used to teach an app or apply machine learning. • Analyze an app to determine any bias in the system. • Explain how artificial intelligence systems can become biased as part of the machine learning process. • Explain the problem with bias in health-related AI systems. • Analyze data through pattern recognition. • Represent data in a graph to analyze patterns. • Identify possible data sources for their project.	**Written** • Assignments • Self-Assessment **Performance** • Class Presentation • Teamwork Tasks • Teacher Observation • Teamwork according to contract	Note: given that the SBEB resource materials and unit/lesson plans are designed for a longer course- teachers may need to consider implementing student tasks with healthcare problems from previous learning experiences. Unit 3: Artificial Intelligence in HealthCare (see attached project resource days 1-10)	**Career Ready Practices** CRP #1, 6,7,8,12 **ELA** 8R 1,2, 8W 2,5,6,7 8S&L 1,4,5,6 8L 1,2,3,4,5 **Literacy** 6-8 RST 1,2,4 6-8 WHST 2,5,6,7 **CSDF** 7-8.CT.10 7-8.DL.2 7-8.IC.1 7-8.IC.3 7-8.IC.5 7-8.NSD.**1**

8 HS

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Possible Projects/Activities	CCTC and NYS Standards
Week 10 **Machine Learning** **Project Presentation** **(Project #3 Plan, Create and Communicate)**	● What might an app look like and perform? ● What are model cards? ● How do model cards help to minimize bias? ● How is technical writing different from narrative writing? ● How can a design idea be communicated to an outside audience? ● How does a portfolio demonstrate personal growth and skills?	● Create a design for an app to address the identified health care problem and to avoid bias. ● Explain how model cards are used by the AI industry to communicate the design of their AI systems. ● Create a visual of app design. ● Identify data needed to teach the AI system for the app. ● Demonstrate technical writing skills. ● Create a model card to communicate the design of the app. ● Develop and deliver a short "pitch" or presentation on their project. ● Articulate personal interests, learning, experiences, and skills in their on-line portfolio.	**Written** ● Assignment ● On-line Career Portfolio ● Self-Assessment **Performance** ● Class Presentation ● Teamwork Tasks ● Teacher Observation	● Unit 3: Artificial Intelligence in HealthCare (see attached project resource days 11-15)	**Career Ready Practices** CRP #1,4,6,10,12 **ELA** 8R 1,2, 8W 2,5,6,7 8S&L 1,4,5,6 8L 1,2,3,4,5 **Literacy** 6-8 RST 1,2,4 6-8 WHST 2 **CSDF** 7-8.CT.10 7-8.DL.2 7-8.IC.1 7-8.IC.3 7-8.IC.5 7-8.NSD.1

8
HS

Standards

CCTC: Common Career and Technical Core

Career Ready Practices

1	Act as a responsible and contributing citizen and employee.
2	Apply appropriate academic and technical skills.
3	Attend to personal health and financial well-being.
4	Communicate clearly and effectively and with reason.
5	Consider the environmental, social, and economic impacts of decisions.
6	Demonstrate creativity and innovation.
7	Employ valid and reliable research strategies.
8	Utilize critical thinking to make sense of problems and persevere in solving them.
9	Model integrity, ethical leadership, and effective management.
10	Plan education and career paths aligned to personal goals.
11	Use technology to enhance productivity.
12	Work productively in teams while using cultural global competence.

Full Text: Career Ready Practices

8
HS

8th Grade Reading Standards (Literary and Informational Text)

Key Ideas and Details	
8R1	Cite textual evidence to strongly support an analysis of what the text says explicitly/implicitly and make logical inferences. (RI&RL
8R2	Determine one or more themes or central ideas of a text and analyze their development over the course of the text; summarize a text. (RI&RL)
8R3	In literary texts, analyze how particular lines of dialogue or events propel the action, reveal aspects of a character, or provoke a decision. (RL) In informational texts, analyze how individuals, events, and ideas are introduced, relate to each other, and are developed. (RI)
Craft and Structure	
8R4	Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings. Analyze the impact of specific word choices on meaning, tone, and mood, including words with multiple meanings. (RI&RL)
8R5	In literary texts, and informational texts, compare and contrast the structures of two or more texts in order to analyze how the differing structure of each text contributes to overall meaning, style, theme, or central idea. (RI&RL)
8R6	In literary texts, analyze how the differences between the point of view, perspectives of the characters, the audience, or reader create effects such as mood and tone. (RL) In informational texts, analyze how the author addresses conflicting evidence or viewpoints. (RI)
Integration of Knowledge and Ideas	
8R7	Evaluate the advantages and disadvantages of using different media—text, audio, video, stage, or digital—to present a particular subject or idea and analyze the extent to which a production remains faithful to or departs from the written text. (RI&RL)
8R8	Trace and evaluate an argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient and recognizing when irrelevant evidence is introduced. (RI&RL)
8R9	Choose and develop criteria in order to evaluate the quality of texts. Make connections to other texts, ideas, cultural perspectives, eras, and personal experiences. (RI&RL)

8th Grade Writing Standards

Text Types and Purposes	
8W1	Write arguments to support claims with clear reasons and relevant evidence.
8W1a	Introduce a precise claim, acknowledge and distinguish the claim(s) from a counterclaim, and organize the reasons and evidence logically.
8W1b	Support claim(s) with logical reasoning and relevant evidence, using credible sources while demonstrating an understanding of the topic or text.
8W1c	Use precise language and content-specific vocabulary to argue a claim.
8W1d	Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.
8W1e	Provide a concluding statement or section that explains the significance of the argument presented.
8W1f	Maintain a style and tone appropriate to the writing task.
8W2	Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
8W2a	Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast,8 and cause/effect
8W2b	Develop a topic with relevant facts, definitions, concrete details, quotations, or other information and examples; include formatting, graphics, and multimedia when useful to aid comprehension.
8W2c	Use precise language and content-specific vocabulary to explain a topic
8W2d	Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.
8W2e	Provide a concluding statement or section that explains the significance of the information presented.

8W2f	Establish and maintain a style appropriate to the writing task.
8W3	Write narratives to develop real or imagined experiences or events using effective techniques, relevant descriptive details and clear sequencing.
8W3a	Engage the reader by establishing a point of view and introducing a narrator and/or characters.
8W3b	Use narrative techniques, such as dialogue, pacing, description, and reflection to develop experiences, events, and/or characters.
8W3c	Use a variety of transitional words, phrases, and clauses to convey sequence, signal shifts from one time frame or setting to another, and show the relationships among experiences and events.
8W3d	Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events.
8W3e	Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.
8W4	Create a poem, story, play, artwork, or other response to a text, author, theme or personal experience; explain divergences from the original text when appropriate.
8W5	Draw evidence from literary or informational texts to support analysis, reflection, and research. Apply the grade 8 Reading Standards to both literary and informational text, where applicable.
Research to Build and Present Knowledge	
8W6	Conduct research to answer questions, including self-generated questions, drawing on multiple sources, refocusing the inquiry when appropriate. Generate additional related questions that allow for multiple avenues of exploration.
8W7	Gather relevant information from multiple sources; assess the credibility and accuracy of each source; quote or paraphrase the data and conclusions of others; avoid plagiarism and follow a standard format for citation.

8th Grade Speaking and Listening

Comprehension and Collaboration	
8SL1	Engage effectively in a range of collaborative discussions with diverse partners; express ideas clearly and persuasively, and build on those of others.
8LS1a	Come to discussions prepared, having read or researched material under study; draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.
8SL1b	Follow norms for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.
8SL1c	Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.
8SL1d	Acknowledge new information expressed by others, and, when warranted, qualify or justify personal views in light of the evidence presented.
8SL2	Analyze the purpose of information presented in diverse formats (e.g., including visual, quantitative, and oral) and evaluate the motives (e.g., social, commercial, political) behind its presentation.
8SL3	Delineate a speaker's argument and specific claims, evaluating for sound reasoning, and the relevance and sufficiency of the evidence; identify when irrelevant evidence is introduced.
Presentation of Knowledge and Ideas	
8SL4	Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear enunciation.
8SL5	Integrate digital media and/or visual displays in presentations to clarify information, strengthen claims and evidence, and add elements of interest to engage the audience.
8SL6	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

8th Grade Language Standards

Conventions of Academic English	
8L1	Demonstrate command of the conventions of academic English grammar and usage when writing or speaking*.

8L2	Demonstrate command of the conventions of academic English capitalization, punctuation, and spelling when writing*.
Knowledge of Language	
8L3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
8L3a	Use verbs in the active and passive voice and in the conditional and subjunctive mood to achieve particular effects (e.g., emphasizing the actor or the action; expressing uncertainty or describing a state contrary to fact).
Vocabulary Acquisition and Use	
8L4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases, choosing flexibly from a range of strategies.
8L4a	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.
8L4b	Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., precede, recede, secede).
8L4c	Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses) to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.
8L4d	Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).
8L5	Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
8L5a	Interpret figures of speech including irony and puns in context.
8L5b	Use the relationship between particular words to better understand each of the words.
8L5c	Distinguish among the connotations of words with similar denotations (e.g., bullheaded, willful, firm, persistent, resolute).
8L6	Acquire and accurately use general academic and content-specific words and phrases; apply vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Core Conventions Skills for Grades 6-8

- Ensure that pronouns are in the proper case (subjective, objective, and possessive).
- Recognize and correct inappropriate shifts in pronoun number and person.
- Recognize and correct pronouns that have unclear or ambiguous antecedents.
- Explain the function of phrases and clauses in general, as well as in specific sentences.
- Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers.
- Use simple, compound, complex, and compound-complex sentences to signal differing relationships among ideas.
- Explain the function of verbals (gerunds, participles, infinitives).
- Form and use verbs in the active and passive voice.
- Recognize and correct inappropriate verb shifts.

Core Punctuation and Spelling Skills for Grades 6-8

- Use punctuation (commas, parentheses, dashes, hyphens) to clarify and enhance writing.
- Use punctuation (comma, ellipsis, dash) to indicate a pause or break.
- Use an ellipsis to indicate an omission.

Full text found at NYS ELA Standards.

8
HS

NYS Literacy Standards: NYS Next Generation 6-12 Literacy Standards in History/Social Studies, Science, and Technical Subjects

Reading Standards for Literacy in Science and Technical Subjects 6	
6-8RST 1	Cite specific evidence to support analysis of scientific and technical texts, charts, graphs, diagrams, etc. Understand and follow a detailed set of directions.
6-8RST 2	Determine the central ideas or conclusions of a source; provide an accurate, objective summary of the source distinct from prior knowledge or opinions.
6-8RST 3	Describe how and why scientific ideas and reasoning are developed and modified over the course of a text, source, argument, etc.
6-8RST 4	Determine the meaning of symbols, key terms, and other content-specific words and phrases as they are used in scientific or technical sources.
6-8RST 5	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
6-8RST 6	Identify purpose and/or point of view when an author is presenting information, describing a procedure, discussing an experiment, etc. Compare and contrast the information gained from two or more experiments, simulations, videos, multimedia sources, readings from texts, graphs, charts, etc. on the same topic.
6-8RST 7	Identify and match scientific or technical information presented as text with a version of that information presented visually (e.g., in a flowchart, diagram, model, graph, or table).
6-8RST 8	For scientific sources, distinguish between observation and inference-based judgments, and reasoned judgment and opinion. For technical sources, distinguish between facts and reasoned judgment.
6-8RST 9	Compare and contrast the information gained from two or more experiments, simulations, videos, multimedia sources, readings from texts, graphs, charts, etc. on the same topic.

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6	
6-8WHST 1	Write arguments focused on discipline-specific content.
6-8WHST 2	Write informative/explanatory text focused on discipline-specific content.
6-8WHST 3	Write narratives to understand an event or topic, appropriate to discipline-specific norms, conventions, and tasks.
6-8WHST 4	Write responses to texts and to events (past and present), ideas, and theories that include personal, cultural, and thematic connections.
6-8WHST 5	Conduct short research projects to answer a question (including a self-generated question by the end of grade 8), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
6-8WHST 6	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source by applying discipline-specific criteria used in the social sciences or sciences; and quote or paraphrase the data/accounts and conclusions of others while avoiding plagiarism and following a standard format for citation.
6-8WHST 7	Draw evidence from informational texts to support analysis, reflection, and research.

Full Text: New York State 6-8 Next Generation ELA Standards at a Glance

8
HS

NYS K-12 Computer Science and Digital Fluency Learning Standards: Grade Band 7-8

Subconcept	Standard	
Impacts of Computing		
Society	7-8.IC.1	Compare and contrast tradeoffs associated with computing technologies that affect individuals and society.
	7-8.IC.2	Evaluate the impact of laws or regulations on the development and use of computing technologies and digital information.
Ethics	7-8.IC.3	Identify and discuss issues of ethics surrounding computing technologies and current events.
	7-8.IC.4	Identify and discuss issues related to the collection and use of public and private data.
	7-8.IC.5	Analyze potential sources of bias that could be introduced to complex computer systems and the potential impact of these biases on individuals.
Accessibility	7-8.IC.6	Assess the accessibility of a computing device or software application in terms of user needs.
Career Paths	7-8.IC.7	Explore a range of computer science related career paths.
Computational Thinking		
Modeling and Simulation	7-8.CT.1	Compare the results of alternative models or simulations to determine and evaluate how the input data and assumptions change the results.
Data Analysis and Visualization	7-8.CT.2	Collect and use digital data in a computational artifact.
	7-8.CT.3	Refine and visualize a data set in order to persuade an audience.
Abstraction and Decomposition	7-8.CT.4	Write a program using functions or procedures whose names or other documentation convey their purpose within the larger task.
	7-8.CT.5	Identify multiple similar concrete computations in a program, then create a function to generalize over them using parameters to accommodate their differences.
Algorithms and Programming	7-8.CT.6	Design, compare and refine algorithms for a specific task or within a program.
	7-8.CT.7	Design or remix a program that uses a variable to maintain the current value of a key piece of information.
	7-8.CT.8	Develop or remix a program that effectively combines one or more control structures for creative expression or to solve a problem.
	7-8.CT.9	Read and interpret code to predict the outcome of various programs that involve conditionals and repetition for the purposes of debugging.
	7-8.CT.10	Document the iterative design process of developing a computational artifact that incorporates user feedback and preferences.
Network and System Design		
Hardware and Software	7-8.NSD.1	Design a user interface for a computing technology that considers usability, accessibility, and desirability.
	7-8.NSD.2	Design a project that combines hardware and software components.
	7-8.NSD.3	Identify and fix problems with computing devices and their components using a systematic troubleshooting method or guide.

Networks and the Internet	7-8.NSD.4	Design a protocol for transmitting data through a multi-point network.
	7-8.NSD.5	Summarize how remote data is stored and accessed in a network.
Cybersecurity		
Risks	7-8.CY.1	Determine the types of personal information and digital resources that an individual may have access to that needs to be protected.
Safeguards	7-8.CY.2	Describe physical, digital, and behavioral safeguards that can be employed in different situations.
	7-8.CY.3	Describe trade-offs of implementing specific security safeguards.
	7-8.CY.4	Describe the limitations of cryptographic methods.
Response	7-8.CY.5	Describe actions to be taken before and after an application or device reports a security problem or performs unexpectedly.
Digital Literacy		
Digital Use	7-8.DL.1	Type on a keyboard while demonstrating proper keyboarding technique, with increased speed and accuracy.
	7-8.DL.2	Communicate and collaborate with others using a variety of digital tools to create and revise a collaborative product.
	7-8.DL.3	Compare types of search tools, choose a search tool for effectiveness and efficiency, and evaluate the quality of search tools based on returned results.
	7-8.DL.4	Select and use digital tools to create, revise, and publish digital artifacts.
	7-8.DL.5	Transfer knowledge of technology in order to explore new technologies.
Digital Citizenship	7-8.DL.6	Explain the connection between the persistence of data on the Internet, personal online identity, and personal privacy.
	7-8.DL.7	Describe safe, appropriate, positive, and responsible online behavior and identify strategies to combat negative online behavior.

Full Text: New York State 7-8 Computer Science and Digital Fluency Learning Standards

8
HS

Resource for Lesson Plans

SCSD Grade 8

Health Sciences

Unit 1: Community Health Plan

CTE Content Focus: Health Sciences

20 INSTRUCTIONAL DAYS

Unit Focus	Unit Text Set
This is one of three projects in the Health Science middle school course. Each project can be taught in any order. **This project engages students to determine the most pressing health-related problem in their local area and present a possible solution to the problem. Students learn about local health agencies and careers in their area.**	Videos: • "Health Equity" • "What is Public Health?" • "What in the Health is Public Health" • "Online Research: Tips for Effective Search Strategies • "The most powerful woman you've never heard of - T. Morgan Dixon and Vanessa Garrison" Websites: • Onondaga County Health Department Website • 211 Community Initiatives Website. • https://www.publichealth.org/careers/#Careers Texts: • "Public Health Services" • "Public Health Strategies"

Unit Anchor Charts/Instructional Tools

Project Scenario	Health Debate guidelines
Know/NTK chart	Debate scoring card
Team Contract	Debate scoring rubric
Design Journal	List of Example Health Issues
Four Corners Discussion	"CRAAP" Test
Think, Pair, Share	Inquiry Chart
CDC's Lesson: Food for Thought	Brainstorming Protocol
Health Ethics Debate student handout	Logic Model handout
Cornell Notes	Design Charrettes

Guiding Questions & Big Ideas

8
HS

Driving Question: How might we influence our communities to be more health equitable?

Big Ideas:

- A variety of public health professionals work daily to solve local health problems to make our communities more equitable.
- Public health professionals work to solve health problems before they become problems.

Final Tasks

Students will create a Logic Model and at least one product to support their solving their health-related problem

8
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Culturally and Historically Responsive Framework	Essential Learning Concepts
Identity: How will the unit help students to learn something about themselves and/or others? Students will be continuing their learning about how to collaborate with other students. Students will investigate and work toward solving a local health problem that may also affect them. **Skills: How will the unit build students' skills in the content area?** Students collaboratively learn together by working through the design process. Students will research, read, discuss and problem-solve as part of the learning process. **Intellect: How will the unit build students' knowledge and mental powers?** Students will build upon prior project work and develop their reading, research, discussion and design skills. **Criticality: How will the unit engage students' thinking about power and equity and the disruption of oppression?** Ultimately this project is about solving local health problems so that we can have more equitable, healthy communities **Joy: How will the unit allow students to experience joy through their learning?** We will celebrate their hard work and thinking at the end of the project.	**Students will be able to…** • Define public health. • Identify common problems public health professionals work toward solving. • Research a public health issue. • Develop an argument about a public health issue using evidence from my research. • Describe health initiatives within my local area. • Determine a health-related problem to solve. • Determine the credibility of an internet source. • Research credible sources to provide evidence and data for a health-related problem. • Develop a problem statement for a health-related problem. • Describe how activists develop a health movement. • Brainstorm ideas to solve my health-related problem. • Develop a Logic Model to solve my health-related problem. • Develop a creation plan with my team. • Create a product that will help in solving my health-related problem. • Present my plan to an outside audience. • Describe a public health career pathway. • Describe how public health professionals work together to solve community health problems.
SEL Benchmarks	**Integrated Standards**
	NY Digital Literacy Standards: • 4-6.DL.3 Conduct and refine advanced multicriteria digital searches to locate content relevant to varied learning goals.

	• 7-8.DL.3 Compare types of search tools, choose a search tool for effectiveness and efficiency, and evaluate the quality of search tools based on returned results. • 7-8.CT.10 Document the iterative design process of developing a computational artifact that incorporates user feedback and preferences. • 7-8.DL.2 Communicate and collaborate with others using a variety of digital tools to create and revise a collaborative product.

Community Health Plan

Key Vocabulary		Oral Language	Writing
Public Health Various Public Health Careers Design Charette	CDC Source Credibility	Team Meetings Four Corners Discussion Think, Pair, Share Brainstorming Whole Group Discussions Design Charrettes	Design Journal Cornell Notes Inquiry Chart Logic Model Summary

Teacher Preparation & Notes

This is a continuation of projects students experienced in the 7th-grade CTE curricula. Students were introduced to the design journal, team contract, and how to collaborate with each other. Consider how you want to re-introduce students to these concepts. Below are supports and tools used in the 7th-grade projects along with some new resources for team building.

- Design Journal – students are expected to keep a written design journal, typically in the form of a composition notebook.
  - Design Journal Instructions
  - Design Journal Checklist – Teacher version
  - Design Journal Checklist – Student version – can be printed, cut out, and pasted into their design journal

8
HS

- Team Contract

The goal of this project is to give students a taste of the types of problems that are working to be solved related to health and the wide variety of public health professionals that work to solve these problems. At the end of the project, students will ideally share their work with the local community. You will want to secure people who can come to listen to students presentations and provide other ideas to improve their plan. This could be parents, community health professionals, or other student and educators in your building.

Day	Learning Targets & Standards	Texts & Tasks	Supports
1	**Launch and Task Analysis**	**Launch**: • Chalk Talk: Write the word Health in the center of a larger piece of banner paper. Ask students to write any thoughts they have about what come to mind when they think of the word "Health". For larger classes, consider 2 – 3 pieces of banner paper. After writing their thoughts for a few minutes, have them rotate to another banner paper and add to what is already written, or connect to what someone else wrote. Students can write in visuals or words. • Lead students on a discussion to pull out themes of health from the banner Chalk Talk. Help them to make broad connections to what it means to be a healthy community: Nutrition, Fitness, Diseases, Substance Abuse, Mental Health, Access to Care, etc. • Show students the video, "Health Equity". Have them take note of and share thoughts and ideas that can add to our collective understanding of Health. Optional Guest Speaker: Invite an Onondaga County Health Department representative to speak to the students about what they do and what health problems they see within the local community. **Task Analysis & Team Contract**	Video: "Health Equity" Project Scenario Know/NTK chart Team Contract Design Journal

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
		• Divide students into their design teams of 2 – 4 students. • Introduce the guiding question, "What can we do to make our communities more health equitable?" for this project and hand out the project scenario. • Have students highlight the scenario and ask any clarifying questions about the expectations of the project. • Have students start their Know/NTK chart for this project. If needed, probe them to add things they learned from last year about the design process and how to design an item for a target customer. • Have student teams develop their team contract.	

2	**Ask & Empathize**
	• I can define public health.
	• I can identify common problems public health professionals work toward solving.
		What is Public Health?
		• Goal: Introduce students to the role of public health and start them thinking about possible problems they may work to solve.
		• Lead students in a Four Corners Discussion on the Role of Public Health. Below are some possible statements for students to discuss. The goal of the discussion is to get students thinking about the types of issues public health professionals support and that solutions to common health issues are complex.
		  ○ Everyone should be vaccinated before they come to public school.
		  ○ School lunches should eliminate all desserts or candy.
		  ○ All communities should have sidewalks.
		  ○ People should be required to get yearly physicals.
		• Tell students the discussions they had are examples of discussions happening in public health institutions across our city, state, and country. Show students the video, "What is Public
			Four Corners Discussion
			
			Video: "What is Public Health?"
			
			Video, "What in the Health is Public Health"
			
			Think, Pair, Share
			
			Design Journal

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
		Health?" or the video, "What in the Health is Public Health". Ask students to capture in their notebook words and phrases they help us better understand: ○ What is public health? ○ What are some issues that public health experts work to solve? ○ How do public health experts work together to solve these problems? • Have students Think, Pair, and Share their notes and thoughts from the questions with table partners, then with the class to collectively capture our knowledge about public health.	
3 – 5	**Ask & Empathize** • I can research a public health issue. • I can develop an argument about a public health issue using evidence from my research.	**Health Debate – Example Health Issues** ○ Goal: Provide students with two examples of potential health-related issues that public health representatives work on and give students experience performing keyword searches to find information and make logical arguments. Students will also consider what information made for a "strong" or "weak" argument. ○ This debate lesson is based on CDC's Lesson: Food for Thought. ○ Divide the class into four teams. Teams 1 & 2 will work on Debate one in the Health Ethics Debate student handout and Teams 3 & 4 will work on Debate 2. ○ Give each student the Health Ethics Debate student handout. The handout provides a scenario for each debate, a Cornell Notes graphic organizer for their research and a graphic organizer for preparing for their debate. ○ Have students first brainstorm possible topics that relate to their scenario and keywords they can use to search in an internet search engine. Students will not know which side of the debate they will be assigned, so they will need to research both sides.	CDC's Lesson: Food for Thought Health Ethics Debate student handout Cornell Notes Health Debate guidelines Debate scoring card Debate scoring rubric Design Journal

Day	Learning Targets & Standards	Texts & Tasks	Supports

		○ Students should give each student on their team a selection of topics or questions to research. After researching students return to their teams and share their information.
		○ On the day of the debates, assign each team their position and give student teams 10 minutes to prepare for the debate using the graphic organizer provided in the Health Ethics Debate student handout.
		○ Use the Health Debate guidelines to set up your room and run the debate. You may choose to have other teachers or community members be judges for the debates. You can use this scoring card and scoring rubric to "score" the debates and declare a "winner". Students who are participating in Debate 1 will take notes on Debate 2 and vice versa. Ask them to track in their design journals
		  ○ The most powerful arguments
		  ○ Which side do you agree with and why?
		○ Each debate will take roughly 20 minutes.
		
		Debate Reflection
		○ In their design teams, students share their notes and reflections from the debates and consider what they now think about each topic presented in the debates. Are these health issues facing our communities? What might be other health-related issues we would like to see solved in our communities?
		○ Lead students in a whole class discussion to share their insights and start collecting a class list of potential health issues facing our local community.	

6 – 7	**Ask & Empathize** • I can describe health initiatives within my local	**Local Health Issues** • In their design teams, have each student examine the Onondaga County Health Department Website and the 211 Community	Onondaga County Health Department Website

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports

	area.
	• I can determine a health-related problem to solve.
		Initiatives Website. Each student in the design team should choose three initiatives to explore further.
		• Students use the websites to learn more about the initiative. In their design journals, students take note of:
		  ○ What agencies help each initiative?
		  ○ What current actions are being done to support this health issue?
		• Students report back to their groups what they found.
		• Ask student teams to share at least one health issue they investigated and add it to the class list.
		• Ask student groups to brainstorm other problems they see that we might work toward solving in our class.
		
		Optional: Community Partner Panel – Invite representatives from Syracuse and Onondaga County Public Health to talk to students about current public health initiatives in their area. Prior to the visit, have students prep questions for the visitors based on their K/NTK list
		What health-related issues affect our local area?
		
		Student design teams pick a health issue they would like to work towards solving. If needed, refer to this list of Example Health Issues for other potential issues to investigate.
		
		Students revisit and updated their K/NTK chart in their design journal:
		• Add knowledge gained
		• Check-off questions answered
		• Add new questions needed to be answered to better understand their problem.
			211 Community Initiatives Website.
			
			List of Example Health Issues
			
			Design Journal
			
			Know/NTK chart

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
8 – 10	**Ask & Empathize** • I can determine the credibility of an internet source. • I can research credible sources to provide evidence and data for a health-related problem. • I can develop a problem statement for a health related problem.	**What do we know? – "Brain Dumps"** • Goal: We will use our collective knowledge of ourselves and our classmates to better understand our chosen problems. • Students start in their design teams with a piece of chart paper. At the top of the chart paper, they write the topic or problem they are seeking to solve. • For 5 minutes, each person in the group writes on the chart paper all they know or have experienced relating to this problem. • In 3-5 minute, intervals, have students rotate to each team's chart paper and add to what is there. They can't repeat anything someone else as written. They can add their own experience, fact, or other important detail about the topic. • When back at their original chart, students examine all the information and pull out the 3 – 5 most important facts that help them to better understand their problem. **Preparing for Internet Search** • Note: You may want to connect with your school media specialist to deliver lessons on determining keywords for internet searches, Boolean operators and source credibility. If your media specialist is not available, below are some lessons and tools to teach students how to search the internet more effectively for credible information. • Show students the video, "Online Research: Tips for Effective Search Strategies" then have students test different search strings with and without Boolean operators. Students compare results and share insights in a whole class share and discussion. • Source Credibility ○ Have students visit the site The Pacific Northwest Tree Octopus (or choose one from this list of hoax websites).	Brain Dump Video: "Online Research: Tips for Effective Search Strategies The Pacific Northwest Tree Octopus (or another hoax website) "CRAAP" Test Inquiry Chart Design Journal Design Teams Problem Statement

Day	Learning Targets & Standards	Texts & Tasks	Supports
		Have them discuss and share facts from the site and if this fit with what they know about Octopi. ○ Introduce the "CRAAP" Test to students and have students use this to validate the hoax website. ○ Ask students to search for something they know well and use the CRAAP test on two different sites that come up in their search. ○ Have students discuss what they discovered and how we might use this to test the credibility of our sources. **Understanding the Problem** • In their design teams, students revisit their K/NTK document and brainstorm questions they need to have answered to better understand: ○ Who experiences this problem the most in our local community? (age, gender, race, socio-economics, geographical location) ○ What has been done to attempt to solve this problem in the past or in other communities? How have the efforts worked? ○ Statistics and data surrounding the problem • Each student takes on different questions or topics to research to better understand the problem and the needs of the people who experience the problem. • Students may use an Inquiry Chart along with the CRAAP test to capture their notes and consider the credibility of each source. Tell students they should aim to reference three websites for the same question. • Students share their knowledge gained with their teammates and	

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
		the top 3 – 5 sources for their information and write up an outline of their collective findings. This can be in a Word document or PowerPoint presentation. • Collaboratively students develop a problem statement for their work together and add it to their write-up. • If students need support, they can use this Needs Assessment Graphic Organizer.	

11 – 12	**Imagine**
	• I can describe how activist develop a health movement.
	• I can brainstorm ideas to solve my health-related problem.
		What can we learn from a Health Activist Movement? (GirlTrek)
		• Show the video, "The most powerful woman you've never heard of - T. Morgan Dixon and Vanessa Garrison"
		• Students take note, discuss and share
		  ○ What inspired their need to create GirlTrek?
		  ○ What did they do?
		  ○ What are they planning to do to continue their health activism?
		
		Public Health Intervention Strategies
		• Give students a copy of the resources, "Public Health Services" and "Public Health Strategies".
		• Have students independently read and highlight strategies or services that might be useful for their problem.
		• Students share and discuss in their groups, what strategies or services might be best for their problem.
		
		Team Brainstorming
		• Student teams brainstorm various actions they would like to see happen to help solve their problem. Remind them brainstorming is about going big and not editing ideas for workability.
			Video: The most powerful woman you've never heard of - T. Morgan Dixon and Vanessa Garrison
			
			Texts: "Public Health Services" and "Public Health Strategies"
			
			Brainstorming Protocol
			
			Design Journal
			
			Design Teams

Day	Learning Targets & Standards	Texts & Tasks	Supports
		• If needed, choose an appropriate brainstorming protocol to support their discussions.	

13 – 14	**Plan**
	• I can develop a Logic Model to solve my health-related problem.
	• I can develop a creation plan with my team.
		Narrow Ideas and Develop a Logic Model
		• Goal: Logic models are used by organizations and programs to communicate their needs (inputs), what they plan to do (activities and outputs), and their intended goals. This activity will help students narrow down their ideas and support them in communicating how they will help solve the problem.
		• Give each student team a copy of the Logic Model handout. It has directions and a graphic organizer.
		• Students work in their teams to complete their logic model.
		• Students submit the model to their teacher for feedback and/or approval.
		
		Team Meeting – Develop a plan
		• Students meet in their design teams to review their logic model and determine what they can do now to support their vision. Ideally this will be something to support an action or output on their Logic Model. Ideas include:
		  ○ Developing a communication tool
		  ○ Developing an informational video
		  ○ Creating a product that helps their goals such as a health cookbook or guide to walking the city.
		• Students develop a plan to complete their product that includes task for each person in the design team.
			Logic Model handout
			
			Design Journal
			
			Design Teams

15 – 17	**Create** • I can create a product that will help in solving my	**Work Time** • Students work with their design teams to create their products. • Students track their progress in their design journals.	Design Journal Design Teams

Day	Learning Targets & Standards	Texts & Tasks	Supports

	health-related problem.	• This may take several days to complete. At the beginning of each day have students check in with their teams, discuss the following questions, and put their task lists in their design journals:
		  ○ What did we accomplish yesterday?
		  ○ What do we need to do today?
		  ○ Who is responsible for each task?	

18	**Improve and Communicate**
	• I can present my plan to an outside audience.
		Public Health Design Charrettes
		• Design Charrettes are workshop style meetings where design teams can share their work and ideas with the public and get feedback and other ideas for improving their plan.
		• The teacher will need to either secure local people in the area (such as parents or other health care professionals) or possibly other students or educators in the building to come in and participate in the charrettes. If you are not able to get outside visitors, then students can play the part of people in the community.
		• Pair 2 – 3 teams together and place local communities members with different student groups.
		  ○ Each round of charettes will consist of:
		  ○ Student teams sharing their logic model and product (5 minutes)
		  ○ Other students and community members providing feedback about what they like about the plan, what might be missing, and other ideas they may consider adding to the plan. (7 – 10 minutes)
		  ○ The presenting team thanks everyone for their feedback and shares how they might use the feedback. (5 minutes)
		• Repeat for all teams.
			Design Charrettes

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
19 – 20	**Communicate** • I can describe a public health career pathway. • I can describe how public health professionals work together to solve community health problems.	**Our Public Health Ecosystem** • Goal: To help students see the bigger picture of the public health system, the different careers involved and how they might interact with each other and the problems they identified. The class will develop a banner or school bulletin board that showcases their identified problems and connect the public health professionals who would be a part of solving the problem. Depending on space you may wish to also include their Logic Models. • Have each student choose a different career in Public Health to research. Students can use the website, https://www.publichealth.org/careers/#Careers • Students need to create a visual that represents that career and a summary of what they do on a word document. These will be printed out so they can be placed on banner paper that will serve as our class Public Health Banner. • Student design teams also prepare a word document that summarizes the problem they identified. • After documents are printed, place a larger piece of banner paper on a wall in the classroom. Have each student group place the summary of their problem and possibly their logic models on the paper. • Invite each student up to share the career they researched and a summary of what they do. Students will place their career on the banner and draw arrows to problems they might be a part of helping to solve. **Celebrate Success!** – Students have worked hard, so do something that celebrates the hard work they have put into this project. This is also a good time	https://www.publichealth.org/careers/#Careers

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
		to have students share verbally what they liked about this learning experience and what can be improved upon for next time.	

8
HS

SCSD Grade 8

Health Sciences

Unit 2: Outbreak

CTE Content Focus: Health Sciences

21 INSTRUCTIONAL DAYS

Unit Focus	Unit Text Set
Students will learn about how diseases can spread within a population and how to develop an action plan for minimizing the spread of a disease. Students will develop a containment plan and a test to determine its effectiveness. Students will deliver their plan and test results in a final presentation.	Articles: • National Geographic Infographic: Methods of Disease Transmission • FAQ from the Department of Microbiology at Mount Sinai Hospital, Toronto, Canada • An Introduction to Infectious Disease from Harvard University (Scroll down to **Figure 3** in the article.) Video: "Stopping the Spread!"

Unit Anchor Charts/Instructional Tools

- "Outbreak Games"
- Outbreak Project Scenario
- Know/NTK chart
- Team Contract
- Design Journal
- Possible Diseases
- Pathogen Transmission Lesson
- Pathogen Transmission Lesson – Teacher Version
- Mapping Patient Zero
- The Story of Patient Zero
- CRAAP test
- Making a Containment Scale Lesson
- Containment Scale Lesson – Teacher Version
- Designing an Experiment lesson

8
HS

• Experimental Design organizer • Action Plan Research • Project-Management Plan • Action Plan Organizer • Presentation Comment Cards • Formal Presentation Rubric	

Guiding Questions & Big Ideas

Essential Question: How can we, as Centers for Disease Control outbreak investigators, develop and test a containment procedure for a viral outbreak in a small rural community?

Big Ideas:
When there is a disease outbreak, health professionals and scientist work together to develop an action plan to contain the spread of the disease.

Final Tasks

Action Plan, Experimental Plan, and a Communication Tool

8
HS

Culturally and Historically Responsive Framework	Essential Learning Concepts
Identity: How will the unit help students to learn something about themselves and/or others? Students will be continuing their learning about how to collaborate with other students. **Skills: How will the unit build students' skills in the content area?** Students collaboratively learn together by working through the design process. Students will research, read, discuss and problem-solve as part of the learning process. **Intellect: How will the unit build students' knowledge and mental powers?** Students will build upon prior project work and develop their reading, research, discussion and design skills. **Criticality: How will the unit engage students' thinking about power and equity and the disruption of oppression?** N/A **Joy: How will the unit allow students to experience joy through their learning?** We will celebrate their hard work and thinking at the end of the project.	Students will be able to… • Describe various diseases. • Describe how diseases can be transferred from one person to another. • Conduct an experiment to better understand how a disease is transmitted from one person to another. • Describe how diseases can be transferred from one person to another. • Determine the most likely vehicles for my disease to be transmitted from one person to another. • create a linear scale from a qualitative data set. • Use my linear scale to assign a quantitative number to qualitative data. • Develop an understanding of the experimental design process. • Create an experiment to better understand how pathogens are transferred and the variables affecting the amount of virus transferred by direct or indirect contact. • Present findings from my experiment. • Describe various containment measures for minimizing the transmission of diseases. • Determine the best containment measures for a specific disease. • Summarize and communicate my research in an action plan. • Design and conduct an experiment to test the validity of a containment measure. • Communicate my research and experimental findings to an outside audience. • Communicate my research and experimental findings to an outside audience. • Research a potential healthcare career and develop an infographic on that career.

8
HS

SEL Benchmarks	Integrated Standards
	NY Digital Literacy Standards: • 7-8.CT.10 Document the iterative design process of developing a computational artifact that incorporates user feedback and preferences. • 7-8.DL.2 Communicate and collaborate with others using a variety of digital tools to create and revise a collaborative product.

Unit 2: Outbreak

Key Vocabulary		Oral Language	Writing
Pathogen	Independent Variable	Team Meetings	Design Journal
Disease	Dependent Variable	Formal presentation	Experimental Design
Virus	Control Variable	Think, pair, share	Action Plan
Bacteria	Experimental Design	Whole group share and discussion	Summary of Findings
Indirect transmission	Direct transmission		

Teacher Preparation & Notes

This is a continuation of projects students experienced in the 7th-grade CTE curricula. Students were introduced to the design journal, team contract, and how to collaborate with each other. Consider how you want to re-introduce students to these concepts. Below are supports and tools used in the 7th-grade projects along with some new resources for team building.

- Design Journal – students are expected to keep a written design journal, typically in the form of a composition notebook.

- Design Journal Instructions
- Design Journal Checklist – Teacher version
- Design Journal Checklist – Student version – can be printed, cut out, and pasted into their design journal

- Team Contract

This projects utilizes the powder, gel, and possibly aerosol from the GloGerm kits. These help to give students a way to examine how disease is transmitted and develop an experiment to prevent the spread of a disease. The final presentation is mean to be delivered to an outside audience. The could be health care professionals, but it could also be teachers or students from another class playing the part of CDC doctors.

Day	Learning Targets & Standards	Texts & Tasks	Supports
1	**Launch & Task Analysis**	**Launch**: • Lead students through a series of "Outbreak Games" that show how diseases can spread. • Introduce the scenario that there has been a disease outbreak in nearby rural village. The CDC has start their work in the town, but they need the students to develop and test different containment measure to minimize the spread of the disease. **Task Analysis & Team Contract** • Divide students into their design teams of 2 – 4 students. • Introduce the guiding question, "How can we, as Centers for Disease Control outbreak investigators, develop and test a containment procedure for a viral outbreak in a small rural community?" for this project and hand out the project scenario. • Have students highlight the scenario and ask any clarifying questions about the expectations of the project. • Have students start their Know/NTK chart for this project. If needed, probe them to add things they learned from last year about the design process and how to design an item for a target	"Outbreak Games" Outbreak Project Scenario Know/NTK chart Team Contract Design Journal Design Team

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
		customer. • Have student teams develop their team contract.	
2 - 3	**Ask & Inquire** • I can describe various diseases.	**Background Reading on Possible Disease** • Show students the video, "The Worst Disease Outbreaks of the Century, Pre-Covid". Tell students they will be investigating a few of these diseases further. • Give each student a copy of the "Possible Diseases" Handout and assign each design team a different disease to investigate. • Part 1 has students researching a different disease with a starting link (students may need to investigate a disease further). Students will prepare a 2-minute summary on their disease to share with a "mixed-group". • For Part 2, divide students into mixed groups where each person will share what they learned about each disease and compare similarities. Students will also discuss and brainstorm ways the spread of each disease could be minimized.	Possible Diseases Design Journal Design Team

4 – 5	**Ask & Inquire**
	• I can describe how diseases can be transferred from one person to another.
	• I can conduct an experiment to better understand how a disease is transmitted from one person to another.
		Pathogen Transmission Lesson
		• Give students a copy of the Pathogen Transmission Lesson. This will guide them to learn more about how disease spread and how to use GloGerm to test how germs spread.
		• Teacher notes for each section are provided on the Pathogen Transmission Lesson – Teacher Version.
		• Use the links below if students need additional resources for activities to try with the GloGerm gel or powder
		  ○ GloGerm Experiments
		  ○ GloGerm Kit Lessons
		• Students will need to take pictures of different stages of "pathogen transmission". One should be completely clean (no GloGerm
			Pathogen Transmission Lesson
			
			Pathogen Transmission Lesson – Teacher Version
			
			GloGerm Experiments
			
			GloGerm Kit Lessons
			
			Design Journal

Day	Learning Targets & Standards	Texts & Tasks	Supports

		Present) and others should represent varying amounts of GloGerm present under black light. The Containment Scale lesson will only need pictures using GloGerm on their hands; however, students may need other pictures to develop containment scales for their experiments.
		
		Revisit Know/NTK Chart
		• In their design teams, students revisit their K/NTK chart.
		  ○ Add new knowledge
		  ○ Check-off answered questions
		  ○ Write new questions
		
		Have each design team randomly pick one of the six diseases that were studied in the "Possible Diseases" activity. This will be the disease their team is tasked with developing and testing a containment measure. This may not necessarily be the disease the studied during the activity. Feel free to add to this list with other diseases. (Note: Lyme disease may not be a good choice because it is primarily spread through contact with infected ticks and not people). If needed, give students time to investigate more about their disease.
			Design Teams

6	**Imagine** • I can describe how diseases can be transferred from one person to another. • I can determine the most likely vehicles for my disease to be transmitted from one person to	**Patient Zero Mapping Activity** – Adapted from NGSS: Mapping the Spread of a Disease • Give each student a copy of the town map, "Mapping Patient Zero". They will use this to track the movements of Patient Zero and determine possible containment points. • Read, "The Story of Patient Zero" (except the bolded statements that give possible containment points). Ask students to track on their map different places where patient zero could have spread the disease.	Mapping Patient Zero The Story of Patient Zero CRAAP test Design Journal Design Team

Day	Learning Targets & Standards	Texts & Tasks	Supports

	another.	• In their design teams, students discuss what could be possible points of disease spread.
		• Invite student groups to share their findings with the rest of the class.
		
		Research Disease Transmissions
		• Lead students on a think, pair, share discussion to brainstorm all the ways they know that diseases can be spread.
		• Have students search the internet for
		  ○ Research for evidence that shows one of the containment measures on our list is a legitimate strategy and provide more information on how this happens, and
		  ○ Other transmission possibilities
		• Remind students to use the CRAAP test from the Community Health project to ensure their information is coming from a credible source.
		• Students share their discoveries with their design team and the class. Any new measures are added to the class list. Students will refer to this a various times during the Making a containment scale lesson and the designing an experiment lesson.	

7	**Imagine** • I can create a linear scale from a qualitative data set. • I can use my linear scale to assign a quantitative number to qualitative data.	**Making a Containment Measurement Scale** • Give students a copy of the Making a Containment Scale Lesson. This will lead students through how to make a scale based on how much GloGerm is left on hands after different "treatments". This simulates a procedure they will need to do when they are designing their experiments. • The Making a Containment Scale Lesson – Teacher Version has notes for implementing each section with students.	Making a Containment Scale Lesson Containment Scale Lesson – Teacher Version Design Journal

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
			Design Team
8 – 10	**Plan** • Develop an understanding of the experimental design process. • Create an experiment to better understand how pathogens are transferred and the variables affecting the amount of virus transferred by direct or indirect contact. • Present findings from my experiment.	**Designing an Experiment** • Ask students to revisit their K/NTK chart and the class disease transmissions list. In this lesson students will learn how to design an experiment by testing a "theory" how diseases spread. You may want to assign different groups a different transmission to test, or have groups pick one based on the disease they are studying. Students can also use the containment scale they developed in the "Making a Containment Scale" lesson, or they may need to develop their own. In most cases, students can use the GloGerm kits; however, in others, students may need additional supplies. They will need to run their experimental design by you so you can provide feedback and secure any needed items. • Give students the Designing an Experiment lesson and a copy of the Experimental Design organizer. • This lesson will guide students through the experimental design process by designing an experiment to test a theory about how a pathogen is transmitted from one person to another. Students will repeat this process for designing an experiment for their containment measure. • The Designing an Experiment Lesson – TV has teacher notes for supporting students through the lesson. • At the end of the lesson, students will develop a 3 – 5 slide PowerPoint presentation to share their experiment, their graphed data and what they learned.	Designing an Experiment lesson Experimental Design organizer Design Journal Design Team

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports

11 – 12	**Plan**
	• I can describe various containment measures for minimizing the transmission of diseases.
	• I can determine the best containment measures for a specific disease.
		Understanding Containment Measures
		• Lesson adapted from NGSS Lesson: Reactive Policies and Practices for Disease Control.
		• Show student the video, "Stopping the Spread!". The first part of the video will be a review of transmission methods, the second part will introduce different types of containment measures. Have students take notes of and share:
		  ○ Different containment measures
		  ○ Different careers or jobs involved in the process.
		• Give students a copy of the Action Plan Research organizer. In their design teams, have students divide up who will research which containment measure. Remind students they can use the CRAAP test to test in sites for information.
		• Completing their search for information on the organizer, students may also want to search for other methods of containment and add those to their chart.
		• Students share they research with their design teams.
		• Design teams discuss and consider the best containment methods for their disease.
		• Design teams discuss and consider which containment measure they would like to test in the lab.
			NGSS Lesson: Reactive Policies and Practices for Disease Control
			
			Video: "Stopping the Spread!"
			
			Action Plan Research organizer
			
			CRAAP test
			
			Design Journal
			
			Design Team

12 – 16	**Create**
	• I can summarize and communicate my research in an action plan.
	• I can design and conduct an experiment to test the validity of a containment
		Design Team Project-Management
		• Design teams will have three main tasks to do to complete their Action Plans
		  1. Develop an experiment to test one of the containment measures for effectiveness.
		  2. Write an action plan to contain the initial spread of their disease
			Project-Management Plan
			
			Action Plan Organizer
			
			Containment Scale Lesson

Day	Learning Targets & Standards	Texts & Tasks	Supports
	measure.	3. Develop a communication tool to inform the local's of what they can do to stop the spread of the disease. • Student design teams will develop a project-management plan to accomplish all the tasks. They will need to: ○ Break down each larger task into smaller tasks and place on this Project-Management plan that can be taped into their design Journals. It may be helpful to brainstorm smaller tasks on sticky-notes first so they can be rearranged into a timeline first. ○ Determine who will do what ○ Develop a timeline for when they will have each smaller task completed. **Work Time for Action Plan and Experimentation** • Students work with their design teams to create their products. • Students track their progress in their design journals. • This may take several days to complete. At the beginning of each day students check in with their teams and review the Project-Management Plan. They should discuss the following questions, and put their task lists in their design journals: ○ What did we accomplish yesterday? ○ What do we need to do today? ○ Who is responsible for each task? • Students working on the action plan may need this Action Plan Organizer to think through and collect the information. • Students can use the Containment Scale and Design and Experiment lessons and Graphic Organizer to help through designing and implementing an experiment for their containment measure.	Design and Experiment Lesson Experimental Design Graphic Organizer Design Journal Design Team

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
17 – 18	**Communicate** • I can communicate my research and experimental findings to an outside audience.	**Presentation Preparation** • Students analyze their experimental data and determine their conclusion about the effectiveness of their containment measure. • Write their Action Report findings into a word document that includes data from both their experiments (how the disease is transferred and how to contain the spread) • Students prepare a presentation to share the highlights of their action plan and containment measure research to an outside audience.	Design Journal Design Team
19	**Communicate** • I can communicate my research and experimental findings to an outside audience.	**Present Findings and Action Plan** • If possible, secure an outside audience for students to present to. This could be health care professionals, teachers in the building, or students from another class. • Student teams present their findings. • Visitors can use these Presentation Comment Cards to give students feedback on their presentations. • You can use this formal presentation rubric for providing feedback and assessing their presentations.	Presentation Comment Cards Formal Presentation Rubric
20 – 21	**Project Wrap-up** • I can research a potential healthcare career and develop an infographic on that career.	**Celebrate Success!** – Students have worked hard, so do something that celebrates the hard work they have put into this project. This is also a good time to have students share verbally what they liked about this learning experience and what can be improved upon for next time. **Health Science Career Exploration** • Students were exposed to possible careers in the Advanced Manufacturing and Engineering pathways throughout this course. This is a chance for students to pick a career that they might be interested in learning more about.	https://explorehealthcareers.org/ https://www.mynextmove.org/ Storyboard organizer,

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports

		Career List (feel free to add others)
		• Students can choose one of the careers they researched during the Community Health Plan project.
		• Primary Care physician
		• Nurse
		• Surgeon
		• Physician's Assistant
		• Nurse Practitioner
		• Medical Researcher
		• Health Informatics
		• Dietician or Nutritionist
		• Or a health career from the website, https://explorehealthcareers.org/
		
		Introduce what information students will need to include in their infographic:
		• Must-haves:
		  ○ Title with the name of career (or job)
		  ○ Brief description
		  ○ Salary information
		  ○ Education needed
		  ○ Skills needed
		  ○ Exciting visuals
		  ○ Summary of what makes this an exciting career choice
		• Recommended-haves
		  ○ Job growth - will there be jobs in this career in the future?
		  ○ Career pathway - how do I grow in this career?
		
		Career Research
			Examples of career-related infographics.

Day	Learning Targets & Standards	Texts & Tasks	Supports
		• Have students visit https://www.mynextmove.org/ or https://explorehealthcareers.org/ to get basic information about their chosen career. • Have students search for at least one example job entry for their chosen career using a job search engine such as Indeed.com or similar. Have them note the salary information, skills and education needed, and generally, what would a person do in this job. • If they need more information, guide them to research using Google. **Career Infographic** • To plan their layout, students can plan their infographic using a Storyboard organizer, then can cut out the individual sections of the storyboard organizer and arrange them on a blank sheet of paper or in their design journal to get a general idea of how they want their infographic to look. • If they need ideas, here is a resource with examples of career-related infographics. Have students use an online tool such as Canva or MS Publisher or MS Sway. To help kids become familiar with the program, you may want to plan for some "play and exploration time" with the software before diving into producing their infographic.	

8
HS

SCSD Grade 8

Health Sciences

Unit 3: Artificial Intelligence in Health Care

CTE Content Focus: Heath Science

15 INSTRUCTIONAL DAYS

Unit Focus

Students will work to solve the problem of designing a pitch for a health-related app that uses machine learning that minimizes bias.

In this phase, students will be introduced to the problem, their know/need-to-know chart, conduct some initial reading and research on artificial intelligence, consider the app's end user, and develop a problem statement for the type of app they want to design.

Unit Anchor Charts/Instructional Tools

Lesson Plan: Launch
Project Scenario
Know/NTK chart
Lesson Plan: What is AI?
GIST Summary Organizer
How Does AI Work in Science Activity
Health Chalk Talk
Brainstorming
Question Formulation Technique
Internet Research
Inquiry Chart
Empathy Map Lesson Plan

Teaching Machines to Think Lesson
App Prototype Canvas
Machine Learning Bias Lesson
Artificial intelligence experiments exploration
Artificial Intelligence Data Lesson
Data Collection Student Handouts
App Prototype Canvas
Model Card Lesson
Model card graphic organizer
Presentation Feedback Cards
Presentation Rubric

Unit Text Set

What is AI Articles:

- How AI and Machine Learning Help Prevent Sports Injuries
- How artificial intelligence could turn thoughts into actions
- AI in Healthcare
- High-tech partnership refines artificial intelligence in healthcare

Machine Learning Bias Articles

- Article: Machine Learning Bias
- Article: How AI Can Remedy Racial Disparities in Healthcare
- Article: Algorithms Can Help Us Combat Racial Bias
- Article: AI and Health Equity

8
HS

Empathy Map		

Guiding Questions, Big Ideas, and Final Task

Driving Question: How can we design an AI system to improve a healthcare (health-related) process and minimize bias?

Big Ideas:

- Artificial Intelligence Systems are powerful tools for examining large sets of data and making decisions.
- Bias can creep into an AI system based on the data collected.

Final Task: Students will develop a pitch for a health-related app that utilizes artificial intelligence and minimizes bias

Culturally and Historically Responsive Framework

Identity: How will the unit help students to learn something about themselves and/or others? Students will be continuing their learning about how to collaborate with other students.

Skills: How will the unit build students' skills in the content area? Students collaboratively learn together by working through the design process. Students will research, read, discuss and problem-solve as part of the learning process.

Intellect: How will the unit build students' knowledge and mental powers? Students will build upon prior project work and develop their reading, research, discussion and design skills.

Criticality: How will the unit engage students' thinking about power and equity and the disruption of oppression? The heart of this project is

Essential Learning Concepts

Students will be able to…

- Define artificial intelligence (AI).
- Explain how AI is used in our daily lives.
- Explain how AI is used in the healthcare industry.
- Research potential health-related problems to solve in their local community.
- Understand how individual needs are connected to the problem being solved.
- Develop a problem statement for a health-related problem
- Define machine learning.
- Compare and contrast different methods of teaching an app.
- Describe a process for how data is used to teach an app.
- Explore an example healthcare app and determine the bias within the system.
- Explain how artificial intelligence systems become biased as part of the machine learning process.
- Explain the problem with bias in health-related AI systems.

examining health-equity and how machine learning bias and negatively effect the lives of marginalized people. **Joy: How will the unit allow students to experience joy through their learning?** We will celebrate their hard work and thinking at the end of the project.	• Collect and analyze data through pattern recognition. • Graph data to analyze patterns. • Explore possible data sources for their AI system. • Brainstorming ideas for their app and steps to avoid bias in their app/solution • Narrow down design ideas to one workable solution. • Understand how model cards are used by the AI industry to communicate the design of their AI systems. • Determine what information will need to go into their model card to communicate their app idea. • Develop a polished visual of my app design. • Determine the data needed to teach your AI system. • Write a model card to communicate the design of your app. • Develop a pitch to communicate your design idea to an outside audience and describe how bias will be prevented in the app design. • Deliver a pitch of your design idea to an outside audience.
SEL Benchmarks	**Integrated Standards**
	• 7-8.IC.1 Compare and contrast tradeoffs associated with computing technologies that affect individuals and society. (machine learning bias) • 7-8.IC.3 Identify and discuss issues of ethics surrounding computing technologies and current events. (machine learning bias) • 7-8.IC.5 Analyze potential sources of bias that could be introduced to complex computer systems and the potential impact of these biases on individuals. (Machine Learning Bias) • 7-8.CT.10 Document the iterative design process of developing a computational artifact that incorporates user feedback and preferences. • 7-8.DL.2 Communicate and collaborate with others using a variety of digital tools to create and revise a collaborative product. • 7-8.NSD.1 Design a user interface for a computing technology that considers usability, accessibility, and desirability.

8
HS

AI in Health Care: Ask & Empathize Phase

Key Vocabulary		Oral Language	Writing
Artificial Intelligence Healthcare	**Health** Empathy Map	Team meetings Small group discussions	GIST Summary Chalk Talk Inquiry Chart Problem Statement

Teacher Preparation & Notes

This is a continuation of projects students experienced in the 7th-grade CTE curricula. Students were introduced to the design journal, team contract, and how to collaborate with each other. Consider how you want to re-introduce students to these concepts. Below are supports and tools used in the 7th-grade projects along with some new resources for team building.

- Design Journal – students are expected to keep a written design journal, typically in the form of a composition notebook.
  - Design Journal Instructions
  - Design Journal Checklist – Teacher version
  - Design Journal Checklist – Student version – can be printed, cut out, and pasted into their design journal
- Team Contract

Determine how you want students to collaborate. We recommend teams of 2 – 4 students. It is helpful to consider student strengths when developing teams such as organization, creativity, leadership, and research skills.

Students will need to access lessons through code.org. You may need to create an account, but it will be a free account as an instructor. You can access the materials through the following navigation tree: www.code.org > Teach at the top left > Full Course Catalog for High School (scroll down a little and on the right-hand side) > Explore the AI Module. We will be incorporating several lessons within this module throughout the project. Students will also need to create an account to access the materials. Contact your IT department to see if there will be any problems. Each student will need access to their computer.

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
1	Project Launch & Task Analysis	**Launch Lesson Plan** • **Goal**: To excite and introduce students to artificial intelligence through something they may have already heard about or experienced. • Lead students through the launch as outlined in this lesson plan. • Students will be exploring and creating AI-generated art to start them thinking about how AI has become an integrated part of our lives. **Task Analysis & K/NTK** • **Goal:** To introduce the problem, assign students to their design teams, and start capturing our knows and need-to-knows for this project. The Know/Need-to-Know (K/NTK) chart is a living document where students will track their learning throughout the project. • Introduce the main goals of the project: To create an app that will solve a health-related problem using AI and machine learning technology such as the one they just explored. • Give students the project scenario. • Have them individually read the scenario and highlight key facts they will need for this project. • Either give each student a copy of the Know/Need-To-Know chart or have them copy the chart into their design journals. • Teams will complete the K-NTK charts as a team, but everyone should write their information individually on their chart. • Student teams first complete the Know column, "What do you know that will be helpful in solving this problem?" First, start by sharing important facts from the project scenario. Then add in their own personal background knowledge about the topic.	Lesson Plan: Launch Know/NTK chart – what knowledge are students bringing into the project on AI? What questions do they have? Use these questions to determine if any further resources need to be provided.

Day	Learning Targets & Standards	Texts & Tasks	Supports
		• You may want to pause and have each student group share one thing on their KNOW column that gets collected on a class K/NTK Chart • Student teams then develop questions for their project, "What will you need to know to solve this project?" ○ If students struggle with developing questions, you can use a question chart to support them to develop questions (see optional lesson below) • Ask students to go through their questions and pick out the top three questions that will need to be answered right away. • Have each group share one question. If their top question was answered, they can share their 2nd most important questions, and so on. • After each group has shared one question, open it up for anyone to share questions relating to the project. • Ask students to write any questions they did not consider on their NTK chart. **Question Chart Activity** (Optional – for student teams who are struggling to develop questions on their NTK portion of the project) • Give each student group a question chart. • Have students brainstorm questions that relate to this project. The goal is for students to have at least one question in each box. • Then have them choose the most relevant questions for this project and put them in the NTK column. **Team Contracts**: Team contracts can help student groups consider how they will work together and give the teacher a starting point for helping groups work through issues that may arise.	

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
		• Introduce the concept of a team contract. • Give each team a copy of the team contract to complete. • Students will work within their team to write up the contract in how they will work together. In each section, ideas are provided, however, students can write on their own. • Students will submit their contracts for teacher approval then each student will sign them. • If possible, make copies of the contract so each student has a copy and the teacher keeps a copy. When there are issues, refer to the contract and help students work through their challenges based on what they decided they would do.	
2	Learning Targets • Define artificial intelligence (AI). • Explain how AI is used in our daily life. • Explain how AI is used in the healthcare industry. Key Questions • Develop a problem statement for a health-related problem. • What is Artificial intelligence? • How is artificial intelligence used in our	Lesson Plan: What is AI? – Students will develop a connected definition of Artificial Intelligence by reading and exploring various resources. • **Goal**: Students will read to develop a working definition of artificial intelligence and summarize how artificial intelligence is used in the healthcare industry. •	Lesson Plan: What is AI?

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
	daily lives? • How is artificial intelligence used in the healthcare industry?		
3	Learning Target • Research potential health-related problems to solve in their local community. Key Question • What is a health-related problem I can solve?	**Health Chalk Talk** (visit the link for more information on the "Chalk Talk" Protocol) • **Goal:** To engage students in thinking about all things related to health so they can brainstorm possible problems to solve. • Write the word health on two pieces of banner paper and hang it in the room or along the hallway where students can easily access it and write on it. • Divide the class in half and give them a marker or other writing utensil. Half the class will start at one banner, and the other at the other banner. • Ask students to silently write or draw anything that comes to mind when they think of "Health". They can write or draw anywhere on the banner. Encourage them to read or connect to what other students are saying. • After 5 minutes, ask students to switch banners. This time they need to add to what other students said on the chart or write about a topic that is not already up on the chart. • Lead a whole class discussion on themes that came up. (Examples include: fitness, food, doctors, diseases, etc). **Team Brainstorming** • In their design teams, considering all the different topics they came up with in the chalk talk activity, students brainstorm possible problems they would like to solve relating to health.	Chalk Talk – what do students know about health-related problems? Team problem idea for feedback and approval K/NTK Chart

Day	Learning Targets & Standards	Texts & Tasks	Supports

		• If they need some help, give them some examples such as:
		  ○ Front office triage
		  ○ Athlete training
		  ○ Nutrition
		  ○ Healthy Goals
		  ○ Mental health (Chatbot for advice)
		  ○ Behavioral Health (For example Diabetes - monitor blood sure and make decisions on diet)
		• After they have come up with at least 5 ideas (or more), have students rank them in order of excitement (what are they more passionate about solving, what are the least passionate about solving)
		• Ask students to choose one of their ideas they want to explore further.
		• Students share their idea with the class and submit it to the teacher for approval.
		
		Revisit K/NTK
		• Once their idea is approved by the teacher, students revisit their Know/NTK chart.
		• To their Know column students add:
		  ○ What new knowledge do we have about artificial intelligence? (Based on "What is AI" Lesson)
		  ○ What knowledge do we have about our chosen problem?
		• In their NTK Column students:
		  ○ Check off questions that have been answered.
		• Add new questions they will need to answer to better understand their problem?	

4	Learning Targets	**Refining Questions for Research**	K/NTK Chart

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
	• Research potential health-related problems to solve in their local community. • Understand the needs of a person who is connected to the problem being solved. Key Questions • Who experiences the problem I have? • What is more information I need to better understand this problem?	• Student teams discuss and determine who would be a possible end-user for their app or who generally encounters this problem. • Student teams look at the Need-to-Know (NTK) section of their K/NTK chart and highlight in one color the NTKs that relate to people. The goal here is to get students thinking about the people that relate to their chosen problem. • Using another color, student teams highlight NTK which helps to better understand the problem. Note: The next task assumes that students will need some time to refine the questions or NTKs before engaging in internet research. If they have some good questions, you can skip to the research section. **Preparing for Internet Research: Question Formulation Technique** • **Goal**: Students narrow down and refine their questions for internet research. • **Preparation**: Either chart paper with markers or post-it notes • Give students the QFT Focus Question, "What questions will we need to better understand our end-user or to better understand how the problem affects them?" • Have them brainstorm questions that will help them better understand the problem or how the problem affects them. Their NTKs from their K/NTK chart can be a starting point. • Sort the questions into open (illicit more thinking or may need multiple sources to answer) vs closed (short responses, or easily google-able) • Rewrite and add questions. Take a closed question and rewrite it to be an open question. Take an open question and write it as a closed question.	Questions from QFT Inquiry Chart Notes and Summaries

Day	Learning Targets & Standards	Texts & Tasks	Supports
		• Students take all their questions and sort them into questions that help understand the end-user and questions to help understand the problem. • Students narrow down the questions to the top 3 - 6 questions that will help them learn more about their end users' needs or the problem. • Optional: If students can interview a possible end-user, they can use the questions for the interview. It is recommended that one student ask the questions while another writes the responses. **Internet Research** • Within their team, each student takes on at least two questions to research, find answers and report back to the team. • Give each student a copy of the Inquiry Chart to capture their notes and summarize what they learned. • Students write their questions in the top row. As they find sources, they take notes in the spaces below the question. • Students write the URL of their source on the second page. • This can be posted in their design journals. • After researching on the internet, students write a summary of what they learned in the last row. • Student teams meet to share what they learned and add it to the Know column of their K/NTK Chart. • Alternatively: Students write a two-sentence summary of the most important information they learned about their end-user and problem and hand it into the teacher. •	
5	Learning Target	**Empathy Map Lesson Plan**	Completed Empathy Map

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports

	• Understand the needs of a person who is connected to the problem being solved.
	• Develop a problem statement for a health-related problem.
	
	Key Questions
	• How does my end-user experience the problem?
	• What might an end-user need from a solution to this problem?
	• What is the problem I am trying to solve?
	•
		• **Goal**: Students will analyze their research through an empathy map and develop criteria and constraints for their app.
		• Lead students through the Empathy Map Lesson. If they are already familiar with empathy mapping, skip to the "Explain" section where students use the empathy map to analyze their research.
		
		Defining their Problem
		• In student teams, students revisit their K/NTK Chart:
		  ○ Add new Knows
		  ○ Check-off answered questions or Need-To-Knows
		  ○ Add new questions or Need-To-Knows
		• Students develop a problem statement for their app. If needed, give them the following sentence prompt to help them frame their words, *"We are designing an app for <insert a description for who the app is for>. The app will solve the problem of <insert description of the problem>."*
		• Students turn in the problem statement for feedback and approval from the teacher.
			Problem Statement – is the problem doable? Does it show an understanding of the problem they need to solve?

8
HS

AI in Health Care: Imagine Phase

Key Vocabulary		Oral Language	Writing
Machine Learning Bias	Data Algorithm	Team meetings Small group discussions	App Prototype Canvas Design Journal

Teacher Preparation & Notes

Throughout the next few lessons, students will engage in a cycle of brainstorming ideas, learning more about AI, and adding to their brainstorms. Students will need encouragement to add to their ideas and not get stuck on their first idea. A Prototype Graphic Organizer has been provided for students to start capturing the look of their app or different screens of their app. You may want to have enough printed for students to use as needed and tape or glue it into their notebooks. It is also recommended that students have access to colored pencils or markers so they can get as creative as they want with their designs.

This phase is where students will use two lessons from code.org to learn more about machine learning and bias in medical systems. If you have not already set up accounts, you will need to provide time for your students to do so in class. You can access the materials through the following navigation tree: www.code.org > Teach at the top left > Full Course Catalog for High School (scroll down a little and on the right-hand side) > Explore the AI Module. Students will also need to create an account to access the materials.

Day	Learning Targets & Standards	Texts & Tasks	Supports
6 - 7	Learning Targets • Define machine learning. • Compare and contrast different methods of teaching an app. • Describe a process for how data is used to teach an app.	**Team Brainstorming Session 1** • **Goal**: Give students time to draw and write down initial ideas they currently have for or about their app. • Students meet in their design teams and brainstorm ideas for their app. This may take different forms depending on where the group is in their thinking. • Student groups who are wanting to plan what the app will look like or what elements they want in their app, can use this App Prototype Canvas.	Brainstorming notes and other design journal entries App Prototype Canvas Teaching Machines to Think Lesson

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
	• Apply their knowledge to brainstorming ideas for their app. Key Question • How do machines learn? • What are ideas that I have about my health-related app?	• Some student groups may prefer to write ideas in a list format in their design journals about what they want to include in their app. **Teaching Machines to Think Lesson Plan** • **Goal**: To develop an understanding of how machines learn about how user input can guide the learning process. • Lead students through the Teaching Machines to Think Lesson. **Team Brainstorming Session 2** • After learning about how machines learn, students return to their brainstorming ideas and add, "What are things our app will need to learn? What data or information might we need to teach our machine?" • Use the App Prototype Canvas as needed to help students visualize their design ideas.	
7 – 8	Learning Targets • Explore an example healthcare app and determine the bias within the system. • Explain how artificial intelligence systems become biased as part of the machine learning process. • Explain the problem with bias in health-related AI systems. • Apply their	**Machine Learning Bias Lesson Plan** • **Goal**: To understand how artificial intelligence systems become biased and develop an understanding of the bigger problem of bias in current healthcare systems. • Lead students through the Machine Learning Bias Lesson. **Artificial Intelligence Experiments Exploration** • **Goal:** At this point, students have explored some AI apps but still may lack some experience. This is meant to give them some fun after deep conversations while building their experience with AI apps that are out there and what they can do. • Note: Most of these apps are not health-related but will be interesting for students to play and allow them to discover what	Machine Learning Bias Lesson Brainstorming notes and other design journal entries App Prototype Canvas

Day	Learning Targets & Standards	Texts & Tasks	Supports

	knowledge to brainstorming ideas for their app.
	
	Key Questions
	• How do artificial intelligence systems become biased?
	How can we minimize bias in our designs?
		might be possible with artificial intelligence.
		• Have students explore some current Artificial Intelligence Experiments. Encourage them to have fun with this.
		  ○ AI Experiments with Google
		  ○ 10 AI Experiments to Try Online
		• In their design journals, students pick 1 or 2 apps to record the following information:
		  ○ What problem do you think the app is trying to solve?
		  ○ What data do you think is the app using to learn?
		  ○ Is there a potential for bias? If so, what?
		• Students search online for health-related apps that solve the problem they are looking to solve. They each should find one example and take notes in their design journals about the app.
		
		Team Brainstorming Session 3
		• After learning about how bias can develop in an AI system and doing some exploration of apps online, students return to their brainstorming ideas and add, "What type of data might we need to collect? What are the possible scenarios of how people will use our app? What do we need to be careful of to represent all potential users?
		• Use the App Prototype Canvas as needed to help students visualize their design ideas.	

9 – 10	Learning Targets • Collect and analyze data through pattern recognition. • Graph data to	**Artificial Intelligence Data Lesson** • Goal: To give students a simulation of how AI systems use data through pattern recognition. Students will practice data collection and graphing skills. Students will then explore data banks that can be used for their AI systems. • Lead students through the Artificial Intelligence Data Lesson.	Artificial Intelligence Data Lesson App Prototype Canvas

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
	analyze patterns. • Explore possible data sources for their AI system. • Apply their knowledge to brainstorming ideas for their app. Key Questions: • How do artificial intelligence systems use data to learn? • What data might we need to collect to help our machine learn? • Where can we find potential data sources?	**Team Brainstorming Session 4** – Final Brainstorming session before moving on to the planning and creating phase. • After learning about data, students discuss and brainstorm what data they will need to collect to teach their app. • Students use the App Prototype Canvas to brainstorm how their app will look. **Revisit K/NTK Chart** • In student teams, students revisit their K/NTK Chart: ○ Add new Knows. ○ Check-off answered questions or Need-To-Knows. ○ Add new questions or Need-To-Knows.	Design journal notes

AI in Health Care: Plan, Create, Communicate Phase

Key Vocabulary		Oral Language	Writing
Model Cards		Team meetings Small group discussions	Design Journal Formal Presentations

		Formal presentation	Model Cards

Teacher Preparation & Notes

In this part of the process, student teams may be at different points and may have different needs or expectations for an end product. This project intends to give students experience with how designers develop artificial intelligence systems and use data to teach those systems. Moreover, the project helps students to develop an understanding of how bias can develop within a system and consider factors for how this can happen and what can be done to prevent it. It is not expected for students to code their apps, but rather for students to be able to communicate their ideas as though they are seeking the "go ahead" from a supervisor to develop the app further. At the beginning of this phase, students will be asked to develop a to-do list to finalize their app idea and develop their pitch along with who will be responsible for each item.

On the last day students will present their work to their classmates and, if possible, an outside audience. Possible outside audiences include students from other classrooms, other teachers or administrators in the building or district, or business or community partners. Since this is an IT-and health-related project, you might consider involving your IT department, or school nurse, or reaching out to a local high school that has an IT, Computer Science, or health career pathways and invite the teacher/s and a selection of students to come to your school as an audience.

Day	Learning Targets & Standards	Texts & Tasks	Supports
11	Learning Targets • Narrow down design ideas and develop one pathway forward to develop their app. Key Questions • What will our look and feel like? • What will our app do?	**Team Meeting – Finalize Ideas for their App** • **Goal**: This is a time for students to reconnect as a team, narrow ideas down to one direction, and start working on tasks to communicate their model. • Students meet in their design teams and review their brainstorming and notes from the prior phase. As a team, students need to plan a direction for their app. They will need to determine: ○ What will the app look like? This may include sketches of each page of the app. If they have several connecting pages, students will need to show the connections on their plans. They can use the App Prototype Canvas to show their final plans with arrows and notes showing the connection between pages.	Design Journal

Day	Learning Targets & Standards	Texts & Tasks	Supports
		○ What inputs will they need to get from the user? (i.e. What information will the app need to collect to provide the outcome). Students may want to discuss and plan using sticky notes so they can sort through their thinking. ○ What outputs will the app give to the user? (i.e., What will the app do? What decisions will the app need to perform with the data?). Students may want to discuss and plan using sticky notes so they can sort through their thinking. ○ Students take notes in their design journals. If they use sticky notes to write down and sort ideas. Their final ideas can be taped into their design journal. They will use this information in the lesson on Model Cards.	
12	Learning Targets • Understand how model cards are used by the AI industry to communicate the design of their AI systems. • Determine what information will need to go into their model card to communicate their App idea. Key Questions • How do model cards help to minimize bias?	**Model Card Lesson** • **Goal:** Model Cards are used in the AI industry to provide transparent communication on how their AI systems operate, what data they provided for machine learning, and how that data is used to improve processes?	Model Card Lesson Final Model Card

8
HS

Day	Learning Targets & Standards	Texts & Tasks	Supports
	What information will I need to put on my model card to explain my App Idea?		
13 - 14	Learning Targets • Develop a polished visual of my app design. • Determine the data needed to teach your AI system. • Write a model card to communicate the design of your app. • Develop a pitch to communicate your design idea to an outside audience. Key Questions • How can we best communicate our design ideas to an outside audience?	**Team Meeting & Worktime** • Once they have a consensus on what their app will be and will do, students need to determine who will lead each task to communicate their idea. ○ Task 1: Take the team's notes and produce a final, polished visual of the app to show in their presentation. This can be a digital drawing using a tool such as PPT, word, publisher, MS Paint, or a similar tool. If students are comfortable with coding or want to stretch themselves, they may want to try Code.org's App Lab. Once they log in and go to App Lab, students can click on "design" to access visual tools to create a rendering of their app. ○ Task 2: Explore data sites to see if there is data that can be used for their machine learning, or determine how and whom they will collect data from to minimize bias in their app. ○ Task 3: Complete the model card in paragraph format including any visuals about or relating to their App idea. Students may use this model card graphic organizer to help plan what information will need to be included in each section of their model card. Students can also add their section as needed to better explain their unique app and problem. ○ Task 3: Write the 3 – 5-minute pitch for their design idea and develop slides or other visuals for their final presentation. The presentation should include: a summary	Final App Visual (Task 1) Model Card (Task 2 & 3) Model card graphic organizer PPT slides or similar for the final Pitch (Task 4)

Day	Learning Targets & Standards	Texts & Tasks	Supports
		of the problem, their final solution, and an explanation of the data they will need to collect (Each person will still be responsible for presenting) • Remind students that while each student in a team is owning one part of the work, they are all expected to help each other. There may be a point when they are waiting on materials from one student before they can finish their task. In that case, they will need to check in with that student to see what they need and how they can help.	
15	Learning Targets • Deliver a pitch of your design idea to an outside audience. Key Questions How can we best communicate our design ideas to an outside audience?	**Presentation** • The original scenario has students presenting their app to the "Vice President of the software company" (you) and the local health community. Ideas for who this might be is included in the teacher's notes. • Presentation Comment Cards – these cards are provided to give informal feedback to students about their design and how they might improve their design ideas should they move toward creating their app. These can be used by you and any visiting partners to provide feedback to students on their design ideas. • You may also use this presentation rubric to provide more formal feedback to students on their presentation skills. **Celebration** • Students have worked hard, so do something that celebrates the hard work they have put into this project. This is also a good time to have students share verbally what they liked about this learning experience and what can be improved upon for next time.	Presentation Comment Cards Presentation Rubric